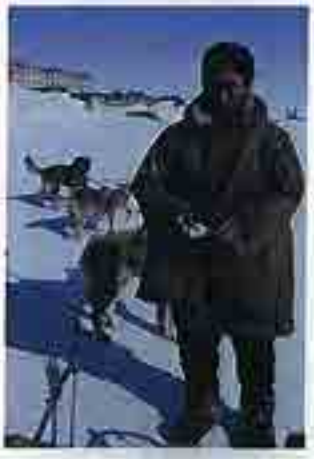
TRADITIONAL KNOWLEDGE OF CHUKOTKA NATIVE PEOPLES REGARDING POLAR BEAR HABITAT USE



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FINAL REPORT

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To the memory of the hunters who shared their knowledge with the authors within the project "Collection of Traditional Knowledge of Chukotka Native Peoples Regarding Polar Bear Habitat Use" and passed away since the project was launched in 1999. These are Piotr Typykhkak from Sireniki, Nikolai Kutylin from New Chaplino, Sergei Kachak, Aleksandr Klimakov and Oleg Nitourgin from Uelen, Rodion Vykvyrosgin from Nutepelmen and Yuri Kotgyrgyn from Konergino.

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INTRODUCTION

All along the history of biological and ecological research of the Arctic the knowledge of indigenous peoples that lived on this territory since time immemorial has been used in a limited and a non-systematic way. Considerable native peoples' knowledge of the surrounding world was not used although their subsistence lifestyle has always been closely linked to the wildlife. The first efforts to systematize the traditional knowledge of the Chukotka and Alaska native peoples about some kinds of animals, vitally important for the economy of traditional communities were not taken until the last decade (Huntington, Mymrin, 1996; Mymrin, 1999). In 1994 within the framework of development of the Environmental Strategy of Protection of Polar Bear Habitat in Alaska the US Fish and Wildlife Service (USFWS) conducted collection of data on polar bear habitat. For the first time hunters from 12 Alaska villages were interviewed (Kalxdorff, 1997).

In 1999 a similar project was launched in Chukotka by the Chukotka Association of Traditional Marine Mammal Hunters (ChAZTO) in cooperation with the Alaska Nanuuq Commission. The project was funded by the US National Park Service. The main goal of the project was to collect data on the use of Chukotka coastal areas by polar bears. The project was focused on location of the areas of den concentrations, feeding grounds and identification of the character of bear seasonal movements. The research goals were extended at the course of the project but this report will give a mere description of polar bear habitat in Chukotka that was provided by the residents of the native coastal villages.

MATERIAL AND METHODS

The research was based on person-to-person conversations with the most experienced hunters and elders of the native villages located within the polar bear habitat territory in Chukotka.

1. Organization of data collection

The work was organized in the following way. The ChAZTO Polar Bear Commission hired project coordinators in the Chaunsky, Shmidtovsky, Iultinsky, Chukotsky and Providensky Raions (districts) (Fig.1). The coordinators had to select and interview the most experienced and knowledgeable hunters and elders in all villages of the raion. Then the results of the interviews and coordinators' reports were given to the technical and scientific advisors of the project. Under different reasons coordinators did not start the work in the Shmidtovsky and Chaunsky raions and that is why project manager and scientific advisor had to take interviews themselves. The preliminary analysis of the interviews collected in the beginning of 2002 revealed the necessity to repeat the work in the Shmidtovsky and Chukotsky raions. The results of the first interviews were hard to interpret because the coordinator chose a wrong methodical approach. Moreover, no interviews were taken in 3 villages of these raions. For this reason in 2002 the scientific advisor and coordinator in the Iultinsky raion took new interviews in these raions and also worked in those 3 villages that were not included in the research area before.

The first three interviews were taken in New Chaplino (Providensky raion) between April 26 and May 3, 1999. This questioning was conducted by Susanne Kalxdorff (USFWS) with participation of Charlie Johnson (Alaska Nanuuq Commission), Vladimir Etylin, Project Director, and Ivan Tanko, Raion Coordinator. The interviewing had a character of presenting the methods of collection and mapping of information to the Russian project participants. The consequent stages of the project field work are given in the Table 1.

In April 2001 the information collected so far (the maps and the questionnaires) in the villages of Iultinsky and, partly, Chukotsky raions was given to the scientific advisor for digitizing. These data as well as those collected in the summer 2001 in the Chaunsky raion were converted to the digital format toward October of the same year but later lost due to the hard disk damage. Between December 2001 and February 2003 the scientific advisor had been restoring the information and digitizing the data from the Chukotsky and Shmidtovsky raions. At the same time the data collected in the Providensky raion and the new material from the Iultinsky raion were being processed. All field information was provided by the raion coordinators.

The new interviews and the research in 3 villages of the Shmidtovsky and Chukotsky raions have been conducted between July 25 and September 20, 2002 (Table 1). Between October 2002 and February 2003 digitizing and preliminary analysis of all collected information had been finalized. The results of this analysis were presented in the reports prepared for the meeting of the Alaska Nanuuq Commission in Nome, Alaska, USA, on December 17-19, 2002 (Kochnev et al., 2002 a,b).

The progress reports on the project were regularly presented at the annual Beringia Days conferences in Anchorage, Alaska, USA, by Ch.Johnson, V.Etylin and V.Kavry and at the Alaska Nanuuq Commission meeting in Anchorage in February 2002 by A.Kochnev, V.Kavry, I.Tanko and G.Inankeuyas. A.Kochnev also presented the preliminary project results at the Chukotka Heritage conference (Anadyr, Chukotka, Russia, February 11-17, 2003) and the meeting between the ChAZTO Polar Bear Commission and the Alaska Nanuuq Commission (Anadyr, Chukotka, Russia, May 26-28, 2003). An update on the project (Kochnev, 2003) was

published in the Marine Mammal Commission newsletter. An article with analysis of some of the materials collected at the course of the project was given to publication (Kochnev et al., in publication).

In 2002 two posters on the project were issued in Russian and English.

2. Methods of interviewing, information recording and mapping

At first the interviewers followed the Alaskan interview pattern (Kalxdorff, 1997) filling in 4 different forms. The first form contained general information about the respondent and his answers to a number of additional questions (Appendix 1), three other forms were made for the information on dens, feeding and seasonal migrations (Appendices 2-4). At the same time the respondent was proposed to indicate the location of dens, migration routes and feeding grounds on the transparencies laid over the field map. The respondents used markers of different colors depending on the season of the observation. The dens were indicated by dots, movements – by arrows, the feeding grounds were delineated as closed lines. Blue color was used to indicate winter and fall observations; red color was used for spring and summer observations.

Along with the questioning by the method of S. Kalxdorff, the hunters were also proposed to fill in the questionnaires drafted by V.Etylin, ChAZTO Executive Secretary. They focused on traditions of polar bear hunt and use of the hunt products (Appendix 5). Besides, V.Etylin made a plan of the annual report of raion coordinators (Appendix 6). These two methodic tools were used for questioning of hunters in 1999-2000.

To map dens, movements and feeding grounds, the researchers used the method proposed by S. Kalxdorff with some changes. The maps of the Geodesy and Cartography Office scaled 1:200 000 were used as topographical basis. We chose four colors to indicate the seasons:

- Blue for winter
- Green for spring
- Red for summer
- Violet for fall

If the respondent could not identify the season or the coordinator did not specify it, we used black color.

Mapping of dens. In most of the cases den locations were indicated by little circles, each of them corresponding with a single den observation. If the respondent said that every year between 4 and 8 dens are observed on such-and-such coastal area and in 1997 he sighted 7 dens, then 7 circles were placed on the map with an inscription "4 to 8 dens annually" Sometimes a respondent had a difficulty to recall a specific den observation but he could delineate the borders of the area where dens occur regularly. In such case this part of the map was shaded. Shading was also used when the respondent did not sight any dens but assumed their occurrence on the basis of his fall observations of digging activity of bears in some area. The color of every circle or shaded area corresponded with the season of the observation.

Mapping of movements. Migration routes of polar bear were designated as arrows. Usually at the interviews the respondent reported on both specific sighting of bears that moved this or that way ("In June 1982 I saw a bear going northward in about 20 km to the west from the Kamak Bay", as well as general information on regular migration routes of bears in the described area ("The mass migration of bears by land usually takes place in November/December. They move from the abandoned village of Dezhniovo along the ridge of mountains to the Vetgyvayam river and by this river to the mouth of the Chegitun river"). These two different types of information were designated, where possible, as the lines of different thickness: the thinner arrows were used for detailed observations, thicker ones – for

more general information. The color of arrows showed the season when bears' movements were observed. If the respondent reported that some route was used in different seasons, several arrows of respective color were placed on the map (i.e., if bears follow the same route in fall, winter and spring, it was delineated by three arrows – the violet, the blue and the green ones).

Unfortunately, both coordinators and respondents often attached the wrong meaning to the word "migration". For them this term signified, primarily, the movements of bears by land. Meanwhile, their migration by sea ice often was not mentioned at the interviews. In many cases the mistake was corrected at the second interview. However, in a number of interviews, especially those taken in the Providensky raion, this tendency remained.

Mapping of feeding grounds. Usually the respondents reported on the specific observations of bears using one or another source of food and indicated the location at the map. To map them, we placed a sign referring to the type of feeding. The differentiation by the type of feeding was the following:

- feeding on carcasses of stranded cetaceans;
- feeding on hunted or crushed walruses on their coastal breeding grounds;
- feeding on carcasses of pinnipeds (walruses and seals) stranded outside their rookeries;
- hunting pinnipeds (walruses and seals) in water and on sea ice (observations of unsuccessful hunts refer here);
- stealing bait from the fur animal traps;
- feeding on dumps, breaking into food storages and ice boxes, eating up butcher waste and other forms of freeloader feeding;
- cases of bear cannibalism;
- feeding on sea birds and their eggs;

Every type of feeding corresponded with a sign (Appendix 8). The color of the sign was defined by a season where an observation was made. In some cases the respondents did not mention the type of food. These data were designated as squares. As for the bears' hunt on pinnipeds on ice, the information was divided into two types: some respondents reported on a specific case of seal hunting and feeding on fresh meat, the others delimited a water area where bears hunting pinnipeds were sighted different seasons. In the first case every feeding or hunt was marked by a triangle. In the other case the area was delineated as a closed line with triangles inside it.

3. Materials

The area of research and the respondents. In general within the project period 53 people from 20 Chukotka native villages were interviewed (Fig. 2,3). All villages except Amguema are located on the sea coast. There was no questioning in the villages of three Chukotka raions: Anadyrsky, Beringovsky and Bilibinsky. The first two raions were not included in the interview area because polar bear occur there occasionally. The coastal part of the Bilibinsky raion is located in the area of a regular distribution of polar bears but at present all villages are situated in the internal part of this raion. Only when the field work on material collection was over, we came to know that the inhabitants of the village of Ostrovnoye of Bilibinsky raion have a hunting base in the area of the deserted village of Krestovoye and constantly observe polar bears in the region between the Big Baranov Cape and the Rauchua River mouth in the East Siberian Sea. This information was not included in our project. We also did not interview the inhabitants of the village of Ushakovskoye on the Wrangel Island as this island for a long time

(since the beginning of 1960-s) was a model territory for regular research and monitoring of polar bear. There are only few native inhabitants left there and they are all research assistants of the state reserve. Their knowledge is not different from the information already published in the scientific literature. Thus, the information we collected covers polar bear habitats of the coastal zone of the East Siberian, Chukchi and Bering Seas from the Rauchua river mouth to the Krest Bay in the Gulf of Anadyr and those of the continental part of the central and eastern Chukotka excluding the areas of the Wrangel and Gerald Islands (Fig.8).

The information we collected over the project area was not similarly comprehensive in the different regions. The most detailed information is referred to the coastal part between the village of Sireniki in the eastern part of the Gulf of Anadyr and the Amguema River mouth in the Chukchi Sea. Very scarce information was collected in the western part of the Gulf of Anadyr as well as in the Chukchi and East Siberian Seas westward from the Amguema River mouth to the Shalaurov Island. The reasons are the following:

1. Different population density (in eastern parts the number and density of coastal native villages is twice as high as in the west of Chukotka).
2. Traditionally the coastal marine mammal hunt was not well developed in the west of the Chukotsky raion and on the coast of the East Siberian Sea. The native population of these regions was engaged primarily in reindeer herding, actively harvesting marine mammals only in the periods of summer migration of reindeer herds to the coast. Some families that lived on the coast were into fur trade but in the 1970s Russian industrial field workers came and made a strong competition to the native hunters, gradually forcing them out of the trade. Thus, up to the moment of our research in the villages of western Chukotka there were very few indigenous inhabitants with the necessary hunting experience and sufficient knowledge on polar bear and its habitat. To make a clear picture, we also had to interview Russian hunters in two villages (Yanranai and Billings).
3. In two remote villages of the Providensky raion (Enmelen and Nunligran) the raion coordinators interviewed only one person in the each (Fig.4). Both respondents had always been reindeer herders and had few observations on the coast. Despite the large number of marine hunters, they have not been interviewed.

The respondents represent the ethnic groups in the same proportion as Chukotka hunters do (Fig. 5). Two Russian hunters that were questioned in western villages had been hunting in those areas for as long as 30 years. They inherited considerable traditional knowledge on the natural characteristics of their hunting grounds because from the beginning they were learning from the native hunters. Their information is consistent with the goals and objectives of the project.

The respondents in majority are active hunters (54.7%). To get the information covering the largest possible period of time, we tried to interview more elders and retired people. We interviewed 8 retired elders and only three of them do not practice amateur hunt because of their state of health (Fig. 6). The rest of the elders still fish and catch small pinnipeds with nets. Many of them become mentors for the young hunters going out to sea with them. We referred these active elders to the category "retired hunter". The second largest group of respondents was the one of reindeer herders (28.3%). As it is known, nomadic reindeer herding has been the traditional subsistence activity for the large part of the Chukotka native population for many centuries. The reindeers are pastured in the continental regions throughout the year, for that reason reindeer herders shared little information on sea areas and coastal territories. However, reindeer herders, who lead nomadic life, shared interesting information on their observations of polar bear far from the sea coast. We divided reindeer herders into 2 interview categories: those

who regularly pastured reindeers ("reindeer herders") and those who had changed reindeer herding to hunting and vice versa ("hunters/reindeer herders"). Moreover, to make a full picture, we interviewed one elder woman who was born in a reindeer herders' stand and had been a hunters' spouse for a long time (referred to the "housewife" category).

All respondents were divided into three age categories (Fig. 7). The first category included those who, being an adult, witnessed a period where polar bear harvest was officially allowed in the USSR (Years of birth: 1915-1940). The second category referred to those who witnessed this period in the childhood and early youth (Years of birth: 1941-1956). The third category consisted of the respondents who were born after introduction of prohibition on polar bear harvest (Years of birth: 1957-1974). The majority of the working hunters belong to the third category.

Principles of digitizing and data analysis. From the beginning we planned to introduce all information collected at the process of mapping into the GIS data base with the help of the corresponding software (ArcView or other programs) but absence of a large-scale map of Chukotka created in the vector graphics and suitable for GIS development did not allow us to do it. We used the available software.

As a basis for computer mapping we took a raster map of the world from the Microsoft Enkarta World Atlas 2000. The maximum map scale in this program is 1:250 000 (2.5 km in 1 cm, or 1.5525 miles in 0.39 inches) although such a scale reduces the quality of the picture. The research territory was divided into 33 areas of the same size (Fig. 8). For each area we created three separate raster files in the BMP format. In the first file we saved locations of dens, in the second – the movements and in the third – the feeding areas and types of food. The methods of mapping (colors and shapes of the signs) corresponded to those that were used at the interviews. The maps of each section unite all information provided by all respondents regardless of the location of their villages, i.e. if hunters from different villages reported on their observations of, for example, dens located in the same section, their data were saved in one file. Vice versa, if the information provided by one hunter referred to different areas, the data were placed on different corresponding maps. For example, if the respondent reported on any bears' movements within the large area covering several areas, these movements were designated as arrows in different files.

One more map scaled 1:1 000 000 (10 km in 1 cm) contained bears' movements in the depth of the continental part of Chukotka (area 34 on the Fig. 8). Mostly it displays the information provided by reindeer herders of the Iultinsky Raion. The arrows in the continental part of the map were located in the following way: a raion coordinator marked all sightings of bears by the respondents as dots on the map and then, as the directions of bears' movements were always the same, connected the dots and made the lines that indicated the migration routes. The movements in the coastal part of this map copy those that were indicated on the map scaled 1:250 000.

The oral information provided by the respondents was digitized as text files in the RTF format. Each text file contains information provided by one respondent. Three more text files consist of the technical reports of raion coordinators (Appendices 9-11).

We did not make any attempts to conduct a quantitative analysis of the data collected at the course of the project and in this report we only make a review of seasonal dynamics of polar bear habitat in Chukotka according to three principal parameters:

- Spatial distribution of dens
- Main migration routes and directions
- Feeding areas and types of food

To determine the time period, within which the information covering a certain section was collected, we used the date of the earliest observation reported by one of the respondents and the date of the last interview that provided information on that area. If the majority of the information was general in character (e.g. if it revealed certain patterns of bears' movements or den arrangements) and was based on the respondent's experience, we identified the year, when the oldest of the respondents started hunting regularly, as the bottom line of this time period. All geographical names in the report are consistent with those on the map issues by the Geodesy and Cartography Office under the USSR Council of Ministers (published in 1982).

Information collected on another subjects (methods of hunt, use of products, management proposals etc.) (Appendix 7) is more or less represented only in the interviews taken by the project scientific advisor in the Chaunsky and the Chukotsky Raions as well as in several interviews from the Shmidtovsky and the Iultinsky Raions, where V.Kavry worked. As they do not give the general overview of the knowledge and ideas of native peoples of Chukotka, we did not include them in the present report. These data will be analyzed together with the new information that will be collected in the future researches. This is an example of analysis of the contemporary use of traditional ceremonies and beliefs related to polar bear (Appendix 12).

RESULTS

This is a review of seasonal dynamics of polar bear habitat in the each of 34 areas in the territory from the Rauchua River mouth in the East Siberian Sea to the Krest Bay of the Anadyr Gulf of the Bering Sea according to the information provided by 53 inhabitants of 20 native villages. The numbering of raions corresponds to that on the Fig. 8.

1. KONERGINO

The area is named after the village of Konergino situated on the eastern coast of the Krest Bay and it includes the northern part of the Krest Bay from the Primychnoye Lake on the western coast and Myskypilgyn River mouth on the eastern coast (from the south) to the narrow bays of Kengynin and Etelkuyim in the north of the bay (Fig. 9). The information was provided by 2 hunters from the village of Uelkal and 1 hunter, 1 hunter-reindeer herder from Konergino who shared their observations of polar bear made between 1959 and 2001.

Hunters have never seen dens in that area and have not heard about them from their fellow-villagers.

Fall

The bears occur rarely. There is one observation of a middle-sized animal that came along the sea coast from the north-west to the place of walrus butchering in the Konergino surroundings. There were no sightings of feeding.

Winter

All along the winter bears are also rare. The first occurrences of the animals in the area start in the end of February. The bears move northward. According to hunters, ice always moves in the village area and occurrence of bears on the coast depends on the ice movement. Usually the ice is driven to the coast by the south and east winds and that's when the bears appear. Sometimes this appearance is not massive in character. As old hunters relate, in some cases they had to remove the polar fox traps because the bears were breaking and trampling them down. There were no observations of feeding except for an attempt of a bear to break into the meat ice house in Konergino in February 1989.

Spring

According to hunters, the fist half of March is the time when bears migrate to the north and the north-east. From the end of February to the middle of March up to 60-70 animals of different sex and age occur. In April the number of bears declines but even then hunters observe up to 30-40 usually large animals. In May there are less bears and they differ in size again. Hunters consider that at the end of spring one can observe up to 20 bears.

The bears move mainly along the ice of the Krest Bay and enter the bays of Echkachek, Kengynin, Etelkuyim. They often appear in the Pomorekynigvyn Bay, from where they move northward crossing the piece of land protruding to the sea on the western end of which Konergino is situated. In one case they sighted a female bear of unknown age with two cubs, which moved northward in 18 km from the sea nearby the Vytgyrgytgyn Lake.

Bears feeding in spring were observed only in two cases when they were eating up a ringed seal near cracks in the northern part of the Krest Bay. Both observations were referred to April.

Summer

In June and July polar bears are not observed. They occur from time to time in August. These are single animals that move along the coast. They were sighted around Konergino and Erulia Spit when they approached people butchering walruses. Being scared off, they entered sea and swam away northward. There were no observations of feeding except for a bear's attempt to break into the meat ice house in Konergino in August 1985 or 1987.

2. UELKAL

The area named after Uelkal located on the similarly named cape on the western side of the narrow entrance to the Krest Bay and includes the southern part of the Krest Bay and its entrance from the Cape Kamenisty and the western part of the Kosa Meeskyn Island in the south to the Vaamchergyrgyn Lagoon and the Ytvergyrgyn Bay in the north (Fig. 10). The information was provided by two hunters from Uelkal and 1 hunter from Konergino who shared their observations of polar bears made between 1977 and 2000.

Hunters have never seen dens in this area and have not heard of them from the villagers.

Fall

The bears are relatively rare. The most regular, almost annual, observations of bears happen on the Kosa Meeskyn Island in September. Up to four animals stay there all along the summer until September. Usually they are male bears of middle size, females with cubs are exceptionally rare. The western end of the Kosa Meeskyn Island is the place of the regular walruse haul outs and the hunting area of the Uelkal marine mammal hunters. Carcasses of walruses stricken by hunters and killed by killer-whales are often stranded on the haul out and the spit. Sometimes walruses run over each other in panic. These carcasses attract bears and it is their regular feeding place between July and September. In fall there are no considerable movements of bears. In the end of November 1997 hunters sighted a single middle-sized bear moving northward near the Koinygytgyn Lake 18 km from the sea coast.

Winter

All along the winter bears are rare too. Sometimes the first animals occur in the described area as early as in January. They move in an indefinite direction, perhaps, looking for food. In January 1999 a female bear with two one-year-old cubs moving to the southeast were sighted on the ice in 4 km off the coast on the beam of the Pynogytgykoimatgyn Lagoon. In January

1999 a single bear went northward across the Linglingneigytgyn Lake 10 km off the coast far into the country.

Relatively numerous occurrences of bears start in February. The bears move chaotically but moving in the northern direction prevails. In this period they stick to the areas of regular fractures and cracks where they hunt seals. Hunters did not mention any specific cases of feeding. In February 1997 or 1998 they observed 7 bears moving one after another northward in the sea in 6 km from the Cabin Nutepylmin. The distance between the animals was 50 m; there were no female bears with cubs among them.

Spring

The most frequent occurrences of bears happen in spring. According to one of the hunters, every year between the end of February and May he observes up to 20 bears and hears about occurrences of about 40 more animals from other hunters. In spring all bears move to the north and northeast. The bears move often along the ice of the Krest Bay (in its central part, in 6 to 8 km from the end of the Kosa Meeskyn Island, in the Pomorenygvyn Bay, in the area of Cape Anniualkal) but sometimes also in the depth of the continent (in the area of the Tundra Mountain in 14 km from the sea, in the area of the Koinygytgyn Lake). In May 2000 there was a sighting of a young male bear going northward across the Uelkal Lagoon.

Annually the bears are observed feeding in spring on the fast ice edge and drifting ice in in 6 to 8 km on the beam of the village of Uelkal. There they hunt seals near cracks and fractures; often two bears occur within one observation. Another area where a system of cracks and fractures develops is a territory that separates the shallow Pomorekenigvyn Bay from the central part of the Krest Bay. The bears are also observed every year feeding on seals and sometimes they hunt seals at their breathing holes. The third annual hunting and feeding ground is a water area between the end of the Kosa Meeskyn Island and Cabin Nutepylmyn.

Sometimes bears enter Uelkal in the search of food. They are attracted to the village by the meat ice houses. Thus, the bears were eating up the leftovers of walrus meat in March and April 1998 and one of them came to the village following the blood track of a seal brought from the ice edge by a hunter. This bear was harvested, it was a grown-up male. In general the most of the bears occurring in spring are identified by hunters as males.

Summer

In summer the bears are observed annually only on the Kosa Meeskyn Island where 1-2, sometimes up to 4 animals live around a walrus haul out between July and October. Their food is based on walrus carcasses that are cast all around the island coast. The bears occur mostly on the haul out but sometimes they appear as far as 35 km from the end of the island. The hunters always chase the bears away from the haul out and sometimes kill them. As they say, frightened bears jump into the water and always swim northward. From 1991 to 1998 not less than 3 bears were taken there and all of them were males. Usually hunters identify other animals that occurred there as males, too. They never observed bears trying to hunt walruses.

3. RETKYN

The area is named after the eastern end of the Kosa Meeskyn Island – Cape Retkyn and also after the similarly named spit that delimits the Rudder Bay in the south. It includes the Anadyr Gulf coast from the Kyrgatyr Tract in the west to the Retkyn Spit in the east (Fig. 11). The information was provided by 1 hunter-reindeer herder from the village of Konergino, 1 reindeer herder from the village of Enmelen and 1 reindeer herder from the village of Nunligran who shared their observations of polar bears made between 1964 and 2000.

The respondents have never seen dens in that area and have never heard of them from - the villagers. They also did not report on the bears feeding in that area.

Fall

In this period the bears' activities were not observed there.

Winter

The bears occur in the described area in February. They come from the sea ice in the mouth of the Ergyveem River and move northward along the left coast of the river. According to one of the reindeer herders, the bears follow this route every year.

Spring

The bears are observed mostly in March and April when they come from the sea ice to the mouths of the largest rivers in this area. They move northward along the river channels to the far inland where reindeer herders often see their recent footprints. According to them, the main routes are the following: 1) along the Ergyveem River to where they come in two ways – via the mouth of this river (as in winter) and the Neran Tract. The bears move along this river up until the Peppen Mountain where reindeer herders' camp is situated; 2) via the lakes of Utinoye and Mezhgornoye they again move to the Ergyveem River and from there northward.

Summer

The bears were not observed in summer.

4. ENMELEN

The area is named after the village of Enmelen situated on the coastal point the most advanced to the sea – Cape Bering. It includes the coastal zone of the Anadyr Bay from the Retkyn Spit in the northwest to Cape Ukilioon in the southeast and the adjacent piece of land (Fig. 12). The information was provided by 1 reindeer herder from the village of Enmelen and 1 reindeer herder from the village of Nunligran who shared their observations of polar bears made between 1983 and 2000.

Fall

In this period the polar bears' activities were not observed there.

Winter

The bears occur in the described area in February when they move from the sea ice to the mouth of the Enmylyin River and go up the river stream to the Kurupka head river from where they move further northward. According to reindeer herders, the bears follow this route every year. Another annual route starts in the area 7 (Nunligran) where bears move from the ice to the Achchen Lagoon and go up the lagoon ice to the mouth of the Granitnaya River that crosses the described area. Along this river channel the animals move up to the north and then, as in the first case, go to the Kurupka head river from where they move northward. The respondents did not sight any dens or cases of feeding.

Spring

The bears occur mostly in spring, especially in March and April. In this period the bears continue to move from the sea ice to the coast and along the channels of the largest rivers northward far into the country. The bears use the same routes as in February (they cross the

Kurupka head river). Moreover, the bears are often observed moving to the northeast along the channels of the rivers Nuniamovaam and Enmylyin. The bears reach Enmylyin going around the rocky Cape Bering from the southeastern side. Bears' footprints were tracked by reindeer herders along this river to the Big Tymkynei Mountain in April and May. One more regular route was tracked by one of the reindeer herders all across the Chukotka Peninsula. It starts in the area 7 (Nunligran) where the bears in March and April move from the sea to the coast in the Cape Shpanberg area and go along the eastern coast of the Achchen Lake to the north. The next part of this route crosses the described section: the bears move from the Achchen Lake along the Kuyulvayam River to the Kurupka River and then along the Chaatamie Tributary. The next part crosses the area 10 (Mechigmen), where the bears move from Chaatamie to the Eonaiveem River, follow it to the north then turn to the northeast and move along the Meingynveem River. The final part of this trip is in the area 11 (Eonai) where bears moving along the Meingynveem River come to the Red Yaranga Tract in the depth of the Mechigmen Inlet.

In spring there was only one observation of a den in the source of the Kurelvyn River on the slope of the Kuyulvyin Mountain (pass to the Kurupka River) in March 1983 (in 34 km from the sea coast). According to the observer, the den was not big – a bit more than 2 m in depth and it was obviously a shelter den.

Feeding of polar bears was observed only in the Neran Tract (The Rudder Bay), where they were feeding on the waste of marine mammal hunt in March-April 1999 and 2000.

Summer

The bears were not observed in the summer except for the case when in June 1998 a middle-sized bear entered a den on the southern slope of the Iurvyn Mountain in the Rudder Bay. As the den entrance was so large that the bear could walk into it, we can suppose that the animal was using a natural cave in the snow field for rest.

5. ERGYVEEM

The area includes the continental area of the middle stream of the Ergyveem River with the system of its tributaries. Some respondents supposed that polar bears use this area to move to the Arctic coast and the Bering Strait. However no one reported on specific movements or routes. For this reason the map of the area was not included in the report.

6. PYCHGYNMYGYTGYN

The area is named after the Pychgynmygytgyn Lake located in the western part of the area. Fishing camps of the villages of Nunligran and Enmelen are situated on the lake coast. The area is the place where reindeer herders' teams of the Providensky, Iultinsky and Chukotsky raions regularly pasture reindeers and it includes the continental part of the land from the junction point of the rivers Ergyveem and Kevianvyveem in the southwest and the middle stream of the Ulyuvveem River in the southeast to the middle stream of the Vykvyrkapvaam River in the northwest and the Kyvetkuyim Bay of the Koliuchin Inlet in the northeast (Fig. 13). The information was provided by 1 hunter from the village of Nunligran, 1 hunter-reindeer herder from the village of Inchoun and 1 hunter from the village of Neshkan who shared their observations of polar bears made between 1962 and 2002.

Fall

There were no fall observations of polar bears in the area.

Winter

Sometimes the animals wander into this area in December. In December 1962 on the coast of the Kevyanvyveem River under the Kevyan Mountain there was fish that the villagers stored in ice boxes. Three bears came there and spent two days feeding on that fish. One more observation is referred to February 1970. On the Pyrkalvevyvaam River coast the villagers fixed some reindeer carcasses on the "milkyn" pillars to store them for winter. A large male bear came, broke the meat storage down, nibbled at the carcasses and left. There is no information on where did the animal come from or to where did it go.

Spring

In March and April the bears going from the south to the sea coast are regularly observed in this area. The animals move to the ice of the Koliuchin Inlet. Sometimes the animals migrating by land eat up reindeer carcasses. Thus, in April 1968 in 1.5 km to the east from the Kevyan Mountain wolves tore several reindeers to pieces. The carcasses were eaten first by a single male bear and then by a female bear with cubs and they ate a whole carcass.

Bears migrating by land sometimes arrange temporary shelter dens. In March 1973 reindeer herders sighted such den on the steep bank of the Pyrkalvevyvaam River. A single animal passed two nights there.

Summer

In June 1982 one of the respondents saw a single bear moving to the northwest in 20 km to the west from the Koliuchin Inlet. There were no other summer observations of bears in this area.

7. NUNLIGRAN

The area is named after the village of Nunligran located on Cape Achchen, the coastal point most advanced to the sea. It includes the coastal zone of the Gulf of Anadyr from Cape Ukiylioon in the northwest to Cape Imtuk in the southeast and the adjacent part of the land (Fig. 14). One more village – Sireniki – is located in the southeastern part of the area, in the mouth of the Sirenik-Keyvuk River. The information was provided by 1 reindeer herder from the village of Nunligran as well as by 1 reindeer herder, 1 hunter and 1 retired hunter from the village of Sireniki who shared their observations of polar bears made between 1947 and 1999.

Fall

For the first time the bears occur in November in the area of the Imtuk Lagoon when they move to the coast from the sea ice and go along the lagoon to the Maingyvykvyn River **(area 8 Chaplino)** and further along the rivers and passes to the Penkigngei **(area 9 Yanrakynnot).** According to the respondent, he observes fall movements of bears regularly since 1947. The animals move both one at a time and in couples. On the spit of the Imtuk Lagoon three bears at a time were observed eating up polar fox bait (whale blubber). In the same period the bears were also regularly observed in the area of the village of Nunligran where they by two and three fed on the dump of whale skeletons, which were used as attraction for polar foxes.

Winter

In December the bears continue to feed on the waste of marine mammal hunt in the Nunligran area. They also appear near Sireniki and on the spit of the Kuyimkai Lagoon where they feed on polar fox bait. The areas, where fur animal traps are usually installed, also attract

bears in January and in one case a bear tore a trapped polar fox to pieces. Some of the bears that come to the villages are very skinny.

The number of bears occurring on the coast and migrating by land to the north and the northeast increases in winter. According to one of the respondents, the male bears usually move to the north first and the female bears with cubs occur later. The bears come out to the shore in the mouths of all large rivers and lagoons of the coast. One of these regular routes (The Achchen Lagoon – the Granitnaya River – the Kurupka River) is described in **"Area 4 Enmelen. Winter".** The bears continue to use the fall route "the Imtuk Lagoon – the Maingyvykvyn River – the Penkigngei Bay". In December and January 1982-1983 a mass movement of bears was observed (there were 5-6 animals at a time) from the mouth up the Sineveem River. The bears reached the Vsadnik Bay in the northern part of the Provideniya Bay **(area 8 Chaplino),** and from there they went to the Penkigngei Bay **(area 9 Yarakynnot).** One more regular route goes from the mouth up the Kurupka River and a part of bears turn to the northeast following the Uskatvaam Tributary. Those bears that move from the coast along the channel of the Liuveem River also reach Kurupka. Every year the bears move northward following the channel of the Sirenik-Keivuk River going around the village of Sireniki from the northwest.

Dens are sighted in the described area only in December-January and these sightings are not regular. Two dens were observed in the surrounding of the Imtuk Lagoon, one was in the channel of the Kurupka River in 1.5 km from the mouth, one more was located in the mouth of the Sineveem River. In three cases the dens were used by single bears.

Spring

In spring the bears continue to come out from the sea ice to the coast and move along the channels of the largest rivers northward far into the country. They use the same routes as in fall and winter (the Imtuk Lagoon – the Maingyvykvyn River – Penkigngei; the Achchen Lagoon – the Granitnaya River – the Kurupka River; along the Kurupka River via its mouth and the Liuveem River; along the Sirenik-Keivuk River). New routes occur as well. One of them is described in the part **"Area 4 Enmelen. Spring"** (Cape Shpanberg – the Achchen Lake – the Kuyulvayam River – the Kurupka River – the Chaatamye Tributory – the Eonaiveem River – the Meingynveem – the Mechigmen Bay). Another routes also lead to the Eonaiveem River **(Area 10 Mechigmen),** but the bears move there via the mouth of the Kurupka River.

The bears are not observed feeding in spring except for the case when a bear in March 1999 visited the village of Sireniki and spent two days feeding on waste near the polar fox breeding farm and stealing walrus meat from the meat ice boxes and meat ice houses.

Summer

The bears were not observed in summer

8. CHAPLINO

The area is named after Cape Chaplin and the village of New Chaplino that is located in the Tkachen Bay. It includes the coastal zone of the Gulf of Anadyr from Cape Imtuk in the northwest to Cape Chukotsky in the northeast and the southern part of the Chirikov Basin from Cape Chukotsky in the south to the Itygran Island and Cape Kuvyloluok in the north as well as the adjacent land (Fig. 5). A large urban-type community, the raion center of Provideniya, where no interviews were taken, is located in the center of this area, in the Komsomolskaya Bay (Emma). The information was provided by 1 reindeer herder, 1 hunter and 1 retired hunter from the village of Sireniki as well as by 2 hunters and 1 retired hunter from the village of New Chaplino who shared their observations of polar bears made between 1947 and 1999.

Fall

The first observations of bears in this area refer to the end of October and November. At this time they start feeding regularly on walrus carcasses stranded in the surroundings of Cape Chaplin. In November there was a sighting of a young bear eating up a stranded walrus on Cape Lesovsky. At the end of that month 4 bears at a time were hunting ringed and spotted seal on the new ice of the Tkachen Bay in 1997.

In November the bears start migrating to the northeast along the river channels. One of such regular routes that partly crosses the Chaplino area is described in the section **"Area 7 Nunligran. Fall"** (the Imtuk Lagoon – the Maingyvykvyn River – further along the rivers and passes to the Penkigngei Bay). Every November the bears are also observed coming out from the sea to Cape Lesovsky and moving along the rivers Annguvaam and Oziornaya to the Vsadnik Bay, from where they follow the Udobnya River to the Penkigngei **(area 9 Yanakynnot).**

Winter

The distinctive features of this area are narrow lengthy fiords and lagoons. Polar bears, when they migrate, prefer to pass fiords crossing only narrow bridges of land between the bays. The regular migrations of bear across the coastal water areas are observed all along the winter from the moment when the water freezes. The main route, according to hunters, leads from the sea side along the coast past the former stand of Chechen to the Tkachen Bay and then to the Karman Bay. From there the animals cross the land by the Tkachen Valley and come out to the Chechengkuyim Strait between the continent and the Itygran Island. As a secondary route, the hunters mention the way from the sea across the Kivak Lagoon to the north where the bears cross a narrow bridge of land and go via the Tkachen Bay either following the previous route (the Karman Bay – the Tkachen Valley – the Chechenkuyim Strait) or moving to the Skrytaya Bay and from there they get to the Rumilet Bay along the Nartovy Stream. The bears occur on these routes regularly all along the winter and the animals often move in groups. Every year the bears also move from Cape Skobelev across the ice of the Tkachen Bay along the eastern coast; from Cape Sivolkut they cross a large area via the Pestchany pass (Uktunyk) coming out to the sea in 3 km to the west from the Mertence Cape.

The bear also regularly move northward in the Cape Chaplin area crossing the Naivak Lake and then going to the Nunaeangan Island along the coastal fast ice. From there they move to the Cape Kygynin on the Arakamchechen Island **(area 9 Yanrakynnot).** From Cape Chaplin a part of the animals move along the coast to the northwest to the Ch'aechenkuyim Strait. In January there were sightings of bears moving on ice from the Provideniya Bay to the Vsadnik Bay and from there by the Udobnaya River to the Paenkigngei Bay that they crossed in the northeastern direction **(area 9 Yanrakynnot).**

In winter the bears continue to use the intracontinental routes that they already start following in fall (the Imtuk Lagoon – the Maingyvykvyn River – further along the river and passes to the Paenigngei Bay; Cape Lesovsky – Annguvaam and Oziornaya rivers – the Vsadnik Bay – the Udobnaya River – the Paenkigngei Bay). A part of the route described in the section **"Area 7 Nunligran. Winter"** (the Sineveem River – the Vsadnik Bay – the Paenkigngei Bay) is located in the Chaplino area.

The absolute majority of the bears are observed in winter moving northward. Only one hunter from the village of New Chaplino reported mainly on the winter movements of bears to the south. As he says, in December there were multiple observations of bears and their footprints leading along the Tkachen Valley Tract southward to the Tkachen Bay. There were also bears crossing the Itygram Island from the north to the south from Cape Konovak, going by a pass and down along the Napakutak River. In January the same hunter saw footprints of a

large bear leading from the Rumilet Bay by a pass southward to the Tkachen Bay and from there along the ice edge up to Cape Skobelev.

In winter, mainly in February, there are numerous observations of bears feeding on walrus carcasses stranded on the coast in fall. One of the most regular feeding grounds is the Cape Chaplin area. There are less sightings of bears feeding on the spit of the Kivak Lagoon, on the northern coast of the Itygran Island. In February 1999 the bears were feeding on the Nuneangan Island where a large walrus coastal haul out regularly appears. The bears were digging the walrus carcasses out of ice and snow. The walruses were probably killed during the breeding period.

In winter there were two observations of dens: in December or January 1971-1972 on the coastal steep in the Chechen Tract and in early 1990-s in February in 1 km to the west from Cape Obryvisty. There were no observations of bears or their footprints by the dens.

Spring

In March and April the bears use the majority of the routes they followed in fall and winter. They move by the fiords (along the coast by the Chechen Tract – the Tkachen Bay – the Karman Bay – the Tkachen Valley – the Ch'echengkuyim Strait; Cape Skobelev– the Tkachen Bay along the eastern coast), by the fast ice of the open coast (Cape Chaplin – the Nuneangan Island– the Arakamchechen Island). They cross vast territories by passes (Cape Sivolkut – the Pestchany Pass (Uktunyk) – Cape Mertence) and by river channels (the Imtuk Lagoon – the Maingyvykvyn River – the Paenkigngei Bay; Cape Lesovsky – Annguvaam and Oziornaya rivers – the Vsadnik Bay – the Udobnaya River –the Paenkigngei Bay). In spring the hunters notice one more annual route that ends in the Paenkigngei Bay located in the area 9 Yanrakynnot. The bears go from the mouth up along the Anytikomkivi River, come out to the Provideniya Bay and by the bay and then by the Vsadnik Bay they reach the Udobnaya River and by the river they get to the Paenkigngei Bay.

In this period the bears often visited the village of New Chaplino and once (on April 1, 1987) there were two animals of the same size in the village. One of them had a collar (it was probably a female bear with a two-year-old cub – AK). The female bear in the collar with the cub were also observed and even taken picture of at the end of May 1998 on Cape Stoletiya.

All bear movements are directed to the north and the northeast. Only one hunter from New Chaplino saw footprints of a large bear leading from the Rumilet Bay by a pass southward to the Tkachen Bay and from there by the ice edge up to Cape Skobelev. The footprints were observed in March. Bear migrations stop toward the end of April and in May they are already quite rare.

Feeding in March and April is observed mostly on the Nuneangan Island where bears stay for a long time feeding on walrus carcasses left after the breeding period.

In March 1997 and in March-April 1991 two dens were sighted. One of them was found on the rocky sea steep in the area of Cape Sivolkut and another one was located on a steep bank of the Anytikomkivo River. A single animal was resting in the second den.

Summer

In summer the bears are observed regularly although they are not numerous. One of the hunters reported that in June when the ice breaks up in the Tkachen Bay the bears migrate by land to the north from Cape Povorotny. In June 1985 on Cape Chaplin, that was still ice-covered, a bear was observed eating up a stranded walrus carcass. One of the New Chaplino hunters had several observations of dens in the area of Cape Sivolkut in June and July.

9. YANRAKYNNOT

The area is named after the village of Yanrakynnot that is located on the Seniavin Strait coast in the mouth of the Marich River. It includes a coastal zone of the Chirikov Basin from the Itygran Island in the south to the surroundings of the Zhuravlinoye Lake in 6 km to the south from Cape Nygligan in the north (Fig. 16) as well as the adjacent part of the land and the Arakamchechen Island. The information was provided by 1 reindeer herder, 1 hunter and 1 retired hunter from the village of Sireniki, 2 hunters and 1 retired hunter from the village of New Chaplino, 2 hunters-reindeer herders and 1 hunter from the village of Yanrakynnot and 2 hunters from the village of Lorino. They shared their observations of polar bears made between 1947 and 2002.

Fall

Usually in November and December, less in the end of October, ice fields are driven from the Bering Strait and polar bears occur with them. The ice often drifts southward and then the bears are observed moving to the north by land and ice of the frozen bays. In November the bears start coming to the Paenkingngei Bay, which is the last or the intermediate stage of the intracontinental routes that go from the areas **7 Nunligran** and **8 Chaplino** (the Imtuk Lagoon – the Maingyvykvyn River – further by rivers and passes to the Paenkingngei Bay; Cape Lesovsky – Annguvaam and Oziornaya rivers – the Vsadnik Bay – the Udobnaya River – the Paenkingngei Bay). In October and November the bears move to the mouth of the Ryrkaramken River from the Paenkingngei Bay. They go up the river channel and move to the Marich River. There are no fall observations of feeding or den arrangements in this area.

Winter

In winter the bears continue to use the fall intracontinental routes from the areas **7 Nunligran and 8 Chaplino** (the Imtuk Lagoon – the Maingyvykvyn River – further by rivers and passes to the Paenkingngei Bay; Cape Lesovsky – Annguvaam and Oziornaya rivers – the Vsadnik Bay – the Udobnaya River – the Paenkingngei Bay). The same bay is the end of the winter routes described above (the Sineveem River – the Vsadnik Bay - the Paenkingngei Bay; the Provideniya Bay – the Vsadnik Bay – the Udobnaya River - the Paenkingngei Bay). In December the bears were observed moving from the Paenkingngei Bay to the southeast via Cape Iranki to the Arakamchechen Island. Nevertheless, in winter the bears move mostly northward. According to hunters, almost all winter routes that the bears follow moving northward in the surroundings of the Tkachen Bay **(see Area 8 Chaplino)** cross in the Seniavin Strait, which toward that time is usually frozen. The bears move northward by the Seniavin Strait often passing by the Paenkingngei Bay where they hunt ringed seals. Thus, in December 1997, hunters observed two female bears with one-year-old-cubs, which had been there for a week successfully hunting ringed seals in the area of the Aler Bay in 500 m from the coast. Two years earlier, also in December, a bear ate hides with blubber of 4 ringed and 1 ribbon seals harvested by hunters and left near a hunting cabin in the mouth of the Ukaenin River (the northern coast of the Paenkingngei Bay).

The bears moving northward from Cape Chaplin to the Nunaeangan Island **(see Area 8 Chaplino)** approach Cape Kygynin on the Arakamchechen Island and from there they go to the northwest along the northern coast of the Arakamchechen Island. This is one of the main winter routes. The animals cross the Seniavin Strait and come out to the coastal ice in the area of the Alien Tract and in the mouth of the Kaergyveem River (Cape Ngaelvkytryn). From the Alien Tract the bears go by the coastal ice and along the coast northward to the Mechigmen Inlet **(Area 10 Mechigmen)** and then by the inlet ice to the north and the northwest **(Area 11 Yeonai).** In January and February 1996 and 1997 one to three animals were following this

route. The bears going from the Seniavin Bay use the same way. Moving along the coast, the bears often feed on carcasses of marine mammals stranded on the coast in fall. In February 1992 and 1994 there were observations of bears feeding on gray whale carcasses on the sea coast in the area of the Meinyren Lake (in 2 km to the south from the Zhuravlinoye Lake).

Bears moving to the north often use the intracontinental routes again. According to reindeer herders, every winter they observe bears or their footprints leading from the mouth of the Kaergyveem River via the pass to the Marich River, then along the Amkaylveem and Ivylygrun tributaries they go up and cross the Kyrgalven ridge. The next stage of the route lies in the **area 10 Mechigmen.** The bears reach the Kaenchinivaam tributary, follow it down to the Gaetliangen River, reach a lagoon with the same name and from there go by the Vaellavyveem River to the Utaatap River and further move northward.

In February 1977 one of the hunters found a den on the southern slope of a hill in the area of the mouths of Uskatvaam and Kaatap rivers. The den was deep in hard snow.

Spring

In March and April the bears use the majority of the routes they followed in fall and winter. The Paenkigngei Bay is still one of the key points where the bears' routes cross. The animals come there following the intracontinental routes from the northern coast of the Gulf of Anadyr from the areas **7 Nunligran and 8 Chaplino** (the Imtuk Lagoon – the Maingyvykvyn River - the Paenkigngei Bay; Cape Lesovsky – rivers Annguvaam and Oziornaya – the Vsadnik Bay – the Udobnaya River - the Paenkigngei Bay; the Anytikomkivo River – the Provideniya Bay – the Vsadnik Bay – the Udobnaya River - the Paenkigngei Bay). From there the bears go up the rivers Ryrkaramken and Ukaenin, move to the Marich River and further to the Amkaylveem tributary, follow it up and cross the Kyrgalven ridge and reach the Kaenchinivaam tributary **(area 10 Mechigmen).** As hunters say, in March-April these intracontinental routes are used mostly by female bears with cubs and less by single bears. Two dens were found in the same Paenkigngei Bay, on the coastal steeps in the area of Cape Naskonokytrykyr in March 1993 and March-April 1998. In both cases the sex and age status of the animals that used the dens was not identified.

In March and April the bears from the area of Cape Chaplin **(area 8 Chaplino)** continue moving northward following the same routes as in winter (Cape Chaplin – the Nunaeangan Island – Cape Kygynin– along the northern coast of the Arakamchechen Island – the Alien Tract – the Mechigmen Inlet). The bears from the Tkachen Bay surroundings **(area 8 Chaplino)** also move toward the Mechigmen Inlet by the Seniavin Strait.

There are almost no observations of feeding in spring. Hunters remembered only two cases of feeding and in the both bears "freeloaded". In 1969 2 middle-sized bears tore a lot of polar foxes to pieces on the fur breeding farm in the village of Yanrakynnot. Moreover, every year bears steal the harvested seals that the hunters leave on the fast ice edge in 3 km from the coast, in the area of the Alien Tract.

Summer

Some bears regularly stay in the area for the summer season. During July and August hunters had multiple observations of bears feeding on stranded carcasses of walruses and gray whales in the area of Cape Gusiny on the Arakamchechen Island and in one case (July 1970) 6 or 7 animals gathered around a whale carcass. In July 1995 a bear ate a lot of seal hides that the hunters buried in snow in the Alien Tract. There it nibbled at blubber of a bearded seal's hide and then, frightened by hunters, swam over to the Arakamchechen Island where it was sighted a week later while feeding on a walrus carcass in the area of Cape Goristy. In August 1998 three

bears came to the village of Yanrakynnot, from where they went along the coast to the southwest.

10. MECHIGMEN

The area is named after the Mechigmen Tract located on the spit that separates the Mechigmen Inlet from the waters of the Mechigmen Bay. It includes the coastal zone of the Mechigmen Bay from the Nygligan Cape in the south to the Raupelian tract in the north as well as the adjacent land (Fig. 17). The information was provided by 1 reindeer herder from the village of Nunligran, 1 hunter from the village of Sireniki, 2 hunters/reindeer herders and 1 hunter from the village of Yanrakynnot and 2 hunters and 1 retired from the village of Lorino that shared their observations of polar bears made between 1945 and 2002.

Fall

The occurrence of polar bears in the area depends on the time when the ice is driven from the Bering Strait by winds and currents. In the cold and icy years it can happen as early as in the second half of September. However, it is more usual for November and sometimes the ice does not come until December. A lot of bears appear in the area when the ice comes. Along the fall the ice rapidly drifts southward and the fast ice in that area does not shape until winter. With the east winds the ice is driven close to the coast together with the bears. In this case a lot of animals stay on the ice edge to hunt. Occurrence of bears on the coast is also related to the wind direction. If the wind is off-shore, the bears smell stranded carcasses of walruses and whales and swim to the coast. Since October they go from the coast southward along the Mechigmen spit. On September 20, 1999 in 1.5 km to the south from Cape Khaliuskin, there was a female bear on the sand spit feeding on a stranded walrus carcass. It often happens that the ice fields with bears are driven southward and after that the sea is clean until the next north wind. In those cases the bears start coming by land from the south but they are not numerous.

Since November many bears stay in the area for longer time to hunt seals on the drift ice edge. Every year in this period large shoals of the Arctic cod come to the Mechigmen Bay. The fish attract ringed and bearded seals. In their turn these seals fall prey to the polar bears. On the new ice the bears hunt ringed seals quite successfully, but they can also catch bearded seals. It is not often that they creep to the bearded seals by ice or watch for them by cracks. Usually they carefully swim up to a bearded seal lying on new ice and quickly jump up to the ice surface nearby the seal. If the hunt is successful, the bears do not come out to the coast to feed on carrion. If they cannot get a seal, they go to the coast seeking for walrus and whale carcasses. Sometimes the carcasses attract a lot of bears. As the hunters say, if the bears find a whale carcass, they would eat only blubber that they scratch off by claws.

Some of the animals, especially the full ones, move northward by land. When the coast line goes from the south northward (from Cape Khaliuskin to the strait of the Mechigmen Inlet) the bears move along the coast. When the coast line turns eastward they turn and move inland. In most cases the bears enter the Mechigmen Inlet and from there they go straightforward to the Koliuchinskaya Inlet (**areas 11 Yeonai and 16 – the Koliuchinskaya Inlet).** In this area they have no special route preferences, they move both along the river channels and over the hills.

Winter

In winter the ice continues to drift from the Bering Strait southward. In warmer years the ice and the bears occur only in December. The bears follow the same life as in fall. In this period many bears hunt on the fast ice edge that is not wide in this area and is only half a kilometer in the width. The hunting bears are observed mostly in the north from Cape Khaliuskin to the Raupelian Tract. In December 1997 a bear got a seal on a small fracture near the strait to the

Mechigmen Inlet. Ringed seal is a usual prey in this period. The bears catch it being on the watch by the cracks and seal's breathing holes. Sometimes the bears get bearded seals on the drift ice. If the hunt is not very successful, the bears come out to the shore to feed on walrus and whale carcasses. In February 1992 on Cape Khaliuskin there were observations of two large male bears eating up a walrus carcass. Whale and walrus carcasses are stranded mostly on the spit between Cape Khaliuskin and the strait to the Mechigmen Inlet where they are eaten by both bears and numerous polar foxes. The bears moving along the coast line can gather in large groups. Thus, in December 1995 one of the hunters observed 9 bears at a time moving by the spit southward to Cape Khaliuskin.

All along the winter a multitude of bears move across the area to the north and the northwest. In January and February the bears move from the **areas 8 Chaplino and 9 Yanrakynnot** along the fast ice edge from the Seniavin Strait and the Arakamchechen Island. Many of these bears pass by the Mechigmen Inlet moving to the middle of the inlet and to its northern coast and then toward the Koliuchin Inlet. The Lorino hunters report that since December and all along the winter they observe bear footprints and routes leading inland. Sometimes the distance between the recent footprints does not exceed 500 meters. Aside from the Mechigmen Inlet the bears move mostly from the strait of the Gaetliangen Lagoon to the northwest by the Puvtynei Mountain and from the western end of this lagoon along the Chiniveem River. As the hunters say, different animals except female bears with yearlings move inland. These are mostly single middle-sized animals and female bears with one-year-old and two-year-old cubs.

A number of intracontinental routes, which start on the **area 9 Yanrakynnot,** cross the area. The bears going from the Marich River cross the Kyrgalven ridge, reach the Kaenchinivaam tributary, go down to the Gaetliagan River, reach the lagoon with the same name and then move to the Utaatap River by the Vaellavyveem River and from there they go further northward.

Spring

In March and April the ice almost stops drifting from the north to the south. The sea behind the fast ice edge breaks up and freezes again depending upon the force and direction of winds and currents. A part of bears continues to hunt ringed and bearded seals on the drift ice edge. At this time the ringed seal starts pupping, but the bears almost do not hunt the pups. Only one hunter saw an undersnow seal den dug up by bear in March 1994, but there was no evidence of a successful hunt. However, polar foxes hunt the pups, digging up the seal dens.

The bears follow the same routes as in fall and winter but they occur more rarely inland. They continue to move from the southern areas (the Seniavin Strait and the Arakamchechen Island) along the fast ice edge northward up to the Mechigmen Inlet and then they go by the inlet into the country toward the Koliuchin Inlet. They also use the routes leading from the Marich River via the Kyrgalven ridge, the Kenchinivaam tributary and the Gaetliangen River. In spring there were observations of bears that cross large land territories going from the Gulf of Anadyr coast **(areas 4 Enmelen and 7 Nunligran).** There, they move from the Kurupka river by the Chaatamye tributary to the Yeonaiveem river and then by the Meingynveem river they reach the Mechigmen Inlet. In April 1997 there was a sighting of a female bear with two yearlings that were going from the Iytrygytgyn Lake along the Maingytopalvinveem river and moving to the Utaatap river northward. According to the respondent, this route is also used by bears every spring.

There were only 2 observations of dens in the Mechigmen area and in both cases they were located on a considerable distance (23 km) from the sea coast on the slope of the Vankarem Mountain by the right bank of the Utaatap river. The first den was observed in April 1994, the

second one – in the beginning of May 1996. The second den was inhabited by a female bear with one-year-old cub.

Summer

It is very rare that the bears occur in the described area in summer. The only observation refers to June 1998. The bear went by the ice of the Gaetliangen Lagoon along the coast from the mouth of the Unr'aeryveem river, came out to the fast ice and went northward.

11. YEONAI

The area is named after the Yeonai Lake located in its western part. It includes an intracontinental area from the Navrechgytgyn Lake in the southwest and the internal part of the Mechigmen Inlet in the southeast to the V'aivapaeren Mountain in the northwest and the Akkaigyb Mountain in the northeast (Fig. 18). The information was provided by 1 reindeer herder from the village of Nunligran as well as 2 hunters and 1 retired from the village of Lorino who shared their observations of polar bears made between 1945 and 2002. The area is used by polar bears only for the intracontinental movements. There were no observations of dens and the cases of feeding.

Fall

In fall (usually in November) the bears start moving along the ice of the Mechigmen Inlet to the middle of it and, from there, they follow a long land route to the southeastern part of the Koliuchin Inlet (the Yeonaiveemkuyim Bay). The length of the land route from one basin to another is more than 80 km. The bears have no specific route preferences; they go both along river channels and over hills. There are no other fall observations of movements in this area.

Winter

In winter the polar bears move mostly from the Mechigmen Inlet to the Koliuchin Inlet by land and also they come out to the northern coast of the Mechigmen Inlet and go along the coast first and then turn northward to the Kuuskyn river. The bears moving by land from the Gaetliangen Lagoon come to the internal part of the Mechigmen Inlet.

Spring

In March and April the bears follow the same routes as in fall and winter, but the movements are not so frequent. The bears from the **area 7 Nunligran** that moved from the Gulf of Anadyr coast following the route "the Kurupka river – the Chaatamye tributary – the Yeonaiveem river – the Meingynveem river – the Mechigmen Inlet" come to the Krasnaya Yaranga Tract near the western part of the Mechigmen Inlet.

Summer

There were no summer observations of bears in this area.

12. LAVRENTIYA

The area is named after a large bay located in its center and the village of Lavrentiya, the capital of the Chukotsky raion situated at the narrow entrance to the bay on Cape Khargilakh. In the southern part of the area on the Mechigmen Bay coast there is one more large settlement – the village of Lorino. The area includes the northern part of the Chirikov basin adjacent to the Bering Strait from the Raupelian Tract in the southwest to Cape Leimin in the northeast, as well as the adjacent land (Fig. 19). The information was provided by 2 hunters and 1 retired person

from the village of Lorino, 1 hunters from the village of Lavrentiya, 1 hunter from the village of Uelen and 1 retired hunter and 1 hunter from the village of Inchoun who shared their observations of polar bears made between 1945 and 2002.

Fall

Under regular conditions the polar bears are not observed here in September. Their mass occurrence, as in the previous case, is related to the arrival of ice that drifts from the Bering Strait driven by winds and currents. In the cold and icy years this can happen as early as in the second half of September, it happens more often in October, it is usual for November and sometimes ice does not come until December. All along the fall months the ice together with the bears are driven close to the coast. In this case a lot of animals stay on the fast ice edge to hunt. Sometimes they crowd within the limited water areas. Thus, in November 1984 one of the hunters counted 60 animals within the sight on the new ice. Every year in this period large shoals of the Arctic cod come to the entrance to the Lavrentiya Bay and, later, to the Mechigmen Bay. The fish attract a lot of ringed and bearded seals. In their turn the seals fall prey to the polar bears. The methods of seal hunting are similar to those described in the previous section. Almost every fall large coastal walrus haul outs appear on capes Nuniamo and Krigugon, but no one has even observed polar bears by the haul outs.

Occurrence of bears on the coast is related to the wind direction. If the wind blows off-shore, the bears smell stranded walrus and gray whale carcasses and swim to the coast. In October 2001 when hunters were butchering a bearded seal in the area of Cape Nuniamo, 6 bears at a time came by the sludge ice attracted by the smell of fresh meat. As hunters say, the bears eat stranded walrus and whale carcasses only if they fail in their seal hunt. There are more stranded whales than walruses. Usually they are stranded on the Raupelian tract, in the Lorino area and in the mouth of the Kukun' river. Sometimes whale carcasses attract a lot of bears.

Coming out to the coast, the bears move along the coast line southward by the spit that separates the Mechigmen Inlet from the sea, or they go far inland to the north and the northwest. It often happens that the ice fields together with the bears are driven to the south and then the sea is clean until the next north wind. In those cases the bears start coming by land from the south, but they are not numerous. Some of the animals, especially the full ones, move by land northward. Where the coast line goes from the south to the north (from Cape Nuniamo to the Puvtyn Bay) the bears go along the coast. When the coast line turns eastward they turn and go far inland. The bears go mostly northward along the Loraen river, cross the piece of land between the Mechigmen Bay and the Lavrentiya Bay by the Chulkheveem river, go by the fast ice to the middle of the Lavrentiya Bay and, from there, they go by land to the mouth of the Chegitun river **(area 14 Inchoun)**, by the Nunamavaam river to the western end of the Koolen' Lake and further northward, from the Puvtyn Bay toward the Inchoun Lagoon **(area 14 Inchoun)**. There were no observations of bears arranging dens in fall.

Winter

In winter the ice and the bears continue to drift from the Bering Strait southward. In warmer years the ice and thus the bears too appear only in December. When the sea freezes shortly and the ice stops coming from the north, which is a very rare case, the bears move southward by ice and they are considerably less numerous. The bears follow the same life as in fall. In this period many bears hunt ringed seal on the border between fast and drift ice. The fast ice becomes stable in January or February; it is not wider than 1.5 km. The bears feed on the edge all along the coast from the Mechigmen Bay to Cape Chini. They hunt ringed seals by cracks and breathing holes than seals make in the new ice. Successful bear hunters choose to eat only hide and blubber leaving meat and bones. If the hunt fails the bears come out to the shore to feed on

walrus and whale carcasses. Thus, in early December 2000, in 1 km to the southeast from the village of Lorino a female bear with 2 one-year-old cubs were eating blubber of a whale stranded in fall. In the same month not less than 2 bears were approaching a whale stranded on the spit in 6 km to the southwest from the village of Lorino, digging it out of the frozen sand, eating it and going further to the southwest from the village.

Sometimes the bears find whale carcasses frozen in the sea ice and eat them. Our respondents have heard about such cases although they did not witness them themselves.

In winter the villagers of Lorino and Lavrentiya also hunt ringed seals on the edge and often meet polar bears. The bears sometimes steal the bag when hunters leave it on the fast ice or by the coast to carry it to the village later. It happened in January 1996 in the area of the Kukun' river. A bear took only one of three seals and ate a hide with blubber. In February 2002 two animals ravaged a store of harvested seals on the new fast ice in the area of Cape Verkhovsky. All along the winter the bears visit the settlements where they are attracted by the waste of marine mammal hunt. The bears are mostly young single males, but female bears with one-year-old cubs also occur. They steal walrus meat from the meat ice boxes on the hunting ground of Akkani, eat up the leftovers of butchered whales in the berth area in the village of Lorino (a female bear with 2 one-year-old cubs in December 2001). The heads of the harvested gray whales are used as bait for polar foxes; they are delivered to the hunting grounds on the rivers Kukun' and Loraen by tractors. Feeding bears are also often observed there all along the winter.

In winters the number of feeding bears going to the north and the northwest by land increases. Hunters of Lorino and Lavrentiya think that these animals are full after a successful hunt on the ice. Hunters from northern villages (Inchoun, Uelen) say that the number of bears moving by land from the Bering Strait increases with south winds. The bears follow the same routes as in fall: by rivers Loraen and Chulkheveem, inside the Lavrentiya Bay and, from there, to the mouth of the Chegitun river, from the Puvtyn Bay toward the Inchoun Lagoon. A lot of bears move along the edge of coastal fast ice northward in the area between Cape Nuniamo and the Puvtyn Bay. The bears often arrange shallow temporary shelter dens. A large number of dens are regularly observed in the area of Cape Krigugon and in the area of coastal steeps between capes Nuniamo and Chini. At least one den is found every January or February on the steeps in the area of Cape Krikugon. In February 1984 5 dens at a time were sighted. In 1986 one of the hunters counted 6 to 8 dens on the coast between capes Nuniamo and Chini. In the end of February 2000 a den was found by Cape Sery with no footprints around and with a bear inside it. Hunters observed shallow dens along the bear migration routes in the intracontinental areas.

Spring

In March and April the ice drifting from the north to the south slows down and, after all, it stops. The ice behind the fast ice edge is not stable: depending on force and direction of winds and currents the cracks and fractures appear and freeze again. Polar bears keep hunting ringed seals on the drift ice edge. In this period the seals start pupping and the bears regularly dig up the undersnow seal dens on the still ice of the Lavrentiya Bay and catch seal pups. In the open Bering Strait area the bears prefer to hunt grown-up seals by cracks and breathing holes.

In the end of April and May bearded seals and walruses migrate northward to the Chukchi Sea via this area. In this period the bears hunt bearded seals more actively than they do in winter. Thus, in April 1978 a large male bear harvested a bearded seal on the new ice in 1.5 km to the east from the Krikugon Cape. Polar bears do not hunt walruses. The hunters heard that the bears attack walruses in the coastal waters of the Chukchi Sea, but they did not witness such cases in their raion. They explain this fact by abundance of more accessible food such as ringed

and bearded seals. In spring such pinnipeds as spotted and ribbon seals are observed on the broken ice, but no one has even seen polar bears feeding on these seals.

In spring the bears rarely feed on whale and walrus carcasses stranded on the coast in fall. Nevertheless, such observations are made occasionally. For example, in April 2000 the bears dug up a whale carcass that was lying frozen under a 3-meter layer of snow and ice in the mouth of the Rybnaya River. 10 bears gathered to feed on this carcass. The bears come to the villages and hunting cabins regularly, but less than in fall and winter. In March there was an observation of bears stealing walrus meat from the meat ice boxes on the hunting ground of Akkani. In April or May 2000 a bear was eating up old whale blubber by the berth in the village of Lavrentiya without paying attention at people and dogs. The animal was shot by the police. In May 1999 a small bear was feeding on walruses recently harvested and butchered on the Nuniamo hunting ground. In April of the same year there was an observation of a bear catching cormorants, sea-gulls and guillemots on a seashore bird colony of Cape Krigugon.

In spring the bears use the same land routes as in winter (along the rivers Loraen and Chulkheveem, inside the Lavrentiya Bay and from there to the mouth of the Chegitun River, from the Puvtyn Bay toward the Inchoun Lagoon), but considerably less often. Usually the bears migrating by land are seen in March and early April. Thus, in March 1997 there was an observation of a large bear moving northward along the channel of the Puvtynveem River in the area of the Kayutten Mountain. At that time numerous observations are made of bear footprints crossing the fast ice at the entrance to the Lavrentiya Bay between capes Krigugon and Nuniamo. In March and April a lot of animals wander over ice around Cape Krigugon without an obvious purpose, probably, seeking for food. Later in April and May, the bears actively move northward by ice hunting seals on the way. In the second half of May the ice starts drifting northward and the bears are driven away with the ice. At this time they are considerably less numerous than in winter. Sometimes bears going inland occur in May. According to the respondent from the village of Lavrentiya, in May 2002 two young bears came out from the sea in the area of Cape Seriy and went by the river channel to the northwest to the western end of the Koolen Lake. In the same period he saw 6 bears that came out to the shore to the north from Cape Chini, passed by the rivers to the eastern end of the Koolen Lake, then went by the lakeside to its western end and moved further northward.

Every spring there are observations of both shelter and maternity dens. On the southern coast of the Lavrentiya Bay and to the south from the entrance to the bay hunters observe more shelter dens (on the steeps to the northwest from Cape Verkhovsky and in the area of Cape Krigugon). Hunters from the village of Lorino have either never heard about maternity dens in their area, or describe them as a very rare phenomenon. Nevertheless, one of the hunters heard that there was a maternity den in the area of the Akkani hunting ground in April 1985. Another hunter (Lavrentiya) observed a female bear with a yearling near a den on the coast of the Bezymiannaya Bay in May 2000.

There were more maternity dens to the north from the Lavrentiya Bay. The majority of the dens observed by hunters had female bears with cubs around them, or there were their footprints. In most of the cases the dens were observed in the area from between capes Nuniamo and Chini where, as the respondents say, 6 to 8 dens were sighted regularly. In some cases they were located very close to each other. Thus, in the middle of March 1979, on the seashore near the Enmynai Mountain, there were three dens at a time and the traces showed that a female bear with yearlings were sliding down the slope to the sea from one of the dens. In May 2001 4 dens at a time were observed over the same place. According to a hunter, there were female bears and two cubs inside each of the dens. In April 2000 the same hunter on his way to Uelen saw 2 dens on the shore steeps of the southern coast of the Puvtyn Bay. Near one

of the dens there was a female bear with 1 cub, in the second one there was another female bear with two cubs.

The dens were also observed on a distance away from the sea coast. One of the respondents (Uelen) found an abandoned den in March 1994 in the channel of the Bolshoi Kaegliu in 2-3 km from the sea coast. In the middle of May 2002 another hunter (Lavrentiya) found an abandoned den on the southern slope of the Emtaetkon pass in 9 km from the Lavrentiya Bay. There were footprints of a female bears with two yearlings. The hunter followed the trace that was leading not toward the nearest sea coast, but to the northwest by the passes Emtaetkon, Erychvytoran and further northward to the source of the Endoiguyem river. The female bears with yearlings, probably, often move northward by land, as they did in May 2001. The footprints showed that female bears with cubs went from the dens via the western end of the Koolen Lake toward the village of Neshkan **(area 15 Enurmino)**. The same year in April a female with 2 cubs went by ice toward the middle of the Lavrentiya Bay and then they started going up along the Kuyimatavaam river, where they were hunted by reindeer herders.

Summer

In June the ice stops drifting northward to the Bering Strait. During this month the bears continue to drift northward with the ice, although they are not observed often. In the end of June the hunters from Lorino sometimes observe bears that come swimming from the south by the ice-free water. In June 1975 or 1976 such bear was harvested and there were sandhoppers parasitizing in his axillae. The hunters think that they occurred because the bear spent so much time in water.

13. UELEN

The area is named after the village of Uelen located on the southwestern end of the spit separating the Uelen Lagoon from the Chukchi Sea. It includes the waters of the northern part of the Bering Strait and the extreme southern part of the Chukchi Sea from Cape Leimin in the southwest (in the Bering Strait) to the northwestern end of the Uelen Lagoon in the Chukchi Sea as well as the adjacent part of land, the Ratmanoff Island (the Big Diomede) and the Kruzenschtern Island (the Little Diomede) (Fig. 20). The information was provided by 5 hunters from the village of Uelen, 1 retired hunter, 1 hunter/reindeer herder and 3 hunters from the village of Inchoun who shared their observations of polar bears made between 1986 to 2002. Unfortunately, these data do not cover the polar bear habitat around the Ratmanoff Island as we did not manage to find anybody who lived and hunted on that island until the village was liquidated in 1948.

Fall

Usually the large fields of permanent ice are first driven by winds and currents from the northwest in the end of September and early October. In the same time the coastal water area starts freezing. The polar bears occur in the area with the ice fields in the same period. They drift by ice to the Bering Strait all along October and most of them move in November. In the years when the sea freezes early and the rare ice remains by the coast of the Chukchi Sea all along the summer, the mass occurrence of bears can start already in the end of August or early September. In the last decade the years 1994 and 1998 were notable for the complicated ice conditions. Correspondingly, in 1994 the bears were observed in the area of the abandoned village of Dezhniovo (to the southwest from Cape Peek) already on September 10. Over half of a day, the hunters counted 12 bears within sight on the ice and the coast. Three large bears came out to the shore and started eating up a stranded gray whale. The rest of the bears were hunting on ice. The same day on the ice-floe in 200 m from the coast there was a sighting of a female

bear with 2 one-year-old cubs that were eating a harvested ribbon seal. In the early October of that year the same (or a similar) bear family was observed in the area of a walrus haul out to the north from Dezhniovo feeding on stranded walrus carcasses. In 1998 permanent ice from the northwest arrived toward the middle of August and the first bears occurred, too. Later in September, a female bear with two large yearlings were observed in the Tunytlen tract. They were eating up a stranded carcass of a whale killed by orcas.

All along the fall, the ice fields in the Bering Strait break apart, especially, as hunters say, under the south winds. When the ice breaks apart, the bears come out to the land and move to the north and the northwest passing by the ice of the Chukchi Sea. The bears go from the Lavrentiya and Puvtyn Bays (see previous section) from the Dezhniovo hunting ground and come to the Uelen and Inchoun Lagoons, to Cape Unikyn and by the Vaetgyvayam river they go to the mouth of the Chegitun river **(area 14 Inchoun).** The majority of the observations are made of those bears that move from the Dezhniovo hunting ground. Those animals go either by tundra to the Uelen village or pass to the southern part of the Uelen Lagoon, from where they come out to the sea or move to the Inchoun Lagoon **(area 14 Inchoun).** Among those animals there are a lot of female bears with cubs although there are male bears and young male bears, too. In 1998 the bear migration started early and the animals began moving by land from Dezhniovo in the end of August. Many animals were observed on these routes in September 1998.

Sometimes in October and November the ice is rare and is it a bad substratum for bears. Then they move from the northwest to Cape Dezhniov and turn southward to pass the Bering Strait by new sea ice crust and regelated sludge.

In fall polar bears' food mostly consists of stranded carcasses of gray whales and walruses. Often the bears eat up waste of marine mammal hunt or bait for the fur animals. One of the key areas of the regular harvest of pinnipeds is the surroundings of the abandoned village of Dezhniovo. The bears often feed in that place. In November 1986 a crowd of 12 bears was observed by the leftovers of the butchered whales. Those were mainly single bears. One of them was hunted and it was a male bear. In several days the hunters were checking their traps for polar foxes. The bait (walrus meat) was eaten up by many of the traps and there were torn polar foxes in the other traps. "The beneficiaries" were several female bears with cubs that did not approach the butchered whales preferring to "check" the traps. In November 2001 a female bears with one-year-old cubs were feeding on a whale that was used as bait for polar foxes on Cape Utiny in the Uelen Lagoon.

The bears were not observed arranging dens in fall.

Winter

In December ice and polar bears continue to drift from the north and the northwest to the Bering Strait. With the south winds, the bears come out to the coast and move by land using the same routes as in fall (from the bays of Lavrentiya and Puvtyn, from the Dezhniovo hunting ground to the Uelen and Inchoun Lagoons, Cape Unikyn and to the mouth of the Chegitun river). In December and January the bears keep feeding on the waste of marine mammal hunt and stranded carcasses of whales and walruses. When there is plenty of food, the bears can gather in large numbers. In 1986 there was an observation of about 15 animals feeding on a whale carcass in Dezhniovo. In December 1996 or 1997 the hunters counted 17 animals at the same place. The bears were feeding on the leftovers of butchered whales and walruses. About 30 bears gathered by a whale stranded in the Tunytlen tract. In Dezhniovo, as well as on the Uelen spit to the west of the village, there were several more observations of groups of 2 to 6 animals. One of the hunters tells that the majority of animals feeding on walrus and whale carcasses are female bears with one-year-old and two-year-old cubs.

In the second half of the winter the ice drifting slows down and stops at all. The bears move by land routes less often. In January and February there are more observations of large male bears and young single animals on the land. In this period the animals sometimes enter the village of Uelen. In February 1995 the villagers killed a large male bear going by land from the south toward the strait of the Uelen Lagoon. In February 1999 a grown-up male bear moving by land from the side of Dezhniovo approached a whale carcass in the center of village of Uelen. Roughly in the same time, there was a sighting of a young bear digging in the waste on the dump to the west from the village. Probably, this animal lived in the dump surroundings for quite a long time as it (or a similar animal) was seen there already on January 20. Sometimes the bears that pass by the village try to rob the meat storages. For example, in the winter of 1992 or 1992 a bear opened up an ice box and the villagers had to scare it off shooting in the air.

The hunters report nothing about bears hunting seals on the ice in winter. In January 1999 a middle-sized bear was observed in the area of Cape Kekurny over several days. It was feeding on the ice in 200-250 m from the coast. When the hunters approached the feeding spot, they saw that the bear was had been eating up a whale carcass frozen in the ice.

There were no observations of dens in winter.

Spring

In spring the bears rarely follow the land routes, although sometimes it happens. In this period single bears moving from the side of Dezhniovo and Cape Verbliuzhy or their footprints are observed. Usually in March and April the bears are sighted moving by ice from the Bering Strait to the Chukchi Sea around Cape Dezhniov. In March 1999 the hunters were harvesting seals in the surroundings of the Dezhniovo hunting ground. Over a week they have been observing bears moving by fast ice northward in 6 km off the coast. Twice there were female bears with cubs and once there was a grown-up male bear. The hunters tell that at the time of the spring migrations to the north they observe more single animals. Going out to the fast ice edge, the hunters often see bears on the drift ice that at that time is driven to the northwest. The intense bear movement by ice to the north and the northwest continues in April as well. In April 1998 the bears were going behind the fast ice edge northward by Dezhniovo. The bears going northward were also observed in the Chukchi Sea in April.

In March and April the bears often hunt seals in the water area across the village of Dezhniovo. Usually bears watch for seals by the breathing holes. In May, when seals were coming up to the ice surface by cracks and fractures in large numbers, there were no sightings of hunting bears. There were also no observations of bears digging up the undersnow seal dens and eating pups, although seals make dens in this area. Opposite Cape Kekurny, there was a sighting of a female bear with two two-year-old cubs hunting seal on the new ice. The female bear was sitting by the seal breathing hole and the cubs were a bit aside.

The majority of the den observations in this area are made in spring (mainly, in March-April). The dens are found on the coast steeps or in the river channels and on the hill slopes in no more than 6 km from the coast. The places ,where the dens are regularly sighted, are the area of coastal steeps between the capes Kekurny and Uigven, the steeps in 2-3 km to the west from Dezhniovo, the upper reaches of the Tariyaveem river, the coastal steeps between capes Peek and Dezhniov. The last area can be a territory of a considerable den concentration. Thus, in the early April (unfortunately, the year remained unknown) one of the hunters counted 6 dens at a time there. The hunters usually find and get female bears with yearlings in the dens or near them. That's why they assume that all dens in that area are maternity dens, although in some cases their observations probably refer to the shelter dens. For example, in the end of April 1992, one of the respondents found a blood-traced hole on the southeastern slope of the Kitulin

Mountain and a deeply frozen female bear with cubs, which probably had been there for a very long time. Nearby he found a den and saw a female bear with 2 cubs. The hunter decided that the female bear gave birth in the hole and later dug a den on the slope. Perhaps, it was an observation of a shelter den.

In May the bears occur quite rarely. The animals that were observed, went northward by ice. In early May 1987 a female bear with 2 cubs was crossing an ice-hole behind the fast ice opposite Cape Kekurny. One of the cubs was swimming away with the mother holding on her back and the second one stayed on the ice-hole edge screaming. Later the second cub was driven away with the ice.

Summer

In summer the bears are observed very rarely and only in those years when the drifting ice remains in the area. Sometimes the bears or traces of their stay are observed on ice when hunters go out to sea on whale boats. In June in the Dezhniovo area there is a mass moulting of ringed seals on the ice surface by breathing holes, cracks and fractures, but the bears were not seen hunting in this period. The observations of bears going by land from the south, the Dezhniovo area to the Chukchi Sea coast, were very rare.

In June there are regular sightings of thawing dens on the ice fields in the areas of capes Uigven and Peek.

In the second half of August the number of occurring bears is considerably large. This happens only in those years when the fields of permanent ice are driven from the north early, for example, as it was in August 1998. In such cases, as in fall, the bears are driven to the Bering Strait with the ice and from there they move by land to the Chukchi Sea coast. There were no observations of feeding in summer.

14. INCHOUN

The area is named after the village of Inchoun located on the southeastern end of the spit that separates the Inchoun Lagoon from the Chukchi Sea and adjoins Cape Ravukvun. It includes the waters of the southern part of the Chukchi Sea from the strait of the Uelen Lagoon in the southeast to the Tytylken Mountain in the northwest as well as the adjacent land (Fig. 21). The information was provided by 1 retired hunter, 1 hunter-reindeer herder and 3 hunters from the village of Inchoun as well as by 2 hunters from the village of Uelen and 1 hunter from the village of Lorino who shared their observations of polar bears made between 1962 and 2002.

Fall

The dynamics of ice conditions in the Inchoun area is in general similar to what we described in the previous section. In the end of September and early October the large fields of the permanent ice are first driven by winds and currents from the northwest. At the same time the coastal water area in the Chukchi Sea starts freezing. Polar bears occur in the area together with the ice fields in the same period. They drift on ice from the northwest toward the Bering Strait all along October and, mostly, in November. Thus, in November 2000 there was a large male bear on one of the ice-floes drifting to the southwest along the coast near the village of Inchoun. In the years when the sea freezes early, the mass occurrence of bears can happen as early as in the end of August or in the beginning of September, as it was in 1994 and 1998.

Moving to the southeast along the coastal water areas in fall, the bears regularly come out to the shore in the area of the Inin hill near the western end of the Inchoun Lagoon where whale and walrus carcasses are often stranded, and feed there. In general, in fall the bears' food in this

area consists mostly of stranded gray whale and walrus carcasses. The bears often eat up the waste of marine mammal hunt, trapping bait for fur animals and practically every kind of food they find. This is one of the most interesting observations:

"*That year the ice arrived in the end of October. In the middle of November 1979 Ritlyu, his wife and I came to the former village of Chegitun* (in the mouth of the Chegitun river – AK). *Before that he said that in fall a lot of bears occur there with ice and crowd there because, when the Enurmino villagers slaughter walruses, many walrus carcasses are brought to the mouth of the Chegitun river* (he is talking about the fall slaughter of walruses by the Enurmino villagers on the coastal haul out in the area of Cape Serdtze-Kamen – AK). *Almost every year gray whales killed by orcas are stranded there. They also attract bears. Ritlyu did not have a carabine, only a shot-gun. I had a carabine and that's why he called me because he knew that there must be a lot of bears now there. There was a wooden deck used as a butchering site on the coast. On the deck there were barrels with salted fish. Thirty and maybe even more (up to fifty) bears gathered there. They were feeding on stranded walruses, whales, they even ate salted fish. There were only bones left of some fish. We could hardly chase them out. Maybe they were hungry and maybe it was their mating time (is the bears mate in spring). The old man told me to shoot one for meat. I killed one and started aiming at another,r but the old man said it was enough. He was shooting his shot-gun in the air. The bear were running by circle like reindeers, we pushed* (chased them out – AK) *them to the sea and there they went to the ice fields. These were mainly large and middle-sized bears, I have not noticed any small ones. Among them there were female bears with large cubs of a size almost similar to theirs. Very few bears came on the next day.*"

All along the fall walrus and whale carcasses (and after the strong storms those of bearded and ringed seals) are stranded mostly on the coast along the spit from the village of Inchoun to Cape Unikyn. In November this area (on Cape Unikyn opposite the Tuniten Mountain, near the Inin hill, on the spit of the Inchoun Lagoon) regularly attracts groups (of up to 10) of feeding bears. Usually bears gather on the shore by the food source when the ice moves intensively. When the ice drifting slows down and the ice becomes more solid and firm, bears, as hunters say, move to the ice fields not even having finished eating a whale or a walrus carcass.

In the Uten Tract and on Cape Unikyn large walrus coastal breeding grounds occur between the middle of October and the middle of November. The walruses run over each other leaving a lot of carcasses behind (according to hunters, from 15 to 20 per season). Polar bear feed there in November too. According to some respondents, polar bears sometimes hunt walruses on that haul out, although no one reported on any specific case. The respondents give more specific information on brown bears, which feed on walrus and whale carcasses in September before entering a den. Many of the respondents observed gatherings of up to three to five animals that always scare away walruses and even hunt their pups on the haul out, if it starts shaping earlier than usual, i.e. in the end of September. According to one of the respondents, polar bears behave in a similar way, but later.

Polar bears are regularly observed hunting seals in the end of November, when the coastal fast ice starts shaping. As an illustration of polar bear's hunting methods we cite (with minimum corrections) one of the most interesting observations:

"*In fall when there is no snow on ice yet, little ice domes shape over seal breathing holes when the seals breathe. In the end of November 1979 a polar bear was sitting by a breathing hole across the mouth of the Chegitun river. He was sitting like a human with his forepaws apart. He kept his paws on the walls of the ice dome waiting for a seal. The elders say that a seal shows 5 times in the breathing hole. At the first time it puts out its nose, and then little by little toward the fifth time it shows up its head. That is when the bear catches it. The hunters shoot at the same moment. But before they scratch the ice on the dome with a knife so it*

becomes very thin. Then they put some snow on it again and start listening for the puffing of the seal. When the seal puffs for the fourth or the fifth time, they shoot through the dome."

All along fall in the area there are observations of bears that migrate by land from the Bering Strait to the Chukchi Sea coast when the ice fields break up there. As hunters say, the bears move by land mostly with the south winds. The bears migrate from the bays of Lavrentiya and Puvtyn **(area 12 Lavrentiya),** from the Dezhniovo hunting ground **(area 13 Uelen)** to the Inchoun Lagoon, Cape Unikyn and to the mouth of the Chegitun river. In the last case the bears move both from the Lavrentiya Bay and Dezhniovo along the Vaetgyvayam river parallel to the Chukchi Sea coast. In November 1979 one of the respondents went hunting to the Imlunen Lake. He told that the bears had many times visited the place where the bait for polar foxes was stored, on the way to the Vaetgyvayam river. In fall the bears of different sex and age are often observed in the area of the Inchoun Lagoon when they move by land from the side of Dezhniovo passing the mouth of the Uuch'ynveem river that flows into the Uelen Lagoon. According to the Inchoun villagers, the bears usually approach the village from the area of Cape Mainengytkyn, but following the smell they swim or cross the lagoon by ice going westward from the village. The mass migration of bears from the south in the area of the Inchoun Lagoon was observed between the end of August and November 1998. Up to three bears were sighted in one day on the coast of the Inchoun Lagoon when people were driving out to pick up salmonberries. The respondents say that the bears were easy to observe in the first half of fall because there was no snow yet and the animals stood out against a background of tundra and hills. The land migrations of bears in this area were observed in September 1993-1996 and in October 2000. Coming out to the Chukchi Sea coast, the majority of the bears move to the ice fields right away, but some of them stay to feed on walrus and whale carcasses in the area of Cape Unikyn and in other places, also visiting the village. On October 19, 1998 a large male bear approached Cape Mainengytkyn from the south in the early morning and spent two hours there feeding on a gray whale carcass. In the fall 1984 a polar bear that came from the south by land was trying to dig up a meat ice box in the village of Inchoun.

There were no observations of bears arranging dens in fall.

Winter

In December the ice and the bears continue drifting from the north and the northwest toward the Bering Strait. With the south winds the bears come out to the coast and move by the same routes as in fall (from the bays of Lavrentiya and Puvtyn, from the Dezhniovo hunting ground to the Inchoun Lagoon, Cape Unikyn and to the mouth of the Chegitun river). The land migration activity in December is comparable to that of the fall, but in January and February the bears move by land less often. In this period one of the respondents saw a bear in the middle of the Chegitun river near the R'evnei Mountain. In January 1997, there was a sighting of a large male moving toward the sea along the Chegitun river channel. All along the winter of 1979 the bears visited bait storage on the Imlunen Lake while moving to the Vaetgyvayam River.

In December and January the bears continue feeding on stranded whale and walrus carcasses gathering in large groups on the part of the coast from the Uten Tract to the village of Inchoun. In the second half of winter the bears visit the feeding grounds on the coast quite regularly, but one at a time, only sometimes gathering in small groups. In 1997 a whale carcass was lying since fall on the Inchoun spit to the west from the strait of the Inchoun Lagoon. All along January one of the hunters observed single bears feeding on land three times. As he says, it was always a single male bear and maybe it was the same one in all three cases. The hunters think that the phenomenon of bears feeding on coast on the old carcasses is linked to the particular ice conditions. They say that the bears go to the coast only if the sea does not break up and it thus becomes difficult to hunt seals. Feeding bears were observed in the area of the

Inin hill, opposite the Tuniten Mountain, in the area of the strait of the Inchoun Lagoon and on the western end of the village of Inchoun. In winter the bears are often observed feeding on walrus and whale carcasses on the coast from Cape Ravukvun to the Uelen Strait. Thus, in December 1999 a bear was feeding on a walrus carcass on the beach nearby Cape Inchoun. In February of the same year a female bear with a cub were feeding on a whale carcass to the south from Cape Irgutunken. In December of the same year there was an observation of a bear feeding on a walrus carcass in the mouth of the Chegitun River.

In December there are more observations of bear gatherings by the carcasses of walruses run over in the area of a regular coastal haul out in the Uten Tract and on Cape Unikyn. In this month up to 20 animals at a time were counted. According to hunters, large single animals prevail in such groups and there are no female bears with cubs among them. There are no such aggregations there in January or February. Thus, in February 1999 there were 4 middle-sized bears feeding on Cape Unikyn. Sometimes several carcasses also remain on the regular walrus haul out to the southeast from Cape Inchoun since fall. The bears are also observed feeding there as, for example, in December 1999.

In winter the bears often enter the village of Inchoun. In December or January 1981 a grown-up male bear approached people when they were taking walrus meat from the ice boxes. The peoples ran away to the fur breeding farm building and the bear started eating up the meat fighting off the dogs. Having had plenty, the animal went to the ice fields. In January 1996 a female bear came to the village and ate the dog food.

After the shore fast ice freezes, the bears move along its edge without an obvious purpose hunting ringed seal. In February 1998 a large male bear was going along the coast to the southeast opposite the Tuniten Hill. In December 1997 a bear went in the opposite direction, to the northwest. On the way it caught a seal by the breathing hole and started to eat it from the head turning the hide inside out. In December the hunters often find the carcasses of seals caught by bears on the fast ice edge opposite the village of Inchoun and in the area of the mouth of the Chegitun River. The respondents say that, when the bears are not too hungry, they choose to eat the upper layer of seal blubber turning the hide inside out. The skeleton and the meat are left to the polar foxes. In January and February the leftovers of the bear meals are not found often probably because the fast ice becomes wider and the bear hunting grounds move to the area of fractures far away from the shore. In this period the hunters go to the fast ice edge in 5 to 10 km from the shore to hunt seals. On the recently frozen fractures they see a lot of bear footprints and hiding places by the seal breathing holes. Sometimes the bears take the seal nets out of the breathing holes but the respondents did not see the bears taking the seals out of the nets.

In winter since December the dens are regularly observed in snow drifts on the steep banks from the mouth of the Chegitun River to the Inin hill and from Cape Ravukvun to Cape Irgutunken. There never were any sightings of dens in the continental parts of the area. As hunters say, every year over winter they find 1 to 3 dens from Cape Unikyn to the mouth of the Chegitun River. In the end of February 1987 a den outlet was seen 50 m above the sea level in 600-700 m to the west from the mouth of the Chegitun River. There were no animal footprints, which meant the bear had not yet walked out, or the footprints were covered by snow after a recent snow-storm. In January a den was sighted on the steep to the south from Cape Irnutunken. In winter the dens are mostly observed in the area of Cape Unikyn and the Uten Tract. The majority of the dens are probably the shelter ones. For example, one winter (the respondent found difficulty in recalling the year) in the Uten Tract there was an observation of a den with a female bear and one-year-old cubs in it. The female bear wore a radio collar. Twice the respondents reported on seeing maternity dens in winter. In one case the respondent said he saw footprints of a female bear with a little cub nearby a den in December 1984. The

respondent obviously confused the month of the observation. In another case a female bear with a yearling were harvested in den on the Inin hill in February 1998. This was probably an observation of a maternity den.

In December 2001 a den was found in 3 km from the coast opposite Cape Irgutunken. It was located in the snow drift among the ice-hummocks 2.5 m in altitude and it was a hole sized 1.5x2 m. There were footprints of a large single animal nearby. The den was discovered right after snow-storm. Perhaps this den was the bear's temporary shelter.

Spring

In spring the bears do not use the land routes often. Nevertheless, it happens. In March and April 1979 the bears visited the area of the Imlunen Lake while moving to the Vaetgyvayam River. In April 1988 a bear was going up along the river from the mouth of the Uuch'ynveem river, which flows into the Uelen Lagoon, northward (toward the Kychken Mountain and Cape Inchoun). In the same month the respondent and other Inchoun villagers saw several more bears on land. The animals that moved by land routes were single bears, there were female bears with cubs among them. In April 1998 there was an observation of a bear going from the Evenen hill toward Cape Unikyn northward.

There are many more observations of bears going by ice to the north and the northwest. In this period the ice also drifts northward. There are more male and single bears among the animals, the female bears with cubs are less seen. In March 1999 one of our respondents put a seal net in the ice fields opposite the village of Inchoun. He was chased by a female bear with 2 one-year-old cubs but, having noticed other hunters, the animals quit the pursuit and left.

In spring the bears are not observed hunting ringed seals in this area. The possible reason is that the wide stable fast ice shapes and that makes the bears move the drift ice to hunt and the evidence of these hunts does not fall within the hunters' sight. The bears coming out to the coast continue digging out of the snow and eating whale and walrus carcasses remaining in snow since fall. They do not gather in large groups, but when there is plenty of food, gatherings of up to 4 or 5 bears can occur. Such groups and single animals were seen nearby whale and walrus carcasses in the mouth of the Chegitun River, in the areas of the fall breeding grounds of walruses in the Uten Tract and on Cape Unikyn, in the area of the Inin Hill and on the spit of the Uelen Lagoon.

Every March and April the hunters observe several dens in the area. All mapped dens were located in the snow fields on the sea coastal steeps. No one has ever seen dens far away from the shore. As in winter, the most of the dens are found in the coastal areas between the mouth of the Chegitun river and the Inin hill and between capes Ravukvun and Irgutunken. Up to 2-3 dens are observed annually in the first area. The dens are not found every year in the second area, but sometimes several dens at a time are observed on a slope. Thus, in the end of April and early May 2002, the hunters found 3 dens in a snow field to the northwest from Cape Inchoun. There was a female bear with a cub in the first den. In the second one, which was in 50 m from the first den, there was a single female bear without cubs. The hunters also heard a bear hissing at dogs in the third den. The den with the female bear with the cub had branches and two cells. Thus, there were, as a minimum, one maternity and one temporary shelter den and one den of an unknown status in one snow field.

In the early May 1998, there was an observation of a female bear with two cubs by a den on the northeastern slope of the Inin hill.

The majority of the dens that are found in this area in spring are probably the maternity ones. At least, there were female bears with yearlings in almost all of them. In April 1986 in one kilometer to the southeast from Cape Inchoun a female bear was immobilized in the den

and its cub was taken to zoo by the employees of the Wrangel Island Reserve. Nevertheless, a part of the dens is probably used as shelter by the migrating bears. In addition to the abovedescribed case of taking the female bear with no cubs in den, in March or April 1997 an inhabited den was found on Cape Unikyn. Within a week it was empty and there were footprints of a single animal.

All along April the majority of bears leave the area and there are very few observations of bears in May.

Summer

In summer the bears are exceptionally rare and they are observed only in those years when drifting ice remains in the area. Once there was an observation of a bear going by land from the south in June when only very rare ice remained in the Chukchi Sea. In the year when the fields of permanent ice are driven early from the north, the bears appear in considerably large numbers as early as in the second half of August. In this case the bears are driven to the Bering Strait with the ice and from there they move by land to the Chukchi Sea coast. The bears going by land were often observed in August 1998 in the area of the Inchoun Lagoon. The respondents did not report on any cases of feeding in summer.

15. ENURMINO

The area is named after the village of Enurmino which is located in Naettaekaeniskyn Bay on a spit of land which separates the Aenurmikynmangkak lagoon from the Chukchi Sea. It includes coastal waters of the Chukchi Sea from the Tytyl'ken Mountain in the southeast to the entrance to the Naeskaenpil'gyn Lagoon in the northwest, and also the adjacent land (Fig. 22). There is one more village called Neshkan in the northwest of the area by the Naeskaenpil'gyn Lagoon. The information was provided by 1 hunter/reindeer herder from village of Inchoun, three hunters from village of Enurmino, one hunter/reindeer herder and two hunters from village of Neshkan who shared their observations of polar bears made between 1979 and 2002.

Fall

Sometimes the rare ice remains in the Enurmino area throughout summer. In this case the hunters regularly observe single bears on ice. The bears that occur in the period of marine mammal harvest in September move in different directions, often on drifting ice, and actively hunt ringed seals. In the beginning of September 2001, hunters found a carcass of a small bearded seal on the ice-floe with hide and blubber eaten up by bear.

If the ice moves away completely, the bears are not observed in September at all.

Nevertheless, irrespective of the presence of ice in the summer, the main occurrence of bears in this area begins when the sea freezes in October/November. Usually many bears appear here from the northwest together with fields of pack-ice. If freezing begins on open water bears actively move from the northwest to the southeast on new ice. Sometimes during this period hunters see many bears at the same time. In October 1997, one of our respondents counted more than 30 bears on the ice from Cape Naettaen. All the animals moved eastward. Other hunters counted a total of forty bears from one point.

In this period bears often come to the coast and then move eastward following the coastline, feeding on stranded walrus and whale carcasses on the way. These whale and walrus carcasses are frequently found on a spit of land between the villages Neshkan and Enurmino, in the area of Enmytagyn, on Capes Netten and Kittosetun, in Keniskin Bay, on Cape J'ajakyn, in the mouth of the Ikaljurynveem River and also on Cape Inkigur. Most of the stranded walruses are animals which have died of gunshot wounds. In October and November, groups of up to ten and

more bears gather to feed on walrus carcasses, while groups of more than 100 bears have been observed on whale carcasses. According to hunters, bears keep feeding on the whale carcass until it is completely eaten. In November 1989, twenty four bears gathered by a gray whale carcass in the area of Cape Netten. In October 1993, near Emelin tract, eighteen bears were feeding on a stranded beluga carcass and nearby there were 3 bears eating gray whale. Hunters then killed five bears within one day and stored the bear meat for winter.

The bears are observed mostly on land in the Keniskin Bay area. A regular walrus haul out forms here between the end of September and late October, where up to 300 carcasses of run over animals remain, and that is what the polar bears feed on. In the end of November 1991 or 1992 one of our respondents saw more than 6 bears feeding on walrus carcasses (about 20 animals) on a haul out between capes Kengumen and Sulyn. During the walrus breeding period none of the hunters observed bears actively hunting walruses, although there were numerous sightings of 2 to 3 brown bears spreading panic among walruses. The carcasses of run over walruses are stranded all along the coast between Cape Serdtse-Kamen' and Cape Inkigur after the storms. The carcasses of gray whales are often thrown out to the coast. In the fall of 1997, 11 polar bears were eating the carcass of a gray whale near the Keniskin Bay.

A small walrus haul out also regularly forms on the Idlidlja Island, but none of the hunters observed groups of polar bears there. In September and October 2001, twenty bears gathered on the island where they ransacked the ice boxes, where hunters had stored walrus meat since summer.

In November, as they move eastward along the coast, bears quite often enter the village of Neshkan. Usually they are observed in the area of the village dump or in the places where walruses and seals had been butchered. These animals are frightened off with gunshots and dogs, although sometimes they are killed. In the late fall bears also appear at hunting sites, where they try to break into meat storages or eat polar fox bait. In November 2001 at Cape Netten some bears broke into a beam, where "kymgyts" were stored, carried them away onto the ice and ate behind ice hummocks close to the coast. One of the respondents who hunted in the River Ngagteveem area between 1985 and 1995 informed us that every November bears ate up the bait prepared for polar foxes.

In November polar bears can be observed actively hunting ringed seals. The bears watch for seals near open water or areas covered with thin ice near the Idlidlja Island.

Occasionally in November, bears are seen heading southward overland (on the river Ngagteveem and through the Neskenpil'gyn Lagoon). As hunters think, these are the bears, which earlier come to the Bering Strait by ice and by that time go to the Chukchi Sea. Both single bears as well as females with cubs follow these land routes.

There are no observations of bears moving to the northwest by ice.. None of the respondents reported on den arrangements in this period.

Winter

Since December, bears wander by the sea ice in different directions, although most of them head eastward. By this time stable fast ice shapes in the coastal water areas. There are less observations of bears by the coast, they start actively hunting ringed seals on the drift ice edge.. All along the winter, hunters also go out to hunt ringed seals to the ice edge and regularly see bears there. According to our respondents, bears are observed more often when strong winds break the sea ice up. In the Neshkan area the fast ice usually gets 25-30 km in width by the end of February. Here hunters observe the footworn bear tracks by the leads. They say, bears usually hunt ringed seals, waiting for them at the breathing holes, which they make in the thin ice of the recently frozen leads. Widespread is the hunt by the new leads, where there is always

a lot of seals. According to hunters' observations, when a bear spots a seal, it often goes to the next lead 100-150 meters away, breaks up the thin ice and dives into the water, then swims under the ice to the seal and kills it. Bears hunt ringed seals all along the fast ice edge, and do not have any favorite hunting places. Bears hunting by breathing holes have been observed on the Idlidlja Island and on the other side of Cape Ninveren.

In January - February a small ice dome forms over a seal breathing hole. Hunters say, that when a bear finds it, it scratches it to make it thinner. If there is a snow, a bear would cover the dome with a thin snow layer and then wait for a seal. When the seal shows up and the bear hears it breathing , it kills the seal by punching through the dome of ice with its paw. Some of our respondents believe that the bear grabs the head or the neck of the seal with the claw, killing the victim in a moment and pulling it out onto the ice surface in one movement. As hunters say, they find pieces of seal hide and cube- and plate-like pieces of blubber in the bear stomachs.

In February seals make a burrow in the snow covering their breathing hole. Some hunters have observed bears trying to hunt seals lying in their burrows. One of our respondents told us he saw two bears going by ice, one of them behind, while the other started moving very cautiously, stopping all the time. Then suddenly it punched the snow with its paw and pulled out a seal. Another hunter observed a bear jumping high on the ice opposite the village of Neshkan in February 1994 or 1995, trying to punch the snow with its paws, but it caught nothing.

If the sea does not break up for a long time, bears concentrate their hunting near rocky capes where there are more ringed seals by that period. In these conditions many bears also come to the coast looking for the remains of whale and walrus carcasses. In December it is often possible to see groups of twenty or more bears in the area of the walrus haul out in Keniskin Bay. In January, the bears are observed there considerably less often there. Sometimes in the winter, bears were observed digging walrus carcasses out of snow and ice on the spit of land between the village of Neshkan and the Memin Izba.

Not all the bears can survive by hunting ringed seals during the winter. In the beginning of 1980s hunters found cellophane and packs of cigarettes in the stomach of a thin bear. Hungry bears also come to the villages. In the village of Neshkan bears are encountered more often in January and February. Usually they are single large males, as our respondents say. In January 1999 an adult male taking out blubber from barrels, broke the ice box coverage and tried to pull out meat. For two 2 hours it wandered in the outskirts of the village, without showing any fear of people. The bear was frightened off by firing shots into the air.

One of our respondents who had hunted on the River Ngagteveem between 1985 and 1995 told us that bears visited the area throughout the winter every year eating polar fox bait. In January 1985 he saw, how a bear started eating a walrus head not from the neck where it was cut, instead it began to remove skin from top of the head. In the Emelin area one December in the mid-1980s a bear broke a window in a shed and stole seal meat laying there. Practically every winter bears pull out seals from nets, which hunters set under the ice, stretched between two holes.

One of our contributors recollects a story, which was told to him when he was a child by his father. *« Some hungry and thin bears (such bear calls «mervyl'in») can specially hunt people. In twilight «mervyl'in» stands motionless amongst hummocks of ice, so it appears like a hummock itself, waiting for hunters returning from the floe edge. A father and grandfather came back from hunting and noticed such a bear. They stopped andstarted waiting for what would happen next. «Mervyl'in» remained absolutely motionless for a long time, then realized it had been found out, and ran away».*

During the winter bears are more often observed moving overland from the south to the coast. Usually this occurs in January and February. Bears in this area do not follow any particular route and arrive at the sea in different places along the coast. They move along the rivers and straight over the mountains. Tracks of polar bears coming from the south have been observed in the area of mountain Mama, on the ice of Neskenpil'gyn lagoon at Kytryn Cape, on the River Ngagteveem. At this time bears are not staying at the coast but move onto the sea ice via these different routes: Neskenpil'gyn lagoon, opposite the island of Idlidlja, the area of the Memin log hut, the mouth of the River Ngagteveem, the area around Enurmino village, at Cape Kitsetun, Keniskin Bay, at the mouth of the Ikaljurynveem River. Mostly it is single young animals but sometimes also females with one-year-old and two-year-old cubs move overland. On occasions several bears have been observed moving one by one. In December and January the bears that have come from the south to the ice turn and head eastwards.

The majority of our contributors agree that in February most bears moving on the ice head in a westerly or northwesterly direction. Some of the hunters say that they do not observe any particular direction that the bears move in during the winter. During the winter period in this area denning occurs. According to one resident of the village of Inchoun, he observed a den in a coastal steep between the mouth of the River Chegitun and Cape Inkigur in December 1979. In his words, he saw tracks of the female bear and two small bear cubs. Probably, he has mixed up the month he saw the den in.

In February 2000, two dens were observed at the same time at Cape Kejl'uvl'un. Near one of them the tracks of a single animal were found. Probably, this was a temporary den. Our contributors told us that in this area dens on the ice are regularly seen. They said bears use all of them for temporary rest, and birthing dens of female bears do not occur here because of the constant movement of the ice. One of our contributors found a den in a snowdrift among high ice hummocks 7-8 km from the coast in the area of Idlidlja Island in February 1993. The entrance to the den was about one meter in diameter, and there was a twisting corridor further in. Inside the den a single bear was resting.

Spring.

In March and April the movement of bears overland from the south continues, and sometimes becomes even more intensive, than in the winter. According to some contributors, these are mainly young single animals, others say that there are large males as well. Everyone agrees that female bears with cubs rarely travel overland and that female bears with newborn cubs are generally not seen far inland at all. As well as in the winter, bears traveling overland in this area do not have specific routes, they go on from the western edge of Neskenpil'gyn lagoon up to cape Inkigur. These animals do not stay at the coast, but move further out onto the sea ice. In March bears were often observed traveling from the South in area of cape Kytryn (at the southern coast of Neskenpil'gyn lagoon) where at this time inhabitants of village Enurmino went fishing for navaga.

During March, the bears on the ice gradually move westwards. In April and especially in May they do not remain in the area. In these months hunters do not notice any particular direction of movement, but assume that the bears continue to move northwest. If in May the ice is open, it will also drift northwest together with the bears. In the late spring polar bears are rarely encountered.

In March - April bears continue to hunt in pack ice, watching for the thin ice of leads near the breathing holes. At the beginning of March 1998, one of the hunters found an ice cavity above a crack which had an area of about 30-40 m2. The cavity was used by ringed seals for resting (from the traces on the ice the contributor reckoned that up to 12 seals could have rested there simultaneously). The ceiling of this cavity was made of ice about half a meter thick. A

bear broke it, and at the bottom of a cavity there were blood stains. At the end of March 1994 or 1995 one of our contributors observed through binoculars how a female bear caught a ringed seal in a lead. She lay down, and extended her paws forward at edge of the lead, while her one-year-old cub walked about 15-20 meters from the lead. When she managed to catch a seal, the bear cub threw the seal in the air, probably playing with it.

In March and April, ringed seals give birth to pups in snow burrows. All our respondents say that in the area there are a lot of such burrows but only two of them had often seen these burrows dug out by bears hunting whitecoats. One of the hunters told us that only the fur is left from a whitecoat, the bear eats all the rest. Other contributors say that arctic foxes and wolverines hunt whitecoats and specially move onto the sea ice for hunting during this period. They never saw bears catch a whitecoat.

In May bears continue to hunt ringed seals, but as yet there are not enough such observations. One of our respondents saw from a distance how a bear jumped quickly into a lead some 8 km from the coast opposite to Cape Jajakyn in May 1990. He did not see if this hunting attempt by the bear was successful. Another respondent told us that in April bears sometimes hunt bearded seals but could not give a specific example.

In the spring (March-April) bears can use other sources of food than ringed seals, though less often, than in the fall-winter period. They come to the coast and dig up the carcasses of walruses and whales from under the snow which have remained there from the previous fall. In March 1997 at the mouth of Ikalurynveem River there was a group of fifteen bears feeding on walrus carcasses. In March 1999, in the same place 6 bears were observed at a whale carcasse. In both cases some of the bears fed, while the others lay in ice hummocks and rested. Young animals romped and played. Some animals after their meal slid sown a snow slope, which our contributor assumed they did to clean the fat from their fur.

In the same period bears regularly come into the villages of Neshkan and Enurmino. Our contributors note that in March and April in the vicinities of the villages female bears with cubs are observed more often. In March 1998 in the village of Enurmino, a male bear which had broken into a meat warehouse was killed. In March of the following year in the same village, a male bear which has broken into a shed and carried away a piece of walrus meat, then also attacked dogs and threatened people, was also killed. Similar cases occurred in the village of Neshkan in March 1994 and in April 1998.

In March and April of 1985-1995 bears continued to visit the hunting site on the river Ngagteveem and eat the bait for arctic foxes. In March 2000, a bear pulled out a seal from a net which was set in a lead by one of our contributors. In March/April 1997 or 1998 hunters found the remains of a bear which had been eaten by other bears on the ice opposite Cape Kitsetun.

The majority of observations of dens occur in the springtime in March and April. There is no doubt, that in this area there are significant numbers of dens. Hunters see dens every year and talk about them in detail. They say that pregnant female bears build practically all the dens along the coast. Male bears, young animals and female bear with cubs - teenagers make daybeds and dens on sea ice. In one instance, two adult animals were observed in one den. When female bears leave a den in the spring for the first time, their fur has a grayish shade. Usually female bears have 2 cubs; our observations reveal that female bears with one cub are rare. Female bears wait until their cubs walk a few times before they leave their den and go out onto the sea ice. Usually dens are discovered thanks to sled dogs which smell a den and then start to turn in a different direction, disobeying the commands of the dog team driver.

The highest density of dens, is apparently, at a site of coastal steeps some 5 km to the east of the village of Enurmino between Cape Kitsetun and Keniskin bay. In 1992 one of our contributors counted seven dens in this area. In 2000, in a shorter area of coastline from a ledge between capes Kitsetun and Uvel'entyn up to cape Sulyn another contributor counted five

dens. He informed us that in this area from 5 to 10 dens are built each year. In 1994 in an even smaller area (less than 2 km in length) from Cape Kengumen up to Cape Sulyn, hunters counted five dens. They said that in this area there are usually a minimum of 1-2 dens built each year. It the beginning of April 1994 or 1995, there was one female bear with 2 cubs in one of the dens located at this site. The female bear looked out of den every time when hunters passed nearby on a snowmobile. Hunters who caught ringed seals at the floe edge afterwards always left pieces of seal blubber for her by the den.

Hunters agree, that on coastal steeps in this area (from cape Kitsetun up to Keniskin bay), there are places, which females choose for the making dens more often. These are coastal steeps to the south from Cape Kengumen (1 den in March, 1998), Cape the Serdtse -Kamen' (3 dens in 1993, 4 dens in 1994), steep between cape the Serdtse - Kamen' and cape Uv'el'entyn (1 den at the end of April, 2000), cape Uv'el'entyn (annually 1-2 dens, 2 dens at the end of March, 1994), on the western side of cape Kitsetun (4 dens in the period with 1995 on 2000, 2 dens in March, 2001, 1 den at the end of March, 2002). Dens are also regularly found, though not every year, on coastal steeps from Cape Kitsetun up to Cape Ninveren (1 den in 1993 or 1994, 1 den in 1996). Dens are found not only on coastal steeps, but also on terraces and slopes of the hills located above the sea ice in this area. In in the beginning of May 2000, hunters caught a female bear in her den on the western slope of Mount Ikvychin (above cape Kitsetun), and in April, 1999 they saw a ventilation outlet of a den in the source of a stream, originating on the southern slope of Ikvychin mountain.

The second area of high concentration of dens is Cape Inkigur and ridges of Seshanaj Mountain above it. In spite of the fact that in the spring people do not too often visit this area, our contributors tell us they regularly detect dens here. In April 1999 all three contributors from Enurmino observed a female bear with one cub, which walked near to a den on a steep western slope of Mount Seshanaj (3-4 km from the coastline). Having noticed people, the bear family disappeared inside the den. In April, 2001 one of our contributors, traveling round Cape Inkigur by dog sled, saw 2 dens on coastal steep on the southern side of the Cape and two more on the most easterly ridge of the Cape. The contributor also heard stories from other hunters about dens on Cape Inkigur who consider, that in this area one, two, or perhaps more dens are built each year. In the spring of 2000, at Cape Inkigur, a female bear was hunted in a den and one of her cubs was handed over to a zoo.

Frequently, dens are observed all along the coastline between Keniskin Bay and Cape Inkigur, though they do not form significant density there. In April 1999, a den was found on the southeast side of cape I'ajakyn. On a steep beneath Inkipen Mountain, people saw one den in April 2000 and 2001. From words of other hunters in the village of Enurmino one of our contributors says that dens were sometimes found on coastal steeps Ikaljuryvyjvyn and Cape Inkigur. In April 2001, one of our contributors who was traveling by dog sledge saw a female bear which ran and got into a den situated on a steep 10 km to the south of Cape Inkigur.

To the west of Enurmino village, the dens were only regularly detected in the area of Capes Netten and Keyl'uvl'un. In March 1992, 1996, 2000 and 2001, one den was observes in each year. Further up towards the village of Neshkan there is a long low spit with low steeps on the seaward side. Despite the adverse conditions for snow accumulation, in some parts of this spit dens were also found. One of the contributors saw an air hole of a den near of Enmytagyn in April 2001, and a second contributor saw in detail an abandoned den which was situated in the Emelin area in April 1992 or 1993. From the tracks it seems a female with 2 cubs lived there. The den consisted of two chambers. Our contributor has not seen any more dens in this place, however from what other hunters say, dens were observed there a few times.

In the area of Neshkan Village only one place (Idlildlja Island) is known where females regularly make dens. Here one den were detected in April, 1989 (A female bear with one cub

was laying in it) on northern coast, and one in April, 2000 on the southern coast. According to our contributors, on Idlidlja Island one female bear dens here every 3-4 years. Previously, there were more dens there, but recently females avoid making dens on the island because of constant fear of people. The island of Idlidlja is used by hunters from village of Neshkan as permanent base, and if hunters find out there is a den they usually kill the female bear.

According to our contributors, they have not observed dens inland in an area more than 3-4 km from the coast. Occasionally hunters find dens among hummocks of sea ice at a distance of up to 10 km from the coast. Such dens were found to the Northeast of Mount Ikaljuryn in April 1998, to northwest from Cape Kitsetun in April 1984, and in the area of Idlidlja Island in March 1995. Probably, these dens were temporary, though in two recent instances close to a den a female bear with cubs have borned in a recent year or their tracks was seen.

Summer.

In the years when the sea is completely ice free in the summer, bears disappear from area and reappear when the sea freezes in the fall. If ice remains in the coastal waters all summer, bears are regularly observed though in much smaller numbers than in other seasons. Usually they are spotted from boats and whaling boats during sea hunting in June and July. Bears stay close to ice fields and drift with them in the direction of the wind. According to hunters, in the summer period large male animals are encountered more often. For example, a large male bear was killed from the whaleboat in July 2002. At this time bears continue to hunt ringed seals on broken ice. Hunters repeatedly found the remains of the carcasses of seals hunted by polar bears on ice floes. In July, 2001 a bear ate a ringed seal opposite the village of Neshkan. Occasionally when ice fields move towards the coast groups of polar bears were seen. In June 1997 one of our contributors counted 11 bears on ice in area of Cape Netten. He said that the bears were hunting ringed seals in an area not more than 1 km from the coast. The distance between the individual bears was between 100 and 300 meters. Among the group there were females with cubs. In July 1998 in the same area another contributor observed 18 bears near the coast. However, these animals were not feeding. The contributor assumed that they had a heat time, though probably the bears came together for some other reason.

In the summer period in coastal waters, apart from ringed seals other kinds of Pinnipedia appear: bearded seal, spotted seal, ribbon seal, walrus. According to hunters, even with an abundance of others Pinnipedia, bears usually hunt ringed seals. The majority of our contributors informed us that there are cases of bears hunting on ribbon seals and spotted seals, but none of them had witnessed it. One contributor, in August 2002, found on the coast, in area of the Neskenpil'gyn lagoon, the carcass of a small spotted seal with nibbled hide and blubber. A number of small bear tracks were found nearby however it could have been a brown bear too. Except of ringed seals in the summer (June - July) polar bears hunting on bearded seals have been observed more often. One of our contributors told us of an occasion when a polar bear had pulled out a bearded seal onto an ice floe near Idlidlja Island and hunters then took it from the bear. It was in June, but the respondent did not specify the year.

Only two contributors ever saw a polar bear hunting walrus. The others said that walrus very rarely fall prey to a bear. According to hunters bears usually hunt walruses in June & July. This description of a way of hunting is from words of one respondents from Enurmino. *« The bear jumps out of the water onto an ice floe full of walruses and then pounces on to the back of one of them or first steps on the back flippers of an walrus. Then the bear grips the walrus's head with its teeth, rests its forepaws on victim's shoulders and pulls the head of the walrus back, breaking its neck».* Other hunters have told of their own observations of such hunting. In June 1986, 1.5 km from the coast opposite Cape Netten, a bear got out of the water onto an ice floe and seized a small walrus. The others rushed into the water, and a female walrus attacked

the bear with her tusks but missed and then also went into water. The same day, hunters saw how four bears on an ice floe have killed an average sized walrus. In July 1998, 30 km far to the sea from the village, Neshkan hunters observed a bear floating among walruses. It had swum up to ice haul out of walruses, raised its head high out of the water, as if choosing a victim. Then it jumped onto an ice floe; seized a walrus and carried it away to another ice floe where it began to eat it.

An old male-bear that was floating amongst ice floes towing a walrus carcass was killed in July, 1997 opposite the settlement of Enurmino. Walruses formed a small rookery at Cape Sulyn in August 1999. Hunters from a whaleboat noticed a polar bear lying on the snow close to walruses. Elders said, that this bear should be killed, otherwise it would prevent walruses from coming to the coast.

Sometimes in the summer thawing dens are found on coastal snowfields as happened,for example, in June 2002 on Cape Inkigur.

Sometimes fields of old ice arrive from the northwest in the second half of August. In these circumstances, bears appear in large numbers though not as many of them as in October – November. They move with the drifting ice and go along the coastline towards the southeast.

16. KOLUCHINSKY BAY

The area was named after the Koluchinsky Bay. This shallow bay separates the Chukchi Peninsula from the other part of Chukotka. The area includes coastal waters of the Chukchi Sea, from the channel of the Neskenpil'gyn Lagoon in the east up to Rypatynopelgyn Lagoon in the northwest, and also the northern part of Koluchinsky Bay and the adjacent part of the land (Fig. 23). This information was provided by 1 hunter/ reindeer herder and 2 hunters from village of Neshkan, and also by 1 hunter from village of Nutepel'men. The information reflects observations of polar bears in the period between 1983 and 2002.

In September and October depending on the hydro-meteorological characteristics of the year, in the area of Koljuchinsky Bay, the ice can remain or sometimes there can be completely open sea. Small numbers of bears remain in this coastal water area constantly when there is ice. If the sea is ice free the bears disappear from the area. In any case, the appearance of large numbers of bears in this area is connected to the coming of the ice fields from northwest or when the sea starts to freeze. Usually this occurs in October or November. Bears move with drift ice or on new ice in an easterly direction. During this period they regularly move on land and follow the coastline to the east, on a way they stay at walrus and whale carcasses which have drifted ashore. Carcasses of these large sea mammals can be found all along the coast, and particular at a sites between Cape Dzhenretlen and Khoygunen log hut. Groups of bears, from 2-3 individuals at walrus carcass and between 10 & 60 at a whale carcass are formed in October and November. Groups of over 100 bears were observed at one whale carcass. According to hunters, bears will feed on a whale carcass until they have eaten it completely. 15 bears were seen at a whale carcass in November 1989, on one of the Grey Geese Islands. A Greenland whale had drifted ashore at the Belyak lagoon in the autumn of 2000. Forty bears fed at this site. Between Cape Dzhenretlen and Khoigunen Log Hut, bears fed in turns on a grey whale carcass during the whole autumn of 1980. One of our contributors observed 3 animals here simultaneously. More than 60 bears fed on a grey whale carcass in area of the Veempil'gin Channel in November, 1983. Two Greenland whales drifted ashore on the coast opposite the Gagar'i Gnezda in September, 1992. Bears started to gather in October at this site, and in November there were 50-60 of them there. Hunters from the settlement of Neshkan caught a Greenland whale in autumn 1999, but did not take it to village. The whale remained west of the Chajn area. Bears constantly came there in groups of 4-5 individuals. Local people hunted the bears there.

During autumn migrations walruses occasionally form haul-outs at Belyak and Ryrkalen Spits in area of Koluchinsky Bay. However none of our contributors has seen bears in areas of these rookeries.

Converging ice can lock large groups of whales and walruses into the Koluchinsky Bay during the autumn, in years of intensive ice formation. These groups of animals perish when the Koluchinsky Bay freezes over. Such incidents occurred in 1983 and 1994. 300-400 walruses were locked in Chapatchen Bay in 1983, some of them tried to reach open water by moving overland. These walruses one by one and sometimes in groups of up to 40 moved across the tundra, reaching the sea in area of the Eynenekvyn lagoon. Many of the walruses perished along the way. Reindeer herders and hunters from the village of Neshkan specially went to the tundra to hunt these animals. Some of them were found far from the coast in a stream of the Tenynvaam River. Some of the walrus remained in Chapatchen Bay and died frozen into the ice. Many polar bears fed at these sites from November. The same took occurred in 1994. Then not only walruses, but also about 20 grey whales were lost in Chapatchen bay. Bears also fed there.

Bears start to hunt ringed seal, waiting for the seals at the breathing holes they make in the thin ice of recently frozen leads. The building of dens by polar bears was not observed during the autumn period.

Winter.

Bears appear at the coast with the formation of fast ice in December less often, than in autumn. During this period they stay close to the floe edge where they hunt ringed seals. The majority of contributors informed us, that the east is the prevailing direction that bears move along the ice edge during the winter. Bears start to move to the west in February. However, some of our contributors consider that bears move along the ice edge in no particular direction during January and February. Bears hunting seals have been observed in a zone of constantly forming cracks and leads in all areas. However, if the sea has not been open for a long time, bears start to congregate at rocky capes where, according to hunters, there are more seals. In this area there is only one such place - Cape Dzhenretlen.

Bears more often appear at the coast if ice cover is either stationary or slightly moving. They continue to eat walrus and whale carcasses which have remained since the autumn. Bears eat them throughout the winter though they do not form such large groups as in autumn anymore. Bears feeding on the carcasses of whales and walruses which have been frozen into the ice of Chapatchen Bay in the Koluchinsky Bay were observed during the winters of 1983 and 1994. In middle of the 1980s bears ate a gray whale throughout the entire winter at Cape Dzhenretlen and a Greenland whale opposite in the area of Gagar'i Cnezda, forming small groups of 3-6 animals. Sometimes in the winter bears were observed feeding on walrus carcasses on the coast to the west of Cape Dzhenretlen.

The bears moving to the coast appear in the area during February. Bears come onto the sea ice in the area of Cape Dzhenretlen, in the channels of Eynenekvyn lagoon and Neskenpil'gyn lagoon. They immediately leave the coast. Single animals - young and male – are most common among the bears taking the overland routes. In general, hunters usually observe male bears during the winter both at the coast and on the sea ice. Hunters did not see dens in the winter in this area.

Spring.

Movement of bears overland from the south becomes more intensive in March and April, than in the winter. According to one contributor, young animals mainly go overland, others say that large male bears also do it. Everyone agrees that females with cubs seldom go overland,

and hunters generally do not see female bears with newly born cubs far inland. One of our contributors has informed us, that he participated in a hunt of three "overland" bears. All of them were large, fat males, but their stomachs were empty. Bears come to the coast at the same places as in the winter (Cape Dzhenretlen, a channel in the Eynenekvyn Lagoon, a channel in the Neskenpil'gyn Lagoon). According to one contributor, in the spring bears mostly go to the north on the ice of Koluchinsky Bay and along the coast, and also from an overland route they frequently reach the coast from Cape Dzhenretlen up to the western extremity the Belyak Spit. Bears do not stay at the coast and move on to the sea ice where they start to hunt ringed seals. They hunt for the seals at their breathing holes and break open the seals' snow burrows in March and April. One of our contributers found a seal hole dug out by a bear and remains of a seal one March. Ringed seals give birth in burrows right all over the sea ice in this region, but only one contributor repeatedly found both the dug out holes and the fur of white coats eaten by bears. Another hunter has informed us that he frequently saw white coats hunted by arctic foxes and wolverines, but never saw white coats hunted by bears. Hunting for seals occurs on the sea ice throughout the area.

Sometimes the bears feeding on whale carcasses along the coast were observed in March, but not too often. Bears feeding on the carcass of a Greenland whale throughout the winter and into March were observed in middle of the 1980s in the Gagar'i Gnezda area.

Some of our contributors believe that bears do not move in any particular on the ice throughout the spring. Others believe that bears actively move towards the west during March and April. Everyone agrees that the number of bears in the area decreases during April and May. They are seldom observed here in May.

Dens open in March, less often in April, in the area. Contributors told to us that in all cases in the dens were females with yearlings. All dens were located on the coast. Dens were not found far inland or on the sea ice.

The area around Cape Dzhenretlen is the most common place for concentrations of dens. Here from 1 up to 4 dens are found out almost annually, mainly on the west side of the Cape. One of the contributors observed 4 dens there in March, 1989, and during previous years regularly found 1 den a season at this site. Ventilation outlets of dens were observed in snow drifts at a height of about 10 m above sea level. Other contributors observed female bear with 2 cubs at a den on the north side of the Cape in March or April, 1998. Here wolves had dug into the den, driven off the female and killed the bear cubs in March, 2002.

1-2 dens are regularly made on pressure ridges in the Eynenekvyn lagoon area. The den from which a bear was driven out was observed here in March 1986. Two dens were found in one day 3 km from each other in March, 1989. The female bears which had 2 cubs were inside the dens. Dens were not observed in other places along the coast in this area.

Summer.

Bears disappear from the area in the years when the sea is completely ice free in the summer, it occurs most frequently at the end of July. Bears return with the appearance of ice fields and at the start of the sea freezing in the autumn. Bears are regularly seen if ice remains in the coastal waters of the area all summer, though in much smaller numbers than in other seasons. Male bears usually are found on ice broken ice in June or July. For example, hunters caught a large male bear on the ice in July, 2002.

Walruses, bearded and ribbon seals are numerous during this period in the area. However, not one of our contributors observed bears hunting here for the Pinnipedia, with the exception bearded seals. Bearded seals, being hunted by bears, were observed repeatedly in June and July. Usually they were medium-sized seals. Our contributors tell us that bears having noticed a

bearded seal, dive and try to remain under water, then suddenly jump up on to the ice floe where the seal lays. Probably, beaded seals often manage to escape from the clutches of the bear, as hunters often see polar bear claw marks on the skin of the seals they have caught.

Bears are repeatedly observed on Grey Geese Islands during the summer where they wander around. Such sightings are made even in seasons when there is no ice.

Sometimes fields of old ice arrive from the northwest already by the second half of August. In this case large numbers of bears appear, though not as many of them, as in the autumn. They move with the ice and travel along the coastline towards the southeast.

17. VANKAREM

The village of Vankarem which is located at Cape Vankarem in the northwest part of the region gives the name to this area. It includes the coastal waters of Chukotsky Sea from the Rypatynopel'gyn Lagoon in the southeast up to the eastern edge of the Nutev'i Lagoon (Rigol' Yaranga) in the northwest, including the Sergievsky Channel, and also, the islands of Koljuchin and Karkarpko, an adjoining part of land (Fig. 24). Another village Nutepel'men is located in the southeast of the area between Pynopelgyn Lagoon and Rypatynopel'gyn Lagoon. One reindeer herder from the village of Amguema, 2 pensioners and 1 hunter from village of Vankarem, and also 2 hunters from village Nutepel'men have given the following information. The information reflects observations of polar bears in the period from 1943 to 2000.

Autumn.

Ice can remain in this area year round though periods when the water is completely clear of ice for 2-3 months a year frequently occur, especially during the last 10-15 years. Bears are seen here occasionally in September, but appear in great numbers at the coast in October and November at the start of the sea freezing or the arrival of the fields of pack ice. In this period bears move to the coast and onto then coastal ice in the southeast. Local hunters believe that the occurrence of bears at the coast is connected to bears having to hunt ringed seals at this time, the conditions of constantly drifting ice and the freezing of the sea. Bears feed on carcasses of whales and walruses that have been blown ashore by the autumn storms. Carcasses of whales and walruses drift ashore all along the coast from Cape Vankarem to Cape Onmyn and from Cape Kel'enevyt up to throat of the Koluchinsky Bay, and also on the spit on the west side of Cape Vankarem. A female bear with two one-year-old cubs was observed eating a walrus at a channel in the Vankarem Lagoon in October 1999. Single bears fed on the carcass of a walrus at the mouth of lake Kuvljuknesken and the Kejgipekuveem River in November of this year.

Few coastal walrus haul outs where there are mainly female bears and young animals are formed in this area during the autumn. They settle at Cape Vankarem, Karkarpko Island, Cape Onmyn, Cape Kel'enevyt and Koljuchin Island. Walruses crush each other for the different reasons and in the territory of a haul out there are always some carcasses. The big congregations of polar bears are observed repeatedly here. 8 bears fed on Karkarpko Island in November, 1995 (among them was a female with 2 cubs, the others were single animals). 20-30 bears fed on the same island in October and November 1999. At the same time (October - November 1999) 50 bears congregated on Koljuchin Island. However not one of our contributors spoke of attempts by bears to hunt walrus at a haul out.

Polar bears frequently come into the village of Vankarem while moving along the coast. The smell of walrus meat prepared for the winter attracts them. According to our contributors the highest number of bears coming to the village occurs in the years with highest density of ice and absence of storms on the coast, and when practically no carcasses of whales and walruses have drifted ashore. Hunters say that 10 bears a day can enter the village and there can be a few

bears at the same time on the outskirts of the village. They are frightened off by shots and with the help of the dogs.

Winter.

Bears still continue to move along a coastline to the southeast in December, however more and more animals move out onto the ice and travel far from the coast. The movements of bears to the sea are directed mainly to the north. They hunt seal in an area of constantly forming leads. A large male bear ate a seal at the edge of the fast ice, 3 km from Koljuchin Island in December 1999. In this period many animals used the carcasses of whales and walruses for food especially in the southeast part of the area. A female with two one-year-old bear cubs fed on a walrus carcass in the area of a channel in the Pynopel'gyn Lagoon during December 1990. In the same place a female bear with two yearlings was seen eating a walrus carcass in December 1994 or 1995. A female bear with 2 one-year-old cubs fed on a whale carcass opposite Vatap Mountain in December 1999. One of our respondents counted more than 100 bears on Koljuchin Island which had gathered in the area of a walrus haul out where the carcasses of 87 walruses remained in December 1999.

Bears sometimes continue to come into villages during January. Young bears were attracted by the smell of meat in warehouses in the village of Nutepel'men in January 1997 and 1999. A large male bear which has approached a team of tethered dogs in the village Vankarem was driven away by gun shots. Bears repeatedly ate bait set for arctic foxes in area around Vankarem village in the winter. (February 1982 and December,1999).

Bears and their tracks are regularly seen in inland areas and on lagoon ice rather far from the coast. Animals always move in a northerly and northeasterly direction. An adult male bear, heading north, was hunted in the area of a channel in the Vankarem lagoon at Cape Mejnevyt one December at the beginning of 1970s. Later tracks leading in a northeasterly direction were often seen here. Single bears moving to the north and northeast were seen in the area of Vankarem village, in area of Mount Emnunkemenej and in area of Mountain Ekonmyn in different years during January and February.

Spring.

North is the prevailing direction of bears moving on the ice during the spring. Bears were regularly encountered on the Islands of Koljuchin and Karkarpko. A young male bear, moving north, was killed near the Island of Karkarpko at the beginning of the 1970s. Also at this site a female bear with 2 cubs passed to the East in May 1984 or 1985. A fat old male bear with the worn teeth was killed at the ice edge 10 km from the Island of Koljuchin at the end of May 1991 or 1992. Hunters found marked bears with tags a few times in the spring. According to one of them, a bear with the figure 29 on a leg escaped from him 20 km from the Island of Koljuchin in May 1995. The same contributor has removed, from a thin large male bear, moving to the north 2 kilometers from Koljuchin Island in March 1996, a collar with a transmitter and power supply (the battery was manufactured in France). The wires leading from the transmitter had cut into the neck of the bear and caused a purulent wound.

Our contributors repeatedly observed groups of bears during periods of warm weather at the end April and May. Observers saw how 7 male bears pursued a female bear in May 1998. The animals had been moving north. Hunters say that in this period male animals become very dangerous. One of the contributors encountered a group of bears (one female and 6 males) at the edge of fast ice 20 km from Vankarem village in the1970s. The animals had been walking northeastwards. Two of the male bears fought each other. Then the female bear noticed the hunter and ran and the males followed her. One large and thin bear rushed at the hunter and was killed. Its stomach was empty.

In the spring observers continued to encounter bears that had been moving from inland to the coast. Animals were seen in an channel of the Vankarem lagoon at Cape Mejnevyt in March 1995, at the western shore of the Vankarem lagoon in May 1995 or 1996, Also 3-4 km to the west of the mouth of the Kejgipekuveem River in March 1999. A bear was killed in area of Mount Valjanaj (12 km from the coast) in April 1997. A small amount of a grass was in its stomach. The contributor informed us that he sees bear tracks in this area leading north every year during the spring.

In the spring our contributors repeatedly observed polar bears hunting ringed seals at the edge of the fast ice. In March 1976 or 1978, 5-6 km north of Cape Vankarem one of them witnessed how a bear lay near water at edge of a lead. 20-30 meters from it a seal surfaced and then put its head back under the water. At that moment the bear silently dived and caught it, having grabbed the seal in the water. Keeping the seal in its teeth, the bear disappeared behind some ice hummocks. A bear eating a seal was also observed in area of Cape Vankarem in March sometime between 1983 and 1985. Sometimes bears try to take seals away from hunters. Such an incident happened to one of our contributors in May 1984 or 1985 near Karkarpko Island. A female bear with 2 yearlings had approached him as he was resting after having dragged the seal from the edge of the fast ice. The bear began to open up the seal 3 m from the hunter, without paying any attention to him. The hunter began to move away, but at that moment the dogs broke lose and rushed at the bears. The hunter shot and wounded the female bear which began to escape with one of the cubs, while the dogs killed the second cub.

In May, 1960 another contributor observed at a lead 10 km from Vankarem Village a fight between a bear and a single walrus. Such a walrus has the name *"kegluchin"* in the Chukchi language. The large male bear seized a walrus, but received a sharp blow from one of its tusks in the shoulder area. Both of them were killed. The same elder told us that a bear having killed a walrus removes the skin from it like a stocking.

Sometimes in the spring individual and small groups of bears gather at the site of walrus and whales carcasses which have remained on the coast since the autumn. In March, 1998 a young male bear ate a walrus on the spit of Rypatynoprl'gyn Lagoon. In April, 2000 in the same place 3 female bears that had 2 cubs each gathered at the site of whale carcass.

All observations of dens in this area are made in the spring period. The largest concentration of dens is regularly formed on Koljuchin Island, on coastal cliffs and hillsides on the western coast of Pynopel'gyn lagoon and in area of Cape Onmyn. The island of Koljuchin is a place where in some years concentrations of dens reach a very high density. In the spring of 1998 one of the contributors counted 27 dens on the coastal cliffs of the island. There were not dens only on its northern side. Another contributor in March and April 2000 observed 9 dens there. The dens were concentrated in the northwest and in southeast of the island.

On the western coast of Pynopel'gyn Lagoon, dens were detected on the slopes of the Pekul'nej and Vuukatyn Mountains, and also on coastal cliffs to the south of Mount Vuukatyn. According to hunters, here from 1 up to 3 dens are regularly observed (1 den in 1996, 3 dens in 1998 and 2 dens in 1999).

All contibutors say 2-4 dens are observed annually on the cliffs of Cape Onman, more often on the southern side of the Cape. In April 1995 two or three dens were there. In the beginning of the 1980s between 2 and 4 female bears built a den there each year.

Dens are also regularly seen at Cape Kel'enevyt (1 den in 1989 and 1999) and at Cape Vankarem, nearby to the village of Vankarem (1 den in the beginning of the 1980s and also in March 1996 and 1999). One time a den was observed on the shore of Lake Kuvljuknesken between 1977-79, on a slope in near the mouth of the Kejgipekuveem River in 1990, and also on steep sides of the rivers and lagoons near the coast to the west of Cape Vankarem (1 den in 1975 or 1976, 1 den in 1978 or 1979).

Hunters define all dens in this area as maternity ones. Female bears with yearlings were seen or killed in the majority of them. Dens were regularly observed in snow banks among high hummocks on land fast ice. In 1984 a den was found 5 km from the coast northwest of Cape Vankarem. The respondents from the village of Nutepel'men said that his father found dens 10 km from the coast to the north and northeast of Nutepel'men Village every year. However none of the contributors has specified what animals were in these dens. Probably, they were shelter dens.

Summer

In June, land fast ice usually breaks and the broken ice stays throughout July. Bears are more rarely seen in the area at this time, but still are often seen at distance of 3 to 20 km from the shore. The prevailing direction of their movements is Northwest because of the drifting ice. Bears, heading from inland to the coast, are occasionally seen, for example, at the beginning of June 1993 or 1994 near to Cape Meynevit in the Vankarem Lagoon. Most of the bears are single animals hunting seals. In June 1999, a single bear walked in a northwesterly direction on an ice field 10 km from Cape Onmyn. From time to time it had been trying to catch a seal, lying near holes. A bear attempting to catch a seal at a hole was seen at the beam of mouth of the Keygipekyveem River in July in the second half of 1970[8]. A bear eating a seal was found near Cape Onmyn in middle of 1980s. Opposite to the village of Nutepel'men a bear ate a seal in July 1998. A female bear with 2 cubs ate a seal off Cape Onmyn.

Sometimes in July bears congregate to feed off the old carcasses of walruses on the shore. In July 1993 thin male bear were encountered at Cape Kel'enevyt. In July 1998 three single bears congregated at a walrus carcass on Cape Onmyn.

Bears are very rarely seen in this area in August, specially if sea is completely open.

18. MOUTH OF AMGUEMA RIVER.

The area is named after one of the biggest rivers in Eastern Chukotka, Amguema, the mouth of which is located in the north-western part of area. The area includes coastal waters of Chukchi Sea from the eastern edge of Nutev'i Lagoon (Yaranga Rigol'), in the south-east until the Zemlyznka Povarova region in the north-west, and also the adjoining piece of land (Fig. 25). The information is provided by 2 pensioners and 1 hunter from the village of Vankarem and also by 1 hunter/ reindeer herder from village of Ryrkaypiy. The information reflects the observations of polar bears between 1993 and 2000.

Fall.

In September bears are relatively rarely seen, even with a presence of broken ice. As in the previous area, the mass appearance of bears occurs in October & November, when sea starts to freeze. At this time bears are moving on the coastal ice and on shore to south-east. The bears feed on beached walrus and whale carcasses on the way, often creating a large group at a site. The carcasses of large sea mammals washed ashore are most frequently found in channels of the Vykvyv'yal Lagoon and Nutev'I Lagoon. Our contributors tell us that individual animals usually feed on a walrus carcass and a group of 2 bears is very rare at such a site. Up to 30 bears can congregate at the site of whale carcasses. Very large congregations of bears were observed in the area of the channel in Nutev'i Lagoon in November 1990, about 60-100 bears gathered at a site of three whale carcasses at the beginning of November 1996. 30-35 bears congregated around a whale carcass at the end of 1998. 20-25 bears gathered at a site of a whale carcass at the end of October 1998. There were 20-25 bears at whale carcasses in November 1999.

A few whale and walrus carcasses were washed ashore at once in a channel of the Vykvyv'yal Lagoon. There were one whale 4-5 walrus carcasses at the end of 1970s. A group of 24 bears were observed at this site at the end of the 1980s. Two whales and 5-6 walruses were washed ashore at this place. 80 bears had been feeding at this site in November.

In the words of our contributors, such groups of large male bears and females with cubs are more agressive towards other animals and young animals are more tolerant.

Winter

At the beginning of December bears have been continuing to move south-east along the coast, feeding on beached walrus and whale carcasses along the way. 30 bears had been feeding on a whale carcass and 7-9 walrus carcasses on the bank of the channel of Vykvyv'yal Lagoon in the middle of 1980s.

By the end of December bears move far away from a coast to an area of permanently forming leads. They hunt ringed seal there. One of the contributors found a seal carcass, which a bear had only eaten the blubber of, while checking traps on the sea ice of Nutev'i Lagoon. Sometimes bears have eaten bait prepared for arctic foxes in hunting areas. One contributor told of such a case on the sea ice in the area of the Nutev'i Lagoon, about 5 km away from the coast in February 1980. A large male bear had been eating bait. The person has remembered this incident, because nearby he had found a cub, half-eaten by the same animal.

Sometimes bears, heading to coast from inland, are encountered in the area during the winter. A young bear had been moving north-east on the ice of Nutev'i Lagoon in the middle of the 1980s.

One of the contributors observed 2 dens on the slope on the spit in the Nutev'i Lagoon and in the area of Mountain Open. Probably, he was referring to temporary dens.

Spring

During the spring in this area bears were encountered, but there is no a detailed information about these cases. More detailed information was received only about the location of dens in the spring time in the area. Contributors informed us that usually dens are found on coastal cliffs of the sea or lagoons, and also on the banks of rivers flowing to the sea. Often dens are found in areas of high accumulation of ice where the ice stays motionless throughout the winter. Such hummoking occurs almost every year, starting from the mouth of the River Amguema until Cape Vankarem.

One of the most regular places where concentration of dens reaches a high density is located on the slopes of mountain Open between Vykvyv'yal Lagoon and Nutev'i Lagoon. According to the words of one contributor, from 5 to 9 female bears make dens in 3 ravines there every year. He counted 7 dens here in March 1981 or 1982. Other contributors found 2 dens at this site in the second half of the 1970s.

3 dens were observed at once on the spit of Nutev'i Lagoon at the beginning of the 1980s. The oldest of our contributors has recalled finding of 2 dens in the ice opposite to this lagoon in the 1940s. Both dens were located 4-7 kms away from the coast in a snow drift on the south side of a ridge of high hummocks. A female bear was killed in one of the dens during March.

In the respondent's opinion, this could have been a maternity den.

Summer

In summer time, especially in June & July, bears were seen on the ice, but there is no detailed information about this. Hunters say that bears have been moving on ice towards the north-west (no mark on a map).

One of the contributors has observed how a bear was eating the intestines of fish and seal. He hasn't said which season, but seemingly this information relates to the summer time.

19. KOYVEL'VEGYRGYN

The area includes the valley of the River Koyvel'vegyrgyn with tributaries which flows into the Tenkergykynmagky Lagoon, and also the sources of the rivers Emuveem and Rynnatiynyn (Fig.26). Information was received from 1 hunter/ reindeer herder from village Ryrkaypiy. It reflects observations of polar bears in the period from 1968 till 2000.

Informations, received about this area, are very contradictory. Text description does not always match with marks on a map, and in 3 cases there is no disclosure of the time of year an observation was made. But it is possible to understand that there are some indirect indications that all observations were made in the spring time.

Spring

In spring time bears move to the north in the valley of the River Koyvel'vergyrgyn. This usually occurs in March. The respondant observed a bear taking this route, in April1999. Other reindeer herders have said that sometimes bears moves along the river in May also. Unfortunatly, there is no information about what sex and age of the groups of animals, moving here. Bears come to the valley of the River Koyvel'vegyrgyn from the River Chantal'vegyrgyn (Site 34. **Transferences within the continent**).

They move through the divide to of the tributary Rashel'khovgacha, than along this tributary until the place where it flows into the River Vykvyl'vegyrgyn and further along this river to Koyvel'vegyrgyn. Bears also come to Rashel'khovgacha tributory from River Ilirneyveem.

A contributor has also told of his observations of dens in this area. He had found one on a slope of a hill at the meeting of the River Tyl'vyken'ev and the River Koyvel'vegyrgyn. But there is a den marked at the place that the Rivers Rashel'khovgacha and Vtkvyl'vegyrgyn meet. The exact location of the den has remained unclear. There was a female bear with two "already big" cubs. Unfortunately, it was not possible to define the age of the cubs – were they cubs that were born that year or one-year old ones.

The respondent told of a second den that it also was located in Tyl'vyken'ev Ravine in 1975. There was a female bear with 2 cubs. The precise month of the observation was not indicated, but seemingly, it was in the spring. The respondent has marked a location of a more southerly spot on a map – on a slope of a hill where the River Koyvel'vegyrgyn changes direction from west to north.

The respondent has marked a last den 3 km south of Mount Ilirney, though in a text description the den was located on the slope of this mountain. He saw this den in April, 1968.

It is most likely that all the dens, the respondent spoke about were birthing ones. The most remote den was situated 54 km away from the coast.

20. TWO PILOTS SPIT

The area is named after the long spit, separating the Tenkergykynmangky Lagoon from the sea.

The area includes coastal waters of the Chukchi Sea from the region of Zemlyanka Povarova in the southwest to Cape Shmidt in the northwest, where a large urban community is located, and also an adjoining piece of land (fig.27). Information was given by 1 hunter/ reindeer herder and 1 hunter from the village of Ryrkaypiy. It reflects the observations of polar bears during the period from 1971 till 2002.

Fall

Bears are seen in this area during the whole winter, though more often in the fall. If the ice stays in the coastal waters during the summer and fall, then bears are seen on the ice. Bears had been moving on ice in a northerly direction opposite the mouth of the River Ekvyvatap at the beginning of September 2000. Bears regularly come to the coast and feed on the fresh carcasses of whales and walruses as well as on the old bones and skins. It occurs most often during the fall storms, when ice has broken and drifts away. Bears tracks heading to the northwest on Two Pilots Spit are seen constantly. Bears had been eating an old whale carcass in the mouth of River Ekvyvatap in 1971.

Mainly bears appear in this area when the sea freezes (October- November). Individual bears and groups of 2-3 animals came to feed at a site of old whale bones at the mouth of the River Ekvyvatap at the end of October and during November 1997. There were bears in this area during the fall of different years.

Bears often appear near by village of Cape Shmidt. Bears feeding *(seemingly, on a rubbish dump –A.K.)* close to the weather station were seen in October 1997 and 1998.

Winter

Apparantly, bears are rarely seen in this area. At least, no information about polar bears here was received from our contributors.

Spring

During the spring bear tracks heading in northerly and northeasterly directions along the River Vyvvytkar (to side of Akatan Lagoon) and the River Ekvyvatap, are observed annually. Sometimes bears move to the River Vyvvytkar from the River Maynypontovaam. Mass movements of bears occur on the River Ekvyvatap in April and May. All the animals are single, female bears with cubs were not observed. Some animals move at a distance from the river-bed. Sometimes traces, leading to opposite direction – from sea ice up to current of River Ekvyvatap, were seen, but our respondents have not told how far inland it goes.

One contributor observed a female bear with 2 cubs near to a den on north-east slope of a hill in the area of the pass from the River Ekvyvatap to the River Tygagtyt at the end of March 1999.

Our contributors have not told of any details about the feeding of bears in the spring. They have detected on 2 occasions, which could be observed in spring or summer (one color were used for marking this seasons on a map).

We will tell about it in more detail in a description of the summer period.

Summer

Bears move onto the sea ice during the early summer and are rarely observed on the coast. Bears, heading north on the ice were seen at the mouth of the River Ekvyvatap. From the end of July bears appears on the coast more often. Probably it related to the drifting ice and sometimes to the complete disappearance of ice in August. During August bears eating beached carcasses of walrus or old whale bones, were observed many times. Feeding bears were seen on a spit of the Akatan Lagoon and in the area of Pil'gyn Passage *(there is no information about time of the year the observation was made in the textl description, but on a color of marks on the map it could be related to summer as well as to spring – AK).* In the last case the bear had been feeding on the remains of whale beached a long time ago. Not a large bear ate an old whale bones in the mouth of River Ekvyvatap in August 1977. A bear eating bearded seal opposite the mouth of the same river was seen. Sometimes bears eat fish intestines discarded by fishermen

as it happened on the Pil'gyn Channel, and also on the spit of Akatan Lagoon in the end of July 1997.

21. KYVEKVIN

The area includes the valley of the River Kyvekvin, flowing into Er'okynmanky (western part of the area), and also the source of the River Ekvyvatap (eastern part of area) (Fig.28). Information was given by 1 hunter/ reindeer herder and 1 hunter from village Ryrkaypiy. It reflects the observations of polar bears during the period from 1971 till 2002.

Fall

One of our contributors found a den on slope of a hill at the source of the River Malyi Ekkisun at the end of November 1992. There was a female bear with 2 cubs. The cubs were a little bit different in size: one was a little bigger than the other. Seemingly, the respondent was talking about a temporary shelter.

There are no other observations of polar bears in the fall time.

Winter

No information was provided about polar bears in this area in the winter.

Spring

Active movement of bears from inland to the coast usually occurs in the area in April and May. Single animals usually move in this area. Most regular (annually using) routes lead to the sea along the valleys of the River Ekvyvatap (vide supra previous chapter) and the River Kyvekvin.

At the last place bears are seen more often on the middle of May. The respondent himself observed a bear, moving down along the River Kyvekvin in May 2002. Bear tracks heading to the north were seen many times during this period on the eastern tributary of the River Kyvekvin – River Vochvyvatap and its tributory Gyvechgoygynap. Bears often move parallel to the valley of the River Kyvekvin. Our contributor has observed bear tracks, crossing the River Alyarmagtyn in the northern direction from the side of the River Kuvet. Bear tracks, heading to the sea along the Rivers Malyi Ekkikun and R'evneyveem, are seen almost every year.

Summer

Polar bears were not observed in this area during the summer.

22. RYRKAYPIY

This area is named after the village of Ryrkaypiy, located in southeastern part of the area near to the base of Kozhevnikov's Cliff. The large urban village of Cape Shmidt which is a central village of the area is located 4 km to the east of the village of Ryrkaypiy. The area includes coastal waters of the Chukchi Sea and Long Strait from Cape Shmidt in south-east till Uveran region on the spit of Kanygtokynmanky Lagoon on north-west, and the adjoining area of land (Fig.29). Information was received from 1 hunter/ reindeer herder and 1 hunter from village of Ryrkaypiy and reflects the observations of polar bear during the period from 1963 till 2002.

Fall

Bears are often seen in this area. Probably, they move along the coast without any definite direction because our contributors have not determined any prevailing routes during this period. Usually in the fall period (October/ November) bears congregate at the site of beached walrus and whale carcasses. One of the respondents saw a female bear with two one-year old cubs feeding on two walrus carcasses on the end of the spit dividing a narrow part of Er'okynmanku Lagoon from the sea opposite to area of Nutechikun in November 1999 or 2000. An the end of November 1999, two adult bears were feeding on walrus carcasses 16 kms to the north west of the same spit. Further to the northwest on the same spit, opposite the mouth of the Ozernyi Stream, 1-2 bears come to feed at the site of the old bones of two beached whales in November every year. Bears can form large groups at fresh whale carcasses. From the words of the other hunter one contributor has told of around 100 bears feeding on a whale carcass in October& November 1989 or 1990 at the mouth of the Kyvekvin River. Most of the animals were adult. On that year sea was ice free for a long time.

Female bears make a den sometimes in this area during the fall. Our contributor saw a female bear that lay in a den on a slope of Kuplukey Mountain in November 1999. A female bear made a den on a slope of Chernaya Hill one km from the village of Cape Shmidt. One spring, at the beginning of May female bears came out of dens with cubs. Each of them had 2 cubs. One bear family came into the village. This dens are marked on a map as a spring one.

Winter

Sometimes bears enter to the villages in winter. At the end of 2000 small bear had beem wondering in village of Ryrkaipiy. Dogs drove him away to the sea. No other information about presence of bears in the area from our contributors was received.

Spring

In April and more often in May active movement of bears from inland areas towards the coast are observed annually in the area. Usually they are single animals. Most of the routes are the sequetional of the routes already described in the previous chapter **(site 21 Kyvekvin)**. Bears move to the sea along the valley of Kyvekvin River and in parallel to it, crossing Alyarmagtyn River, and also in the valley of the tributories Vochvyvatap, Gyveychgoygynap and in parallel to them. Bears foot prints heading to the sea along the Malyi Ekkisun River and R'evneyveem River are seen in the area every year.

All observations of dens in the area are made during the spring period. There are few sites with high density of dens, that is probably due to the anthropogenic factor. The Cape Shmidt area, where now two large settlements are located, is the most comfortable for the polar bears. Until the beginning of 1960th female bears regularly lay in the dens in coastal slopes of Kozhevnikov Cliff and Veber Cliff. One of the contributors has recollected that when he was of school age he continually heard of and even saw a den on the eastern side of Veber Cliff. Female bears stopped making dens in this place after 1963 when warehouses were built in this Cape. Kozhevnikov Cliff near the village of Ryrkaypiy is a more remote place. One den was regularly observed here till 1998. A female bear with 2 cubs usually came out of the den. After 1998 dens were not seen here. The contributors consider that the same animal used to make a den every year in the Kozhevnikov Cliff. They related an absence of the den with a case when female bear was killed by poachers in 1998. In May 1998 the rayon hunting inspector found two killed bear cubs on the ice near by Kozhevnikov Cliff.

In outskirts of the village of Cape Shmidt female bears occasionally make dens on a slope of Chernaya Hill. Such a case occured in November 1998. Female bear with 2 cubs came out of den in May 1999 (see also "Fall").

One of the contributors has observed female bears with cubs near to dens on a slope of Kupljukey Mountain at a beginning of May 2000 (see also "Fall") and in the source of Galechnikovyi Stream in the middle of May. Contributor has not said which year the observation was made in the last case.

Summer

Bears start to appear on the coast with rare ice in August. An old woman had been butchering a seal on a pier in the village of Ryrkaipiy when a large male bear attacked her in August 1999. It grubbed her from the collar and pulled her to the sea. The woman was saved by dogs which drove the bear away. We do not have other information about observation of bears in this area in summer time.

23. LENINGRADSKIY.

The area was named after a large settlement situated in its southeastern part on the river Ryveem. At the end of the 1990s the settlement was closed, and its dwellers (the citizens) left. Nowadays the seasonal mining explorations are carried out here. The territory of the region includes the waters of the Long Strait of the East-Siberian Sea from the Uveran boundary southeastward to Cape Enmytagyn in the northwest, as well as the adjacent part of land (Fig. 30). One hunter from the village of Ryrkaipiy, and one hunter and one reindeer herder and hunter from the village of Billings shared their observations of polar bears made between 1965 and 2002.

Fall.

In fall many bears were seen in the area, however there was no information about any migrations in specific directions. Starting from September they regularly saw bears feeding on whale carcasses.

In September of 1998 or 1999 three bears (*according to the description, a female with two two-year-old cubs. – AK*) were feeding on the carcass of a small whale on Cape Yakan. In September of 1996 or 1997 on the sandbar of Malyi Kynmankavytgyr Lagoon they observed a herd of 30-40 bears of both sexes and various age near a dead whale. Sometimes in fall bears come to the hunting camp and sea hunting lands. In October or November of 1998 or 1999 several polar bears attracted by the smell of walrus meat came up to a wooden house on Cape Yakan. When they were transporting the meat from Cape Yakan to the village of Billings, 10 bears of both genders and various ages were following the tractor. There were no females with cubs among them.

During his life one of the respondents (Billings) repeatedly observed many bears and their footprints, as well as snow-digging activity near Cape Enmytagan at the Enmattyr riverbed and in the coast bluffs area from Cape Yakan to Olennaya Lagoon (See also "Spring"). In his opinion up to several dozens of bears hibernate in each of these regions. Other respondents could not confirm these data.

Winter.

There were no observations of bears in this area in winter.

Spring.

There was no information about bears' migrations in this region in spring. One of the respondents who hunted on the coast westward from Cape Yakan informed that he had never seen any bear migrations from the remote parts of land to the sea. The main information about the spring period is about denning places. One of the respondents, hunter and reindeer herder from the village of Billings, informed that every year there are many dens in this region, but he was never particularly interested in them. The respondent showed a section on the map where he always observed dens and female bears with cubs-of-the-year in April and May: near Cape Enmytagan, at the Enmatgyr river channel and on the section of coast bluffs from Cape Yakan to Olennaya Lagoon (See also "Fall"). On the Enmatgyr river dens are seen on both banks' slopes on the section 5-6 km long, starting at the point 2 km southward from the mouth of the river. According to the respondent annually up to several dozens of female bears have cubs here. Also there are as many dens as on the shore bluffs section starting on Cape Enmytagyn (**See also section 24 Billings**). According to his words, many bears hibernate on the bluffs from Cape Yakan to Olennaya Lagoon. The respondent, by the words of reindeer herders, also showed the hilly region near the mountain Vysokiy Kamen' on the right bank of the Ekaznmyvaam, where several dens had been sighted (*the exact period of observations was not indicated. – A. K.*). The respondent informed that reindeer-herders and hunters from the village of Billings are very well familiar with these areas and try to avoid them. However, another respondent from this village said he had never seen dens, and another one mentioned only one den on Cape Enmytagyn. So the information provided needs to be carefully checked.

At the end of April 1999 a female bear and two cubs were observed at their den on the northeastern slope of the Annakenygton range near Kanygtokynmanky Lagoon southern bank.

Summer.

There is very little information about the summer period. When there is ice bears appear to be observed regularly. In August of 2000 on the traverse of Cape Enmytagyn a bear was feeding on the leftovers of a walrus killed and butchered by hunters. In August of 1998 or 1999 three bears were observed feeding on a small whale carcass on Cape Yakan.

24. BILLINGS.

The region was named after the most advanced into the sea Cape Billings and after the village situated 13 km westward from the cape on the sand-bar of Kholkhoznaya Lagoon. The region includes the coastal waters of the East-Siberian Sea from Cape Enmytagyn in the southeast to Lyalerakynmanky Lagoon in the west, as well as the adjacent part of land (Fig. 31). The information was obtained from 1 hunter, 1 reindeer-herder and 1 hunter-reindeer-herder from the village of Billings, and reports on polar bear observations made between 1965 and 2002.

Fall.

Although in September bears are observed at the coast, their migrations have no definite purpose. In September 2000 on Cape Billings after a storm they noticed a swimming female bear with two cubs. The cubs were holding onto the mother's back with teeth and paws. The family came out of the water and stopped to rest, and in an hour they left eastward.

In October, when there is no ice or it is open-pack, many bears appear on the coast. They move along the coastal line eastward, on the way they often visit the village of Billings attracted by the smell of walrus and seal meat and blubber stored for winter. Mass migrations of bears from the west to the east continue for 15-20 days. Bears of both sexes and various ages

are observed. At the beginning the bears look well fed (although the stomachs of killed fat polar bears were empty), then in a month they become skinny, very hungry and would eat everything. In October of 1995 a female with two cubs killed several tied dogs. The female bear was shot, the dogs killed one of the cubs, and the second cub was sent to zoo.

Mass migrations of bears on the coast were observed in October of 1978 and 1996-1999. During freeze-up period bears continue to move eastward on the thin ice. In October of 1998 near Uvargina Lagoon a female bear with four cubs was seen going on the very thin ice eastward. The cubs were howling loudly.

When close-pack ice stays in the coastal aqua area all summer and fall, as it was in 2001, bears visit the settlement very rarely, and they can be hardly seen on the shore. Nevertheless bears still move eastward on the ice.

In November mass migrations stop, but sometimes bears keep visiting the village. In November of 1994 people in the village saw a female bear with two one-year-old cubs attracted by the smell of blubber stored in a barrel near a dwelling.

One of the respondents reported that in October he always sees many bear footprints on the section of shore bluffs 10 km long westward from Cape Enmytagyn. By his words up to several dozens of female bears annually make ancestral dens here. Other respondents did not give any information about such concentration of female bears in the fall at this section of the coast.

Winter.

All winter observations of polar bears comprise the description of animals visiting the village of Billings. According to the respondents, in winter bears are seen in the village less times than in the fall. Usually these are hungry animals looking for food in villages. In February of 1976 a large bear broke a coal-storage in a dwelling. In the same month a bear killed a woman and carried her to the sea ice. The body was found almost untouched in 1 kilometer from the village, nearby there was the bear's sleeping place. Right after the tragedy they shot 3 bears near the village. In December of 1976 a big bear got into a barn with sledge dogs. In winter between 1975 and 1979 a bear killed a man on the river Nanavaam and was shot. In December of 1989 a small bear climbed the balcony where they stored seal blubber and scared the people in the house. The bear ran away scared off by people screaming.

The respondents did not give any information about polar bear migrations or feeding in winter.

Spring.

In spring bears very rarely visit the village of Billings. In March of 1998 a one-year-old cub came to the village. It was caught and sent to the zoo.

Apparently in spring in the coastal aqua area they don't observe bears feeding on the eared seal. At least none of the respondents reported such facts. The polar bear hunting lands are probably far from the coast here. In March of 1976 on Cape Billings they saw a big bear gnawing old walrus bones.

Unlike in most Chukotka regions here they don't observe mass migrations of bears to the coast from inland regions. At the end of 1960s one of the respondents observed three small bears resting near the Umkeney Mountain 28 km from the seacoast, and then they went northward. The respondents did not indicate the season of the observation but it probably occurred in spring. In April between 1976 and 1978 they saw footprints of a large bear going on the ice of the Valkakynmangky Lagoon toward the sea.

One of the respondents reported that there were many sections in the region where female bears had cubs in dens. By his words the Billings village people know these sections, and they

are not especially interested in dens and try to avoid these sections. One of the places with high density of dens is the section of shore bluffs about 10 km long westward from Cape Enmytagyn (See also "Fall" and the above **"Section 23 Leningradskiy").** As the respondent claims in this region up to several dozens of female bears annually hibernate in dens in this region. The respondent himself repeatedly saw female bears with cubs here and their footprints in April and May. He also named the following regions where dens a regularly seen: the Umkeney Mountain (in the Chuckchi language it means "The polar bear hill") located 28 km from the seacoast; the Pyrkatagyn Mountain; the Ykvynagte Hills located 8 km from the seacoast. The respondent did not indicate the seasons when you can see dens but apparently he meant spring. Other respondents could not prove that dens were in those regions. One of them had never seen dens at all, another one told only about 2 dens on sections **23 Leningradskiy** and **27 Aachim**. The information about dens needs to be checked.

Nevertheless in spring in this region they regularly see female bears with this year's cubs. At the end of April in 1987 a female with 2 cubs made an arc-wise way from the Pyrkatagyn Mountain and on the Kuul-Innukay river towards the sea. It was probably going from its den. At the end of March of 1990 or 1992 in a place 30 km southward from the seashore (to the south from the Kamennaya hill) a female bear with two this year's cubs was feeding on the bait for polar foxes. One of the cubs was caught in the trap. People managed to free the cub without doing any harm to the female bear. At the end of April 1998 they observed a female bear with two small cubs in 3 km from the village of Billings on the ice. One of the cubs was caught in the seal net. They cut the net and freed the cub.

Summer.

In summer when there is close pack-ice in the coastal water area bears are almost not seen here. Usually the ice is gone with the east winds and with the north and the west winds ice appears in the coastal water area. If the pack-ice is open enough, hunters often see bears while hunting walruses. They usually hunt walruses in 40 km to the northeast from the village of Billings. In this region bears of both genders and various ages are seen in summer. During summer they usually move westward on the ice. In 2001 during the whole summer the pack-ice was so close in the coastal aqua area that hunters could not go into the sea. That summer bears were almost not seen.

In the years when the sea is without ice or the pack-ice is open bears appear on the coast in August. On the 20th of August, 2002 on the shore of Kholkhoznaya Lagoon a small bear passed the village of Billings westward. Sometimes in August bears accumulate near carcasses of whales thrown to the shore. In August 1976 a Greenland whale carcass was stranded on the shore near Innukay Lagoon Strait. Our respondent counted as many as 50 bears around the carcass.

25. THE NORTH OF THE RIVER PEGTYMEL'.

This inland region includes the middle current of one of the largest rivers of western Chukotka the Pegtymel' with its tributaries as well as the part of land adjacent from the west (Fig. 32). The information was obtained from 1 reindeer-herder and 1 hunter-reindeer-herder from the village of Billings and comprises observations made between 1965 and 2002. The region is used by the polar bears for inland migrations in winter and spring. Dens and feeding were not observed here.

Fall.

They did not observe polar bears in this region in the fall.

Winter.

In January-February of 1982 or 1983 a small bear went northward on the right riverbank.

Spring.

Our respondents periodically observe migrations of single polar bears from the inland on the valley of the Pegtymel' river. According to them these migrations are regular, and many other reindeer herders observe them as well. All observations for which the month was indicated were made in April. In 1983 or 1984 a large bear went from the eastern slope of the Tymlyr Mountain. In the same year they saw footprints of a single bear crossing the tributary Nizhny Umkyveem (in the Chuckchi language "*The River of the Polar Bear*"). In 1990 or 1991 a small bear was going northward in the place where the Kukeveem tributary falls into the Pegtymel' river.

The grandfather of one of the respondents told that he had seen a large bear crossing the Rynnatiynyn tributary northward. The respondent does not know the year and month.

Summer.

In summer polar bears were not observed in this region.

26. THE SOUTH OF THE RIVER PEGTYMEL'.

This inland region comprises the upper stream of one of the largest rivers of western Chukotka – the Pegtymel' with its tributaries as well as the adjacent land (Fig. 33). The information was obtained from 1 reindeer-herder and 1 hunter-reindeer-herder from the village of Billings and includes polar bear observations made between 1965 and 2002. This region is used by polar bears for inland migrations in spring. Bears were not observed here in other seasons. They did not see bears' dens and feeding either.

Spring.

Our respondents not just observed polar bears and their footprints in these regions, but also heard about them from many reindeer-herders. In April 1960 and 1961 they observed a large bear going northward near the Rimyrken tributary, approximately at the same time they saw other footprints in this region. In the same place at the end of May 1990 or 1991 on the Rimyrken tributary they saw footprints of two bears going northward.

Reindeer-herders also told about seeing a bear on the river Gasgagyrgyvaam situated in the central part of Chukotka, in the north of the Anadyrsky region. However we could not find this river on the map and to tick the place of observation. This bear was also going northward.

27. AACHIM.

The region was named after the Aachim Peninsula situated in the center of the region between Kychak and Nolde Bays. The region includes the coastal waters of the East-Siberian saw from Lyalerakynmanky Lagoon in the east to Lake Zapadnoe in the west, as well as the adjacent land (Fig. 34). The information was obtained from 1 hunter and 1 hunter-reindeer-herder from the village of Yanranay and includes polar bear observations made between 1959 and 2002.

Fall.

In the fall polar bears in great numbers come to the coast from the north. In this period they often appeared on Shalaurov Island where since 1986 hunters were annually hunting a seal. There is a permanent fur animal (polar fox) hunting section here. During the fall bears always

fed on the polar foxes' bait and the hunted seals cut wastes. In October bears start moving on the coast and coastal ice field westward. In this period many bears are seen, sometimes very large herds. One of the respondents mistakenly supposed that it was the heat season, as he could not find any explanation for such massive number of bears at that period. In the fall they often observe adult animals.

In this region such feeding sources like carcasses of whales and walruses are very rare. At least our respondents do not remember cases of sea-thrown whale and walrus corpses, and they don't mention any other feeding sources except baits for fur animals and seals cut wastes. When there is ice and during freeze-up bears actively hunt seals around Shalaurov Island.

Winter.

In December bears continue actively hunting seals in the aqua area northward from Shalaurov Island. Like in the fall they often visit the sea coast, steal the hunted seals and polar foxes' bait from hunters on Shalaurov Island as well as on the coast of Kibera Bay.

In February one of our respondents, a reindeer-herder, often observed bears coming from Nolde Bay on the inland to Chaunskaya Bay (See also **Area 29 Valumey**).

Sometimes they observe dens near Kibera Bay and on Shalaurov Island. Our respondent saw a den on the northeastern coast of Shalaurov Island in December of 1962. And in January of 1961 sledge dogs digged a den between Shkolnikova and Kibera Bays. The respondent probably made a mistake as all his observations of dens he dated by November-January, but he never mentioned dens seen in spring.

Spring.

In March and April 1976-1978 many bears appeared on the coast, as well as on the inland regions of this and the adjacent regions. One of the main land routes used by bears to go to the coast in those years was the Keveem river valley. Mostly there were skinny single bears often going on the lines of traps for polar foxes. In the middle of May 1975 they observed a bear going northward from the inland, in the delta of the Pegtymel' river.

In spring they regularly observe opened dens in this region. The main concentration is on the shore bluffs near Kibera Bay and Shalaurov Island. The respondents reported that the overwhelming majority of dens here are ancestral and open in the middle of March. A bear family lives near the den for about a week, and then goes into the ice field. In 1977 one of the respondents observed 3 dens at the same time to the south and to the north from Shkolnikova Bay and in the southwest from Kibera Bay. Dens are seen here regularly with a break of 1-2 years. Up until 1983 the respondents also saw a den located a bit northward from the mouth of the Echuniveemkey creek. The respondent also often hears from other hunters about other dens near Kibera Bay and on Shalaurov Island. In March 1977 he found a dead cub near the den located in the southwest from Kibera Bay.

There were single observations of dens in spring near Lyalera Bay and on the northern coast of the Aachim Peninsula.

Another respondent informed that many female bears go up the rivers in fall, sometimes quite far from the sea and make dens on the riverbanks. According to him annually 1-2 female bears give birth to cubs on each river. He did not show concrete points on the map as he usually went along the seacoast, and not on the rivers, and he saw only footprints of female bears with cubs going from the river mouths.

Summer.

In summer bears are observed more seldom than in other seasons. Not more than 3-5 bears (in turns) came to Shalaurov Island from the ice fields when the hunters were hunting seals. The bears often stole and ate the hunted seals. In the fall bears appeared there much more often.

28. YANRANAY.

The region was named after the village of Yanranay situated on the western coast of the region in the throat of Chaunskaya Bay. The region includes the coastal waters of the East-Siberian sea from Lake Zapadnoe southeastward to Cape Shelagsky in the northwest and the aqua area of Chaunskaya Bay from Shelagsky Bay northward to Pevek Lagoon in the south, as well as the islands of Maly and Bolshoy Routan and the adjacent land (Fig. 35). There is a big town Pevek in the southwest of the region, opposite Bolshoy Routan Island. The information was obtained from 1 hunter and 1 hunter-reindeer-herder from the Yanranay village and comprises the polar bear observations made between 1959 and 2001.

Fall.

Starting from September great numbers of bears appear on the coast between Capes Yanranay and Shelagsky, especially when there is no close pack-ice in the coastal aqua area. According to the respondents bears swim to this place from the northern ice edges. In Septermber 1989 one of the respondents counted 4-5 bears on each 1-km section of his boat route. They were feeding on the carcasses of walruses killed by hunters. Hunters scattered the carcasses on the shore as bait for polar foxes. Up to 3-5 bears was feeding on each carcass. In 1998-2000 bears appeared here comparatively more rarely.

In October there are mass migrations along the coastal line, as well as on the shore and the coastal thin ice, if the sea starts to freeze. Animals go to Cape Kibera westward, then to Cape Shelagsky westward, then southward to Cape Yanranay. Here they turn and go into the sea westward and northwestward. Bears come off the ice near Cape Shelagsky, go round the Shelagsky Peninsula from the south and go eastward along the shore. When migrating on the land and the coastal ice bears rarely find substantial food sources, because it is very rare that dead whales are thrown to the shore. One of the respondents does not know such cases, another one recalled that at the end of August 1959 a Greenland whale was thrown to the shore in the mouth of the Malyi Erguveem river. There were about 15 bears feeding there in October.

At the same period bears were feeding on the polar fox bait distributed on the coast by hunters. Sometimes in October bears visit the village of Yanranay. In 1998 a young bear that possibly just left its mother, for 2 days was chasing the dogs in the evenings. There was no food for it there and it left. In October 1999 a small bear came to the village (the respondent said he was about one year old). For two days it was feeding on the old blubber thrown out of the barrels on the seashore.

After the freeze-up bears actively hunt in the area of open water pools northward from Cape Shelagsky.

Starting from the mid-September the repeatedly observed female bears making dens. Between 1959 and 1964 in November they regularly observed a den on the northern shore of the Shelagsky Peninsula. Here they observed a female bear making a den in the fall of 1985. In November 1963 one of the respondents found a den near the mouth of the Rynnatyinyn river near Cape Kozmina. He reported that many bears hibernate in this area on the shore slopes, these bears go 8-10 km into the land.

In the second half of September 1999 another respondent saw a female bear making a den in the snow hill on the slope in the upper Meinyrylkyn river, approximately 6-7 km from the sea coast. He reported that in the fall of 1999 all this mountainous region (from the Sredny Ergyveem river mouth to its tributary Pravy Ergyveem to the Kuiviveem barracks and from there on the Kuiviveem river to the mouth) was covered with bear footprints. There can regularly be several dens here minimum.

Winter.

There are fewer bears near the coast in December. When there was massive hunting of fur animals in the region, some bears regularly fed on the bait distributed on the shore. In 1959 at the mouth of the Maly Erguveem (See "Fall") bears were feeding on the Greenland whale carcass all winter, made a big hollow in it and ate all the intestines. Besides bear many polar foxes, red foxes, and even wolverines were feeding on the whale meat. If the carcass was covered with snow from one side, the bears removed the snow from the opposite side when getting to the carcass.

During winter bears continue seal hunting at the pools of open water northward from Cape Shelagsky.

Spring.

According to our respondents in spring polar bears constantly move, they never make any special stops for feeding. Usually male or other single bears go pass the village Yanranay on the ice, but don't visit the village. The respondents did not notice any concrete direction of their migrations. Females with this year's cubs have more regular routes after they leave their dens. In spring they always see bear footprints gong northward to the sea along the rivers Kuiviveem and Rynnataynyn. One reindeer-herder repeatedly observed female bears with cubs crossing the Pevek Peninsula from the south to the north (See also **Section 29 Valkumey**). They often stop near the Apapelgino village to go round the pipes installed over the tundra. When female bears reach the shore of Cape Yanranay they turn northwestward into the ice field.

In spring, usually in the second half of March on the East-Siberian sea coast opened dens are observed in many places. They saw a den on the sea bluff in 1977 westward from Cape Kozmin, in 1979 at the Rynnatyinyn river mouth, in 1985 or 1986 a little westward from the Maynyrylkyn river mouth, and in 1975 or 1976 on the northeastern slope of the Yanrenmeem mountain westward from the polar station "Valkarkay".

Dens were often seen far from the sea coast. On the slope of the hill located 1 km up the Tykevgai river tributary they regularly saw a den until 1975, and several times killed a female bear there. In 2000 at the mouth of the creek flowing into Amnonkynmanky Lagoon from the east, they observed a female with two cubs near its den situated in 3-4 km from the sea. Later polar researchers found a dead cub under the bluff at the sea. In 1979 they met a female with four cubs at the den located on the hill on the Maly Ergyveem western bank in 2-3 km up the mouth. Our respondents often see females with cubs and their footprints going from the upper Kuiviveem river 10-15 km from the bank.

The highest concentration of dens is on the Shelagsky Peninsula. 1-2 dens were regularly observed on the northern shore until 1990. Between 1985 and 1987 they saw a den on the sput of the Enlenmeem Mountain (the eastern edge of Mayachnaya Bay). In 1986 they explored a den on the south of the peninsula. In 1990 there was a den on the south of the Erykvynmeem Mountain over the abandoned settlement Shelagsky. In the same year one of the respondents saw a female bear with three cubs here, one of the cubs was caught in a fox trap. When people tried to approach the family the female bear pulled the cub out of the trap and carried it in its mouth. The cub's fingers stayed in the trap.

They did not see dens on Chaunskaya Bay coast. Except for one den on the northern coast of Bolshoy Routan Island in March 1979, the respondent heard it from an acquaintance of his.

Most of the dens in the region are, undoubtedly, the maternity dens. Nevertheless the respondents reported about a den made by a single bear. In March 1979 between the rivers Levy Valkatrynnat and Tynnetkay one of the respondents found a den with a male on the northern slope of the hill 1-1.5 km from the coastal line.

Summer.

In summer bears are practically not observed in this region.

29. VALKUMEY.

The region was named after the abandoned settlement Valkumey situated in the southern part of the Pevek Peninsula on Cape Matiushkin. It includes the coastal aqua area of Chaunskaya Bay from Pevek Lagoon in the north to Cape Turyryv in the south, as well as the adjacent land (Fig. 36). The information was obtained from 1 reindeer-herder-hunter from the Yanranay village and includes the polar bear observations made between 1965 and 2001.

Fall.

In the fall polar bears were not observed in this region.

Winter.

In February one of our respondents, a reindeer-herder, often observed bears going from Nolde Bay (section 27 Aachim) internal part of land to Chaunskaya Bay, going to the sea to the south from the Pevek Peninsula.

Spring.

In March one of the respondents, a reindeer-herder, repeatedly observed females with cubs crossing the Pevek Peninsula from the south to the north (**See also section 28 Yanranay**).

Summer.

In summer polar bears were not observed in this region.

30. RYTKUCHI.

The region was named after the village situated in the delta of two large river the Chaun and the Palyavaam. It includes the aqua area of the southeast of Chaunskaya Bay from Cape Turyryv in the northeast to the storage terminal Kremyanka in the southwest, as well as the adjacent land (Fig. 37). The information was provided by 1 reindeer-herder of the Billings village, and by 1 hunter from the Yanranay village, and includes observations made between 1975 and 2002. There was no data collection from the Rytkuchi residents. The data refers only to spring. There were no observations in fall, winter, and summer in this region.

Spring.

A respondent from Billings reported that in spring bears annually migrate to the west through the Palyavaam river valley (See also the next section). A hunter from Yanranay specified that migrations on the river usually occur in March. Not more than 3-5 single bears use this route. Those bears, which were seen or heard of, were very skinny. Bears go to the ice of Chaunskaya Bay.

There are no other observations of bears in this region.

31. PALYAVAAM.

The region is an inland part, in the center of which there is the middle of the large river Palyavaam flowing into Chauanskaya Bay (Fig. 39) (See also the previous section). The information was provided by 1 reindeer-herder from Billings and includes observations made between 1979 and 2002. The obtained data refers only to spring. There were not observations in other seasons in this region.

Spring.

A respondent reported that in spring every year bears go westward on the Palyavaam river. There is no other information about this section.

32. AYON.

The region includes Ayon Island situated in the throat of Chaunskaya Bay and a part of land near the Malkov house on the East-Siberian seacoast to the mouth of the Pilotkel river mouth flowing into Chaunskaya Bay (Fig. 39). There is a village with the same name on the northwestern coast of the island. The information was provided by 2 retired hunters and 1 yaranga owner from the Ayon village and includes observations made between 1955 and 2001.

Fall.

From the beginning of September until the end of October polar bears often appear on the coast of Ayon Island. Not yearly butt quite often storms bring ice to the coast at the beginning of September. Bears come with the ice. They swim to the coast and wander along the coastal line. The connection between bears coming and a storm is quite evident. Usually bears go on the western coast from the south, from the Malkov house, cross the Maly Chaunsky Strait and migrate northeastward along the island coast. However there were observations of bears migrating from the north to the south past the Ayon village. During such migrations bears look for sea wastes, feed on the fox baits distributed on the coast. Sometimes bears come deep into the island. In the middle of the island there is a lake called Umkogytygyn (the Bear's Lake). The local people suppose that at some time a polar bear was killed in this area. In the fall of 1997 or 1998 a bear came to the reindeer-breeding camp on the Amyskanilkhen river. It came on the ice of the Maly Chaunsky Strait. In various years reindeer-herders hunted bears in the fall near Lakes Besstochnoe and Kakegytgyn. In October one of the respondents saw footprints going from the coast into the tundra to the east from Lake Ledyanoe.

In September and October bears often move along the coast in different directions in the southeastern part of the Ayon Island.

Annually in fall bears go past the village of Ayon, but rarely come to visit. Our respondents suppose that it is due to poorly developed sea hunting here. Everything that is hunted (seals mostly) is eaten right away, almost nothing is stored for winter, and nothing attracts bears there. According to our respondents earlier (in 1960s and 1970s) bears visited the village more often.

The water area around Ayon Island is scarce with marine mammals, that is why carcasses of walruses and whales are thrown to the coast very rarely. Sometimes in the southwest of the island, in the mouth of Emykuul river, in the eastern part of the Maly Chaunsky Strait, dead walruses were thrown on the shallow waters near Chengkuul Island. But people ate them and nothing was left for bears. In the beginning of October 1972 or 1973 one of our respondents reported that a small bear was feeding on the walrus carcass on the shallow near Chengkuul Island. There were polar foxes running around the bear. Sometimes seals, usually wounded and

lost by hunters, are thrown to the coast. If bears find them, they eat them immediately. In September of 1994 or 1995 a dead seal was thrown near Lake Uglovoe. Our respondent's wife covered it with driftwood in order to come back for it. However at night, a polar bear came and took it away. In the same region in September of 1988 or 1989 a small whale was thrown to the coast (it was impossible to determine the kind). The bears moving along the coast regularly came to the whale and fed on it, but there was no large accumulation of them. Earlier in the same region a beluga whale was thrown to the coast, but the bears did not come up to it.

In the end of November of 1969 a hunter who lived near Lake Uglovoe, noticed three walruses crawling on the ice. A stationary crack forms in this region annually. The walruses must have spent the winter in it and when the crack closed up, went on the ice looking for open water. The hunter killed all the three, after the walruses were cut, bears came up to the remnants but did not eat them. According to our respondent's the meat was too frozen to eat.

Sometimes in fall bears get into the hunter's barns for seal meat and blubber. There were such incidents in October of 1964 and in September of 1989 or 1990 on Chengkuul Island. In both cases the bears were shot.

Winter.

In winter bears rarely appear on the coast or near the coast. Howeve, their footprints and sometimes the bears themselves are always seen near the seal hunting area in 3-4 km from the coast opposite the Ayon village. Here there is a stationary crack that starts in the Utatgyr river mouth. The bears do not migrate in a definite direction, they just wander along the crack hunting seals. Seals make many holes in the ice near the crack, and bears watch them. One of our respondents seldom sees bear's food leftovers, as bears take the seals far from the crack. Other respondents reported that bears usually eat only the blubber leaving the meat to polar foxes. In winter they also observed a bear hunting a seal in the north from Ryaynranot Island.

Bears often eat the polar foxes' bait distributed on the coast. Such things happened everywhere on the island coast. In January 1969 near Chengkuul Island hunters found a walrus corpse in the ice and left traps near it. Two large polar bears came along the coast from the west and started feeding on the walrus. In active fur animal hunting times during the Soviet era polar bears were killed for eating baits. Since the sea hunting is weakly developed due to poor aqua area, bait was highly valued. Moreover, hunters believe that the polar bear can take the polar foxes away from the hunting section. In the 1960s in January or February one respondent's father killed a bear that was feeding on the bait in the southwestern end of the island. On the next day the respondent went to cut the bear and found only a skeleton left. During that time other bears fed on the carcass.

In the 1950s and 1960s bears regularly visited the village of Ayon in winter. One of them tried to break the door of the storage house, another one killed a dog, and then it was shot.

According to one of the respondents in February bears often go on the ice along the northern coast of the island eastward and go toward Cape Shelagsky.

Sometimes they find shelter dens in winter. Dens are more often seen in snow hills on shore bluffs and in gullies of the islands Chengkuul and Ryianranot. One of our respondents saw dens on Chengkuul Island at the end of January in the early 1960s and in the mid-1970s. The last den he saw was in a narrow gully filled with snow. There was a deep long corridor into the gully. He also saw a den in February of 1963 on Ryianranot Island. The hunter who used to live on this island told him that dens can be seen here every winter.

Spring.

In spring bears continue hunting seals near the stationary crack opposite the Ayon village in 3-4 km from the coast. Hunters often see footprints near the crack and seals' breathing holes. In the beginning of the 1960s in March one of the respondents observed from the distance a bear waiting for a seal opposite Chengkuul Island. When the seal came to the surface the bear hooked it with claws. In April many seals whelp in ice holes on the western and eastern sides of the island. During this period bears always excavate the seal holes and catch both adults and whitecoats. Hunters find remains of whitecoats seldom because they say bears eat them. A half-eaten whitecoat was found near the village in spring of 2000. In April-May of 1991-1992 they found holes with bloodstains and gnawed whitecoats in the northeast of the island near the Rovaam river mouth. Here polar foxes also hunted whitecoats, hunters say that polar foxes catch them a lot more often than bears. It was reported that whitecoats often freeze to the ice with belly buttons and die, polar foxes and bears simply take their carcasses out of the holes. Perhaps such explanations are mythological quite a bit. They find adult seals' remains more often than those of whitecoats. According to the respondents a bear makes a small hole, puts its head and paw, and then waits for the seal to come up to the surface. Bears often eat only fat, the rest of the carcass is left for polar foxes.

Sometimes bears pull out nets set by hunters in the ice holes and take the caught seal. This thing happened with one old hunter who lived on Ryiaranot Island. In spring especially in March bears continue feeding on the polar foxes' bait in the hunting sections. According to one of our respondent, in about 1970 her husband was taking around the boxes with bait for polar foxes. He saw a female bear come up to the box, take it with the front paws, lift it and leave just like a human. The husband said that the female bear had taken the meat to the den in the ice hummocks where she had three cubs.

They sometimes observe bear footprints going from the ice to the land in April and May. In May of 1991 or 1992 in the northwestern part of the island they saw several large footprints of single bears going to the coast. At the end of April in the mid-1980s a bear came to the village of Ayon and got into the barn where seal blubber was kept.

In March they saw bear footprints going from Ayon Island to the northwest toward Cape Shelagsky. In the same period bears sometimes came to the area around Lake Uglovoe from the ice field.

Dens are rarely seen on the island in spring. Our respondents told us that her husband had heard from old hunters that female bears made dens only on the ice field among the hummocks, and never made dens on the land. In the 1960s in March her husband saw a den in a snow hill near a high hummock on the ice field to the east from the island. Old hunters also told about dens on the ice near Chengkuul Island. Two other respondents who were hunting in the 1960-1980s could not confirm this report. They never heard of dens on the sea ice but sometimes saw dens in gullies and shore bluffs. Between 1963 and 1965 in spring they saw a den near Cape Peschany southward from the Maly Chaunsky Strait. At the beginning of the 1970s they found a den on the northern coast of Chengkuul Island. Perhaps the second respondent told about the same den although he showed the location of the den in the western end of that island. At the beginning of the 1970s in the first days of March he was driving an all-purpose vehicle and noticed a female bear with two small cubs near a den. The driver came up to the family and took pictures. The bears left to the ice field. Near the den there was dry manure consisted of grass.

They saw female bears and cubs' footprints on the island several times in March. In March of 1989 or 1990 they saw footprints up the stream of the Rovaam river, and in March of 2000 footprints from the gullies southward from the Ayon village. Hunters suppose that there were

ancestral dens here. By their words when bears have cubs on Ayon Island after spring openings of dens they immediately go into the ice field.

Summer.

Bears are almost not seen on Ayon Island in summer. Sometimes they are seen on the bank near Lake Uglovoe.

33. RAUCHUA.

The region was named of the large river Rauchua, the delta of which is in the center of the region. The region includes the coastal waters of the East-Siberian Sea from the Malkov house in the northeast to the mouth of the Paltitka river, as well as the adjacent land (Fig. 40). The information was obtained from 1 retired hunter from the Ayon village and includes observations made between 1962 and 2001.

Fall.

Reindeer-herders told that in September-October polar bears wander deep into continent southward up the river Rauchua. According to our respondent these are not regular routes, but accidental walks. Usually males make such walks.

The respondent did not report anything about polar bears' behavior in other seasons.

34. INLAND MIGRATIONS.

The inland region of Chukotka between Krest Bay (Anadyr Bay of the Bering Sea) and Koliuchinskaya Bay (the Chukchi Sea) is regularly used by polar bears for migrating from the south to the north. The main routes of the bears are located along the Amguema River, one of the largest rivers in Chukotka (Fig. 41). The information was provided by 2 reindeer herders and 1 hunter from the village of Vankarem situated in the north of the region and includes polar bears ' observations made between 1960 and 2000. Our respondents never saw bears make dens and feed in inland regions. All bears were seen during migrations northward, to the Chukchi Sea, in winter and spring. The arrows indicating the routes in Krest Bay and in the Chukchi Sea were copied from the maps of the corresponding sections.

Fall.

In the fall the respondents did not observe migrations on the remote land.

Winter.

Hunters note the first migrations of bears in central Chukotka in December and January. Recent footprints of a large bear were seen in 5 km eastward from the abandoned settlement of Vostochny in December, 1994, and in December of 1996 they observed two bears near the Miliutchekay Mountain.

In February bears start migrating on the inland regions more intensively. In February between 1992 and 1994 bears and their footprints were seen eastward from the Amguzma river near the place where the Ekvyvatap tributary flows into the Amguzma, which is 20 km eastward from the Amguema village, near the Massivnaya Mountain, and at the Amguema river channel. They saw bears and footprints westward from the Amguema river at the Tadleoan river mouth between 1990 and 1999 near the mountains Maravaam and Ilgyn in 1987-1989; near the Belesaya Mountain in 1976, near the Kaiengyrgyn river in 1980-1985, at Lake Tumannoe and the Ekityki river in 1969.

When migrating through inland regions bears avoid settlements. All respondents reported that bears never visited the village of Amguema. On Lake Tumannoye one bear stopped in 1 km from the reindeer-herders' storage, went back to his track and went around the storage 3-4 km from the west.

Spring.

In March bears appear on the inland regions even more often than in winter. But mass migrations start with the increase of the light day in April and May (another respondent believes that mass migrations occur in March and the beginning of April, the third respondent thinks that in April). In this period reindeer-herders see up to 3 bears and 10 footprints on average per month. Bears of both sexes and various ages migrate, usually single. Groups of 2-3 polar bears are seen very seldom. When migrating bears do not stick to one type of the landscape, they even climb stiff mountains.

One of the respondents told the following details of the polar bears' behavior during inland migrations. Trying to be imperceptible polar bears prefer migrating at night, and when the light day becomes longer they move in stormy and foggy weather. The numbers of migrating bears and their routes change from year to year. He supposed that 100-200 animals cross the inland region of the Amguema river. When seeing humans adult bears behave calmly, can go past humans in the distance of 100 meters. Young polar bears are cautious and run away, sometimes they come back to their trace. This respondent said that he couldn't tell about all observations of bears in inland regions, there were hundreds of them and mentioned only the most memorable facts.

In March they saw bears and their footprints in the east from the Amguzma river on the eastern bank and near the Massivnaya Mountain in 1992-1994, and on the rivers Velmay and Achilyan in 1960-1964. In the west from the Amguzma riverbed they saw bears and their footprints on the Kayengyrgyn river in 1980-1985, on Lake Tumannoe and the Ekityki river in 1969, on the Veshkap river in 20 km northeast from the Ilultin settlement in 1992.

In April their saw bears and their footprints eastward from the Amguzma river in the Kymyneyveem-Miliutkeyveem interfluve near the Tynooken Mountain in 2000, on the Ekvyvatap in April 1998, near the Guevoygyn Mountain 10 km northward from the Rykuul river in April of 1995. In the Kymyneyveem-Miliutkeyveem interfluve in one day on the section 30 km long they saw several bears of both sexes and various ages, one of them (a male) was killed. At the beginning of April near the Tynooken Mountain they killed an old male bear, which was very skinny with matted fur of dirty yellow color. Its head was covered with fresh scars, the upper lip was ripped, the lower claw was hanging on the gum, and the teeth were worn down. They found deer fur in the stomach.

They saw bears and their footprints westward from the Amguzma river near the Kuiviveem mouth 10 km northwestward from the village of Amguzma. They also saw them on Lake Ekityki in 2000, at the Engyrgyn river mouth in 1997 (a large male bear was killed), on the Kaiengyrgyn in 1980-85, in 3 km from the Ekityki mouth in 1998, on the Imlykirynnet river in 1976 and 1999.

In May of 1987 they saw bears and their footprints in the east from the Amguzma riverbed near the Miliutkay Mountain; on the river Rykuul and near the Miliutchekay Mountain in 1992; near the Elevoygyn river mouth in the southern part of Vankarem Lagoon in 2001 (a male was killed); on Lake Kiem in the upper Echylyn river in 1995-1996. .

In the west from the Amguzma riverbed they observed a female bear with two this year's cubs on the southern slope of the Ilgyn Mountain. The family slowly went through a reindeer herd, the female was going ahead followed by the cubs 30-40 m behind. The cubs showed

interest to the herd, stood up but did not approach the reindeer closely. The distance between the deer and bears was about 10 m.

In different years they saw bears going northward at the mouths of the Chantalvergyrgyn and the Engyrgyn, on the Kayengyrgyn and near the Byk Mountain.

Bears were often observed in the above-mentioned regions not just once but several times a month and even a day.

Summer.

Occasionally bears in inland regions can be seen in June, but very rarely. The respondents did not bring concrete examples.

DISCUSSION

1. Dens.

In figures 42-53 you can see only regular concentrations of dens from 2-3 up to several dozens in one place within one season.

Fall. (Fig. 42). The most regular concentrations are on Cape Shelagsky and around it, and to the southeast from the village of Billings. They observed dens, many bears, their footprints and snow digs. As we see these regions are close to Wrangell Island, one of the main 'maternity hospitals' of polar bears. In the fall in this part of the East-Siberian Sea there are many pregnant females that make dens on Wrangell Island, as well as on the adjacent land regions. On the rest of the Chukotka coast hunters don't notice any den making activity.

Winter. (Fig. 43). Hunters see single dens on the whole coast from Ayon Island in the north to the southern part of the Chukotka Peninsula. However main regular accumulations (up to 6-8 dens in one season) are on the capes located close to the Bering Strait. Perhaps the absolute majority of winter dens are temporary, i.e. they were not made by pregnant females but by bears of both sexes and various ages for a short rest in bad weather during winter migrations. Most of winter dens were noticed on shore bluffs, although there were observations on the sea ice 5 km away from the coast.

Spring. (Fig. 44). This is the time when females with cubs leave their dens. In spring dens are seen on the coast from Cape Bering region to Ayon Island. In the southern part of the Chukotka Peninsula (to the south from Lavrentiy Bay) dens are rarely seen in spring. Most of the observed dens must have been temporary. They did not observe females with newly born cubs. The most southern ancestral dens are made around Lavrentiy Bay. Further northward there are much more ancestral dens. The largest regular accumulations are on Cape Nunyamo (3-6 dens), Cape Dezhnyov cape (4-8 dens), Cape Inchoun (2-5 dens), near Cape Unikyn (2-3 dens), Cape Inkigur (2-4 dens), near Capes Serdtse-Kamen' and Netten (10-15 dens), Cape Jenretlen (2-6 dens), on Koliuchin Island (9-27 dens), on the western coast of Pynopelgyn Lagoon (1-3 dens), Cape Onman (2-3 dens), the shore between Vykvyvial Lagoon and Nutevi (5-9 dens), the area near Cape Olenny (3-5 dens), in the Enmatgyr riverbed (10-20 dens), the coast near Cape Enmytagyn (10-20 dens), the slopes of the Parkatagyn Mountain (1-2 dens), Cape Kibera and Shalaurov Island (3-5 dens), Cape Shelagsky (3-4 dens). Most of the dens observed by the hunters are located on the bank bluffs. Many dens were found in the coastal line in 10-km distance from the seacoast. Some dens were found very far from the seacoast (up to 54 km near Cape Shmidt). In spring reindeer-herders from the Provideniya region found dens in the remote tundra but those dens were probably temporary, made by bears migrating to the Chukchi Sea coast on the land.

In Fig. 44 you can see that the most preferable places for dens are the capes advanced into the sea. Regular accumulations of dens are practically on every cape of the northern coast of Chukotka. Exceptions are Cape Shmidt and Cape Vankarem. Dens are seen on these capes too but not often and in small numbers due to large settlements in these places. The largest settlement is on Cape Shmidt, until the mid-60s they annually observed dens there, but later the agricultural activity and the growth of the settlement lead to rare dens despite the favorable natural conditions.

Most of the main regions of dens' concentration on the Chukotka coast determined by our research, correspond to those earlier mentioned in publications (Uspensky, 1989; Stishov, 1991, 1998). However earlier they did not discuss the degree of regularity of polar bears using these regions for dens. The obtained data about the annual number of dens in this or that region, about their status (ancestral or temporary) allow us to make a new estimation of the polar bear

reproductive geographic range and the importance of the Chukotka coast for Chukotka and Alaska population reproduction.

Sometimes dens are seen on sea ice fields, especially on the section from Cape Inkigur to the Amguzma river mouth and near Ayon Island, i.e. in the sections where a wide stretch of shore ice forms. Dens are usually located in snow hills in the hummocks of shore ice not further than 5-8 km from the coast. Most of these dens are undoubtedly temporary but some of them can be ancestral.

Summer. (Fig. 45). Dens are rarely seen. Some dens were seen on Cape Inkigur and in Rudder Bay. In summer dens are regularly seen on the capes that enclose the Bering Strait from the north (Cape Dezhnyov) and from the south (near Cape Chaplin there is Cape Sivolkut). All dens were located in unmelted land snow hills. On the northern coast and near Cape Dezhnyov these are usually the dens thawed in spring and found by hunters in summer. In the south shallow temporary dens can be made by bears that could not migrate to the north in spring and stayed here for summer.

2. Migrations.

Fall. (Fig. 46). In September many bears appear on the Chukotka coast from Ayon Island to Cape Dezhnyov. The further to the east the more it depends on the sea freeze-up date and ice drifting from the northwest. Most bears migrate with the ice edge southeastward. When the ice drifts bears get off the ice and migrate along the coastal line. The most massive migrations of bears on the coast are seen on Ayon Island and near Cape Billings. On the Chukotka Peninsula bears definitely migrate southeastward. Westward from Koliuchinskaya Bay most bears also move to the southeast, although some of them can move along the coast northwestward. In some points of the northern coast they observe bears going into the inland through riverbeds which is probably because pregnant females look for places to make dens. Sometimes adult males also migrate deep into the land. Bears come to the Bering Strait with ice as far as to Provideniya Bay. Here in fall ice fields always break because of wind and currents, that is why bears come out to the land and migrate northward and northwestward crossing large land territories. Riverbeds and narrow fiords in the southern part of the Chukotka Peninsula serve as corridors for such migrations. In the northern part bears can cross the mountainous territory that is not as high as in the south. Having come out to the north of the Bering Strait and into the Chukchi Sea bears move to the ice and again drift to the south and into the Bering Strait. Such migrations, near Cape Dezhnyov, in particular, were described earlier in publications (Sokolnikov, 1927; Vershinin, 1973).

Winter. (Fig. 47). In winter polar bears continue migrating southward through the Bering Strait as the sea freezes. Many bears go on Anadyr Bay as far as to Krest Bay. Like in the Bering Strait the ice in Anadyr Bay constantly moves. Apparently due to breakage of ice fields bears continue coming out to the coast. They saw them migrating along the coastal line in different directions near Mechigmenskaya Bay and westward from Cape Serdze-Kamen'. However in general coastal line migrations are less massive than in fall. But polar bears start using land routes more intensively in the inland regions to migrate to the Chukchi Sea or the northern part of the Bering Strait where there is more ice and its more close and stable. The length of such routes can reach 300 or more kilometers. Sometimes bears are seen even in the inland regions in the west of Chukotka where they can arrive from Krest Bay or Anadyr Liman. In western regions they also observed bears go into the remote parts of the East-Siberian Seacoast, which possibly happened when ice here was one-piece and there were very few air holes and pools of open water. Near Ayon Island and along the Chukchi Sea coast bears migrate in different directions along the edge of the shore ice and system of cracks and pools during all winter.

Spring. (Fig. 48). In spring bears continue migrating along the shore ice edge near Ayon Island and at the coast of the Chukchi Sea. However the area of such migrations in the south of the Chukchi Sea gradually moves westward. It is connected with breakage of ice cover and ice drifts to the north in the Bering Strait. Due to changing ice conditions bears start migrating northward into the Chukchi Sea. They do not observe bears migrating from Anadyr Bay eastward, into the Bering Strait. But land migration northward in the inland regions of Chukotka becomes of the largest scale. In this period bears actively Krest Bay for migrating northward. Numerous observations of bears coming from the deep inland regions to the sea on the coasts of the Chukchi and East-Siberian Seas are connected with migrations from Anadyr Bay, and female bears leaving their dens with cubs. Such land migrations were mentioned in publications many times (Vershinin, 1973; Shubnikova, 1978). However they believe that bears in Anadyr Bay and their land migrations northward are exclusively due to complicated ice conditions in winter and are very rare (Shubnikova, 1978). According to our research bears make such migrations every year and it is an ordinary element of a yearly life cycle of this part of Chukotka and Alaska population.

Summer. (Fig. 49). In summer polar bears are rarely seen on the coast. In inland regions of Chukotka there are no bears as well. Most of the observations were made in June when bears continue migrating northward and northwestward with the melting ice border. Some bears (males usually) regularly stay for summer near Krest Bay and Cape Chaplin. These are single animals that don't form groups.

In July bears are very rarely observed. In the years when ice comes early from the north to the southern part of the Chukchi Sea, bears appear in the second half of August drifting on the ice from the northwest. When ice fields break bears come out to the coast and migrate eastward along the coastal line. In some places such as Serye Gusi Island in the throat of Koliuchinskaya Bay they observe bears migrating southward as well as northward. In this period in the East-Siberian Sea they also observe bears come up to the coast and migrate along the coastal line, but not in such numbers as they did in fall.

3. Feeding.

Fall. (Fig. 50). In fall they see bears actively feeding on the whole territory of northern Chukotka coast, and in the years with early ice in the northern part of the Bering Strait as well. They actively feed on carrion: carcasses of whales and walruses thrown to the coast. In this period on the Long Strait and the western part of the Chukchi Sea their feeding aggregations can reach up to 80-100 specimen near one whale carcass. They also visit settlements and hunting sections feeding on hunting wastes, especially on the East-Siberian Seacoast. In the east of Chukotka polar bears fed on the polar foxes' bait distributed by trappers on the hunting lands. Seal hunting in the coastal aqua-area is not that frequent as carrion eating because the sea just starts to freeze and the ice cover is very unstable. Nevertheless they saw bears that were seal hunting on the thin ice near Capes Shelagsky and Kibera, and in cold years if there was ice in the east of Chukotka as far as to Mechigmenskaya Bay. An important and regular food source in this period is coastal walrus-rookeries on the northern coast of Chukotka where females with cubs rest during fall migrations to the Bering Sea. Due to different reasons walruses crush each other and many corpses are left on the rookeries (up to 400 dead walruses). Bears feed here all fall and even winter. Groups of 20 to 80 bears were repeatedly seen on walrus-rookeries of Karpkarpka Island, Koliuchin Island, Capes Serdze-Kamen' and Unikyn. Perhaps some bears can actively walrus hunt, as it was observed on Wrangell Island (Kochnev, 1991, 2002; Ovsyanikov, 1995). Nevertheless hunters did not observe active walrus hunting on the coastal rookeries.

In the south of the Chukotka Peninsula feeding bears are seen rarely but regularly. These are single bears that stayed here for summer. Near Provideniya Bay and Cape Chaplin they were seen on walrus carcasses thrown by swash, and on Kosa Meechkyn Island in the throat of Krest Bay bears feed on dead walruses near the rookery.

Winter. (Fig. 51). In winter bears continue feeding on carcasses of whales and walruses thrown to the coast. Groups of bears around the carcasses are not as numerous as in fall but the feeding geography expands. Polar bears come to the southern part of the Bering Strait and into Anadyr Bay where they eat carrion that stayed there since fall. They also continue feeding on walrus carcasses near the coastal haul outs. Bears are not observed on the distant western haul outs (Cape Vankarem and Karpkarkpka Island), but they appear on the haul out on Cape Inchoun in the southeast. In this period bears often visit most villages of eastern Chukotka attracted by the smell of meat that hunters store for winter. They often break the barns and ransack meat storages. It probably happens in the years when the ice condition is not favorable for successful seal hunting. In such periods bears steal seals from the hunters or pull out nets.

Winter is the best season for the hunting fur animals. That is why in winter there is the highest number of observations when bears feed on the bait and hinder the trappers' work by shutting the traps. Once near Cape Billings a bear got its tongue trapped, and the hunter had to cut off the tip of it with a knife tied to a long stick in order to the bear free.

When going northward on the land routes sometimes bears rob reindeer-herders' food storehouses.

In winter the territories in the coastal aqua area where bears hunt seals cover vaster areas in the west and the east of Chukotka. Bears hunt mostly on shore ice cracks and pools of open water, and in the southeastern part of the Chukotka Peninsula they hunt on the shore ice of narrow fiords.

Spring. (Fig. 52). In spring bears often feed on whale and walrus carcasses only on the coast of the southern part of the Chukchi Sea where this source of food seems to be the most abundant and does not run out in fall and winter. However bears do not form groups and feed separately or in families. Near walrus rookeries bears were seen only on Cape Unikyn and on Nuneangan Island in the southern part of the Bering Strait. Like in winter bears often visit the villages on the coast, hunting camps and reindeer breeding pastures where they feed on wastes and ransack food storages.

Seal hunting areas in the Chukchi Sea and the Bering Strait decrease to some extent and bears start hunting actively in Krest Bay. Near Ayon Island in this period bears concentrate on digging the seals' holes and catching whitecoats. Such hunting method is rarely seen in the east of Chukotka. According to hunters here bears prefer to catch adult seals in open water pools or near breathing holes.

In the Bering Strait in May ice starts drifting northward and sea hare and walruses start massive migrations. In this period bears sometimes hunt bearded seals and walruses.

In spring there were cases of cannibalism near Capes Serdtse-Kamen' and Vankarem in the Chukchi Sea.

Summer. (Fig. 53). In summer, only in June if there is ice, in the Bering Strait they observe bears hunting seals, as well as bearded seals and walruses. In the Chukchi Sea bear feeding depends on the season conditions. If ice remains all summer, small number of bears continue hunting seals on the broken ice all along thr summer, although most of the bears migrate northward. If the sea is free from ice, they don't see bears feeding. In August if there is ice bears often come off to the land on the whole coast from Cape Kibera to Koliuchinskaya Bay and start eating the remains of the last year's carrion and recently thrown whale and walruse carcasses.

They regularly observe polar bears feeding on carrion in the southern part of the Bering Strait and on the Anadyr Bay coast. These are single animals that do not migrate northward when the ice thaws. Almost every year 1-2 bears stay on Kosa Meechkyn Island. All summer they stay near the walrus haul out and feed on the hunting wastes from the villages Uelkal and Konergino and remnants of walruses hunted by killer whales. They saw how a polar bear that spread panic on the haul out but did not try to chase and kill the walruses. If there is lack of food bears that spend summer on the coast of Anadyr Bay, visit villages attracted by food wastes.

CONCLUSION

Traditional knowledge and observations of hunters and reindeer herders allowed us to make a comprehensive picture of the geographic area used by polar bears on Chukotka within a yearly life cycle. It should be noted that that the research that gives us exact facts from biology and ecology of any animal species is often hindered by spatial and time limits. The research is usually expensive, for that reason it is done by separate scientists or small scientific groups who are able to cover only a limited territory within a short period of time. For instance, so far all polar bear studies on Chukotka were done only on the Wrangel Island. The results of this research allowed obtaining detailed information about the polar bear biology and ecology on the territory of the island and the surrounding aqua area. However the knowledge of the polar bear life on the rest of the geographic range remained too generalized. The usage of traditional knowledge of the Chuckchi and Eskimos, the life of whose is closely connected with the wild nature, made it possible to trace the life cycle of polar bears on the most of its geographic range in greater detail. We obtained quite detailed data on the places of ancestral dens' concentration and the reproductive geographic range borders. In outline we traced the seasonal dynamics of polar bear migrations and determined the most important feeding sources and feeding regions depending on the season.

It is important to understand that traditional knowledge and observations of the indigenous population are not a result of any specialized scientific research and they cannot be measured by scientific criteria. When recalling observations made during their life the hunters could confuse the dates, the number, the age, the gender of animals, to interpret the animal behavior by traditional mythology. The information obtained from hunters can be a bit tendentious, because the respondents who saw dozens and hundreds of polar bears in the first place recall only the most outstanding and, in some respect, unusual meetings with the polar bear. That is why the data based on the traditional knowledge of the indigenous population should be considered only as a starting reference point for future scientific research and creating the strategy of protecting the polar bear and its main habitats.

Another important result of the project is that the hunters and reindeer-herders realized that their knowledge of the environment obtained during their lives is very valuable and is demanded by scientists. Conversations with hunters convinced the authors of this report that such projects change much in our participants' mindset, they start to realize their responsibility for their natural resources. It can play a very important role in protecting Chukotka natural resources, the polar bear in particular, and will allow the indigenous population to participate in their management with full rights and conscience.

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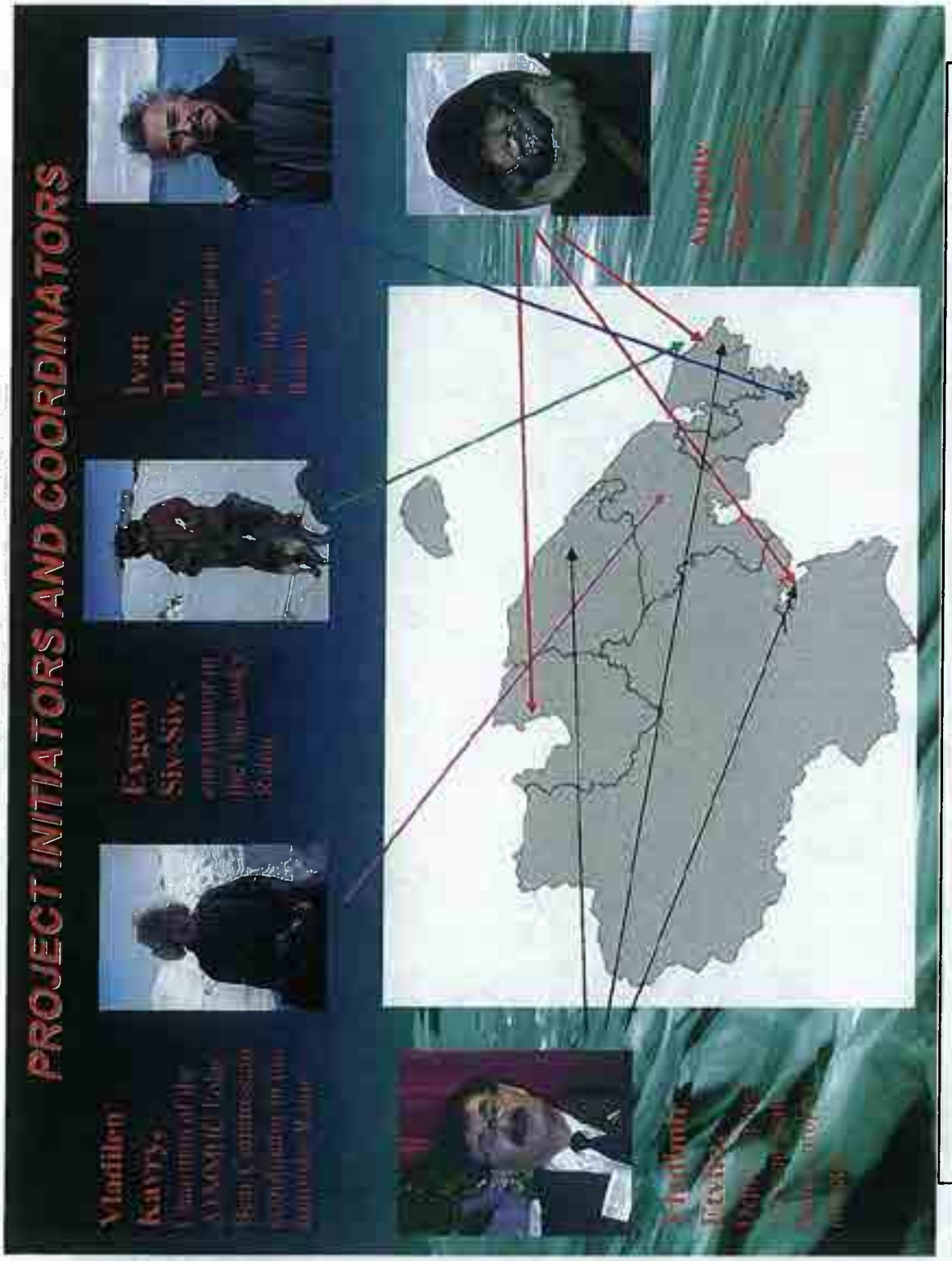


Fig. 1. Initiators and coordinators of the project
«Collection of Traditional Knowledge of Chukotka Native Peoples Regarding Polar Bear Habitat Use»

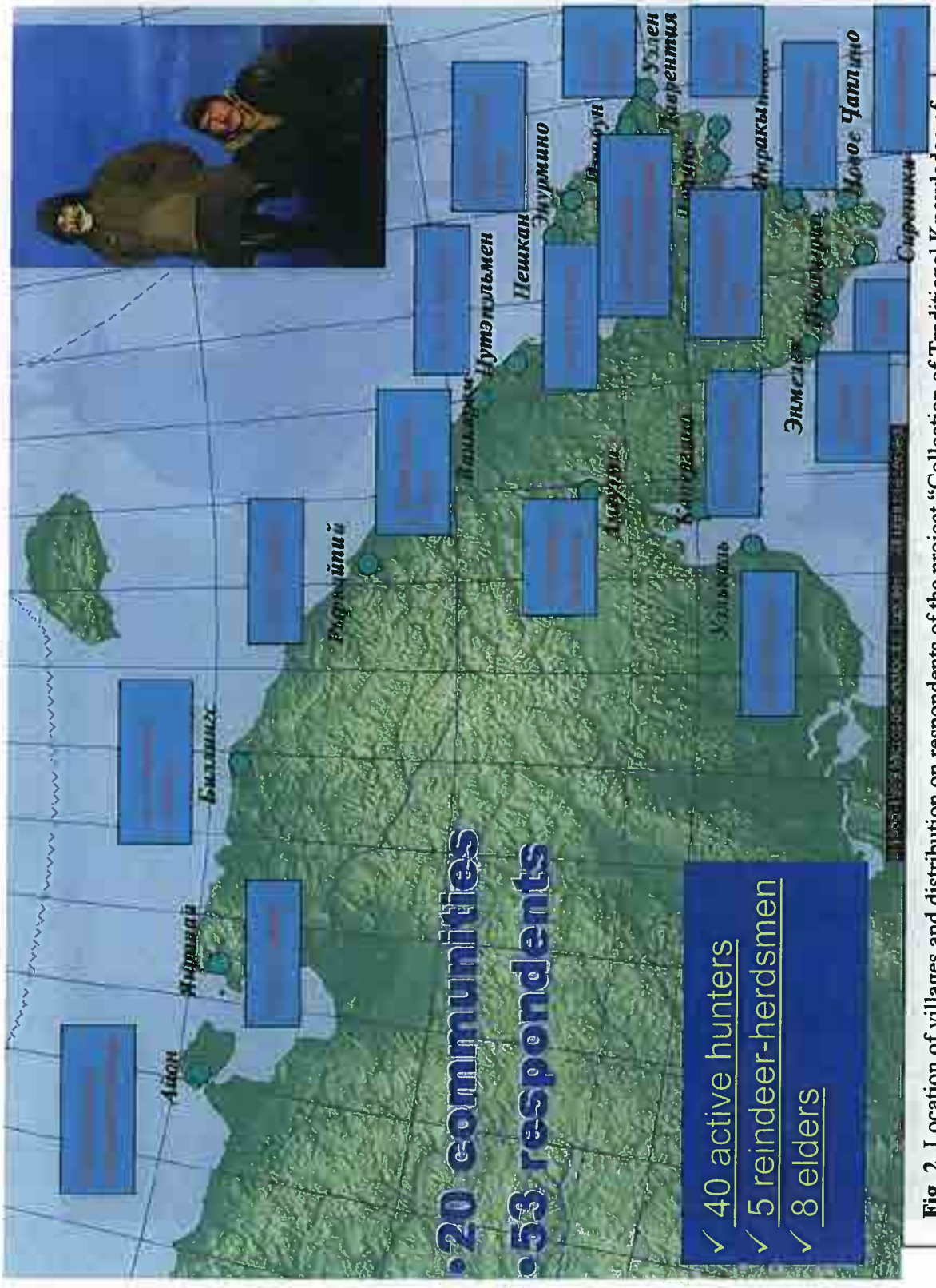
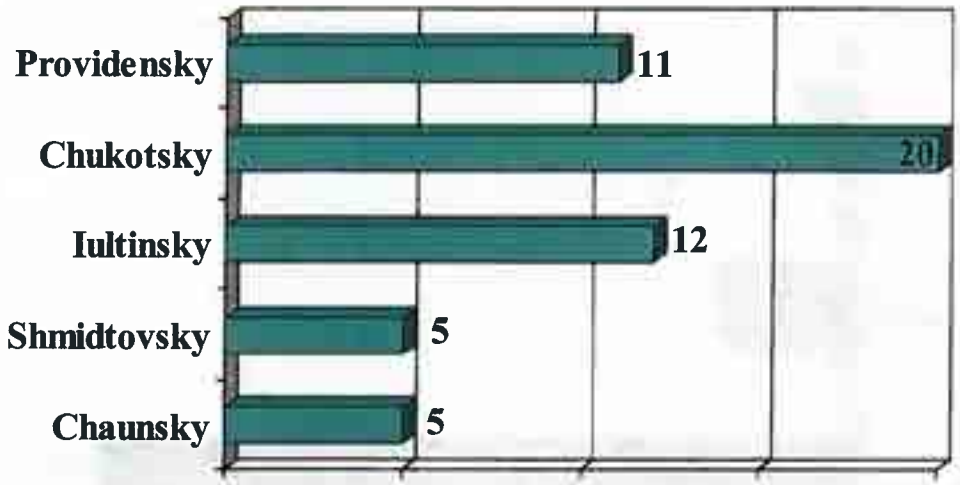


Fig. 2. Location of villages and distribution on respondents of the project "Collection of Traditional Knowledge of Chukotka Native Peoples Regarding Polar Bear Habitat Use

Fig. 3. Distribution of respondents by Chukotka Raions



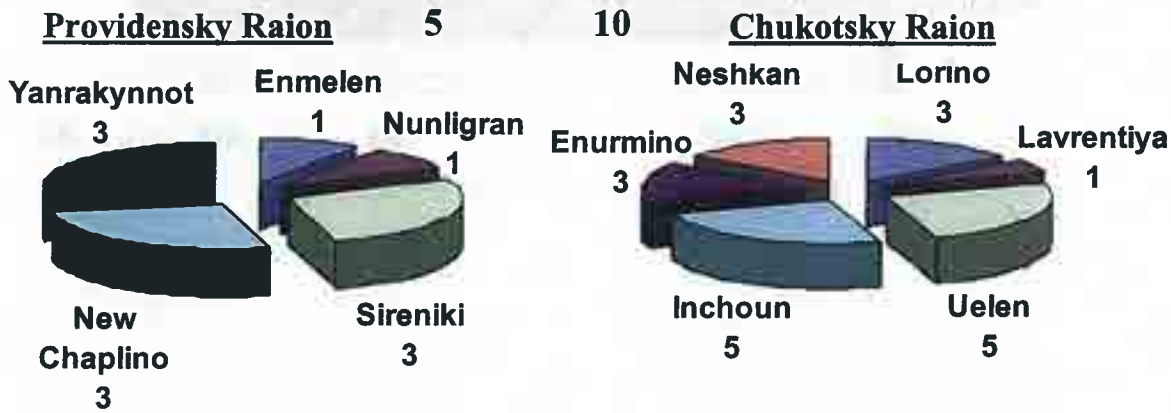


Fig. 4. Distribution of respondents by villages

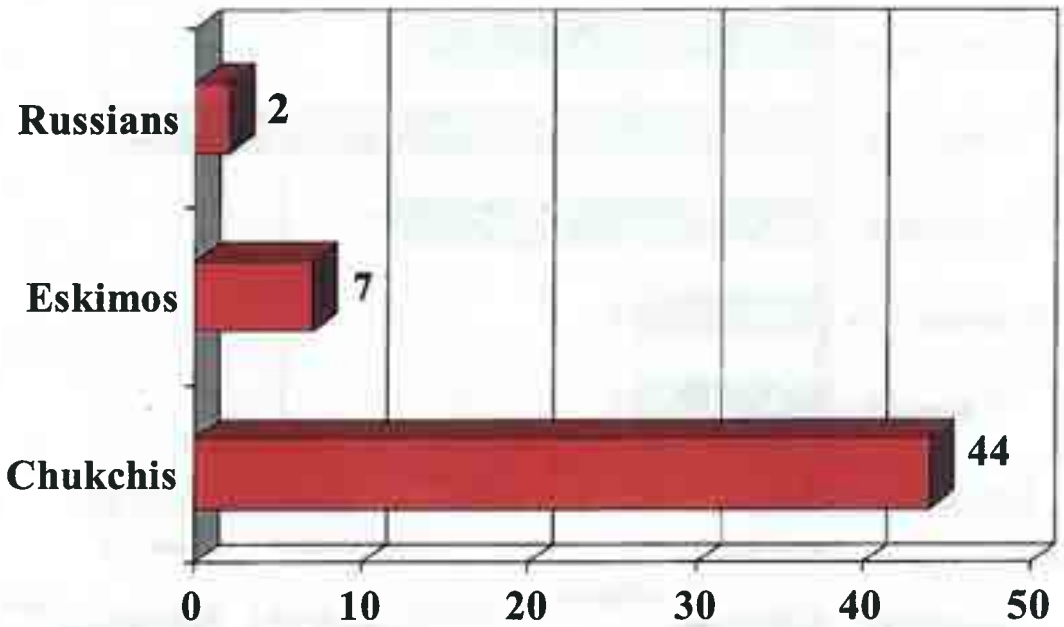


Fig. 5. Ethnicity of respondents

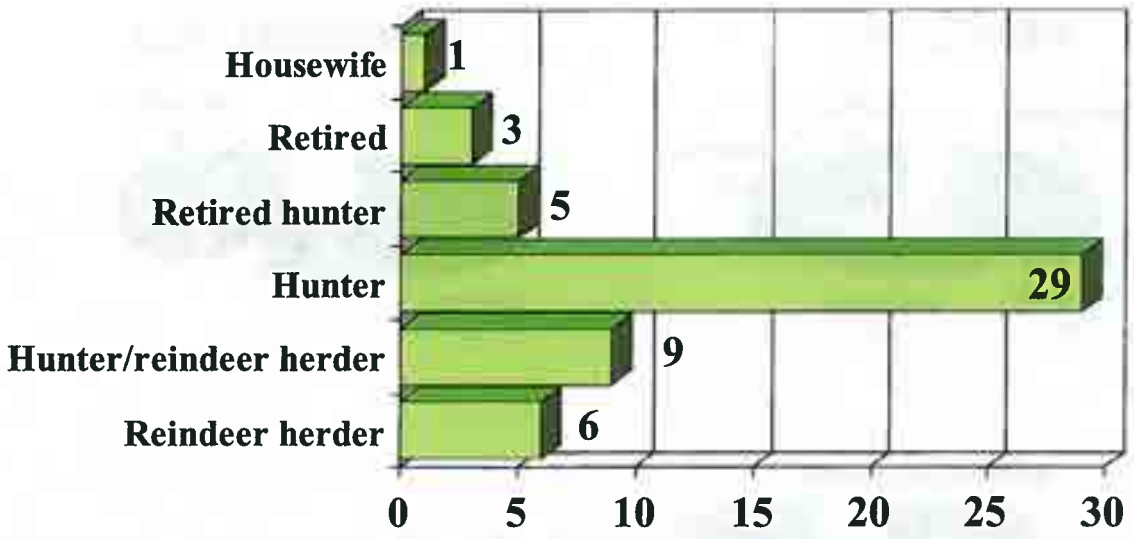


Fig. 6. Occupation of respondents

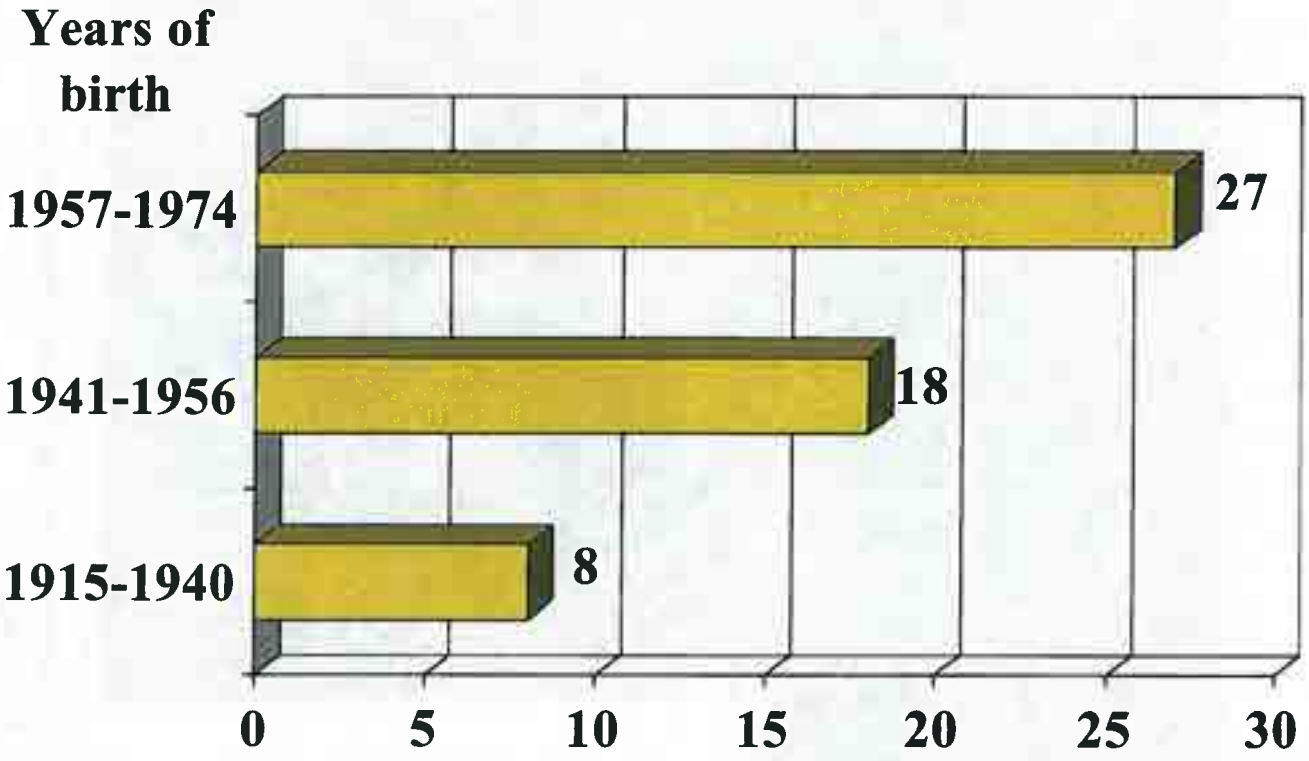


Fig. 7. Age of respondents.

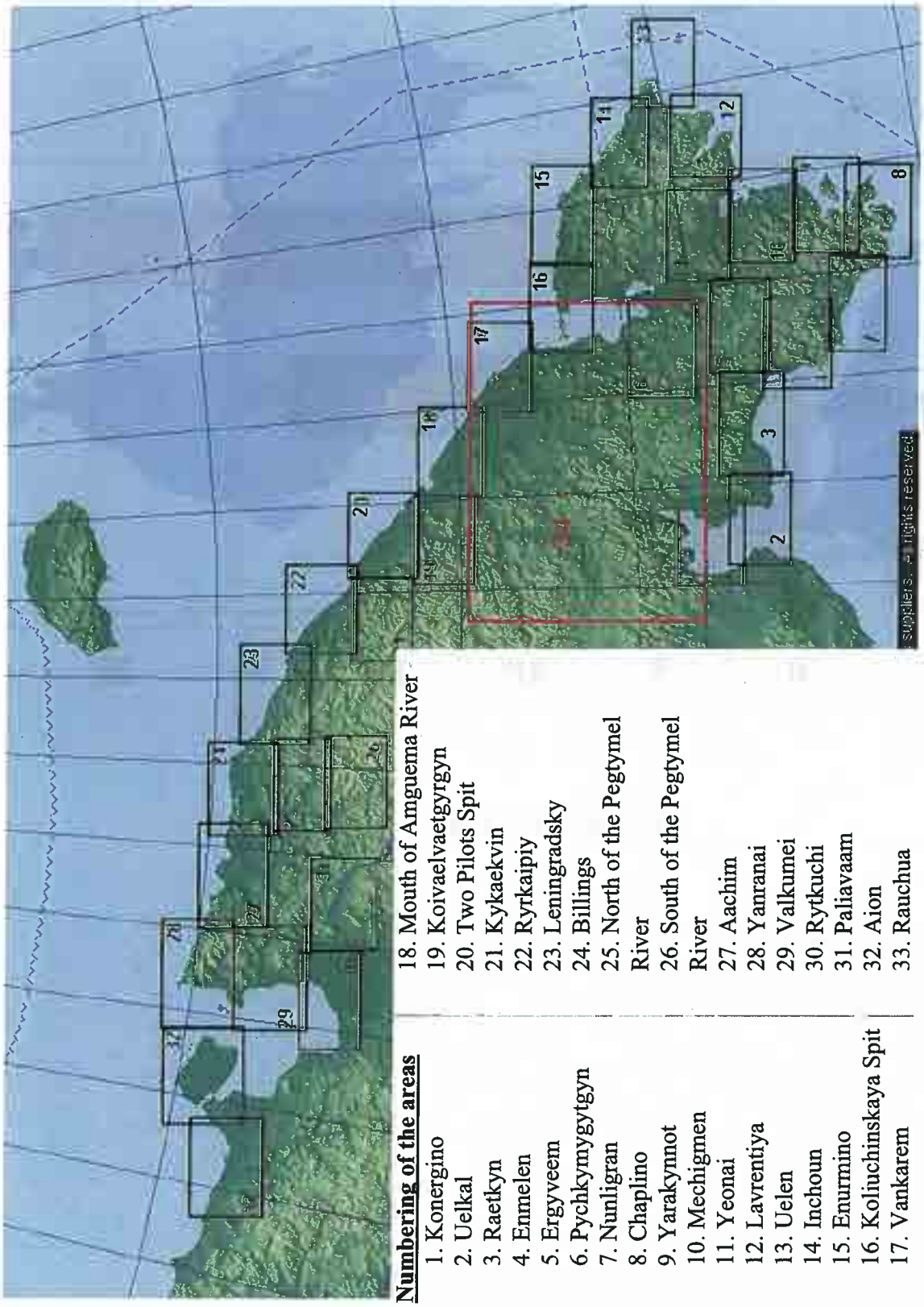


Fig. 8. The research area of the project «Collection of Traditional Knowledge Regarding Polar Bear Habitat Use» and location of the mapped areas.

Fig. 9. Polar bear habitat in the Konergino Area *(area 1 on Fig. 8)* between 1954 and 2001 by the information by two villagers of Konergino and 2 villagers of Uelkal.

There were no observations of dens;
B – seasonal migration routes;
C – feeding areas;

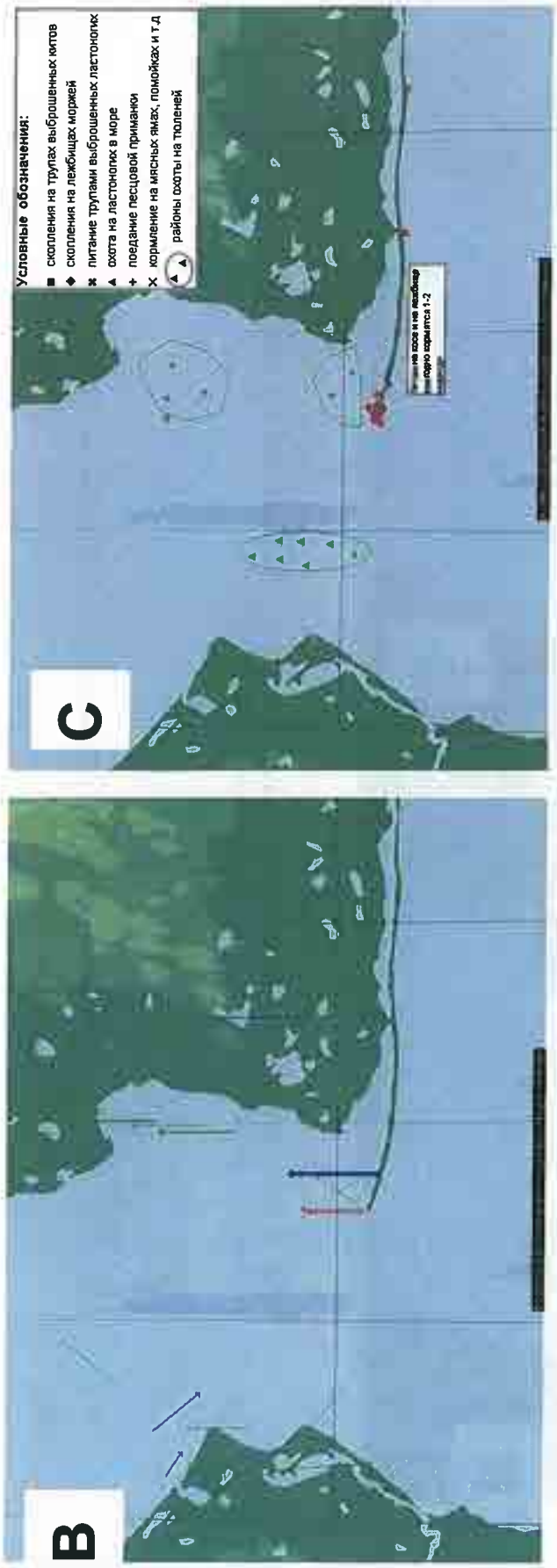


Fig. 10. Polar bear habitat in the Uelkal area (*area 2 on Fig. 8)* between 1977 and 2000 by the data provided by 2 villagers of Uelkal and 1 villager of Kopnergino

There were no observations of dens in the area;
B – seasonal migration routes;
C – feeding areas;

Fig. 11. Polar bear habitat in the Raetkyn area (*area 3 on Fig. 8*) between 1964 and 2000 by the data provided by 1 villager of Konergino, 1 villager of Enmelen and 1 villager of Nunligran.

There were no observations of dens in the area;
B – seasonal migration routes;
There were no observations of feeding in the area;

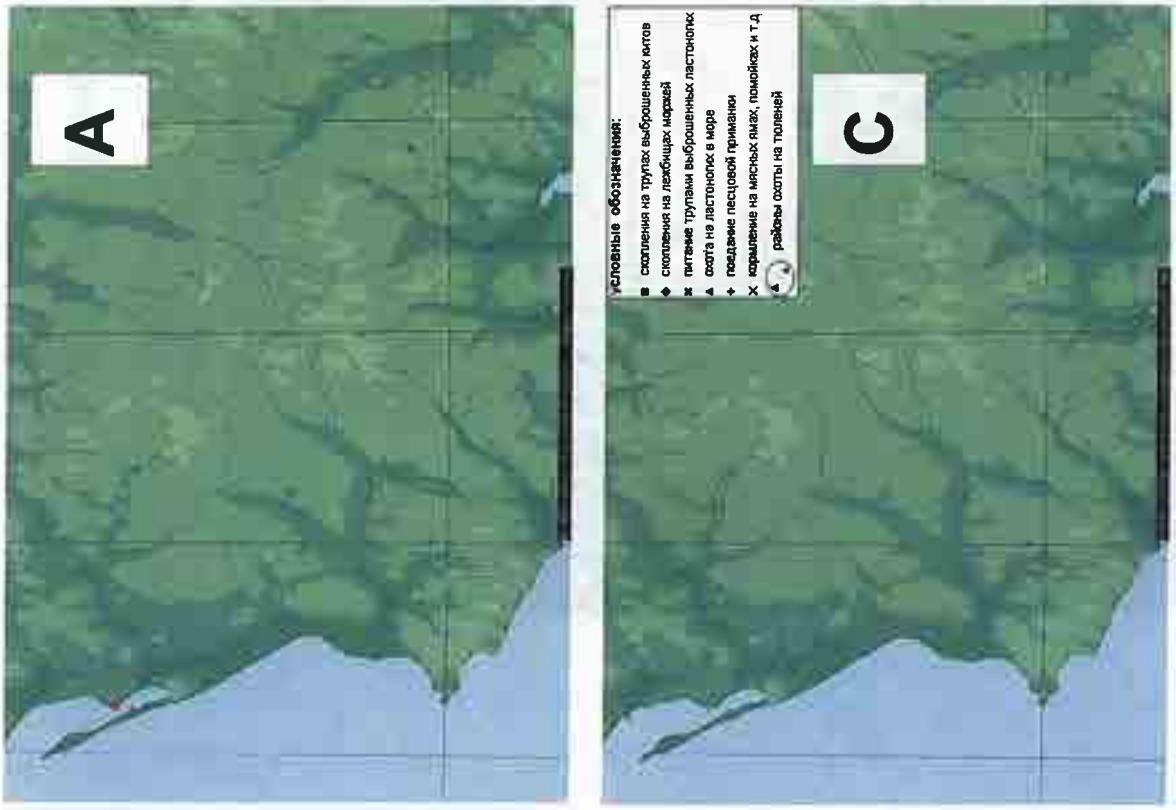


Fig. 12. Polar bear habitat in the Enmelen area (*area 4 on Fig. 8*) between 1983 and 2000 by the data provided by 1 villager of Enmelen and 1 villager of Nunligran.

A – areas of den arrangements;
B – seasonal migration routes;
C – feeding areas;

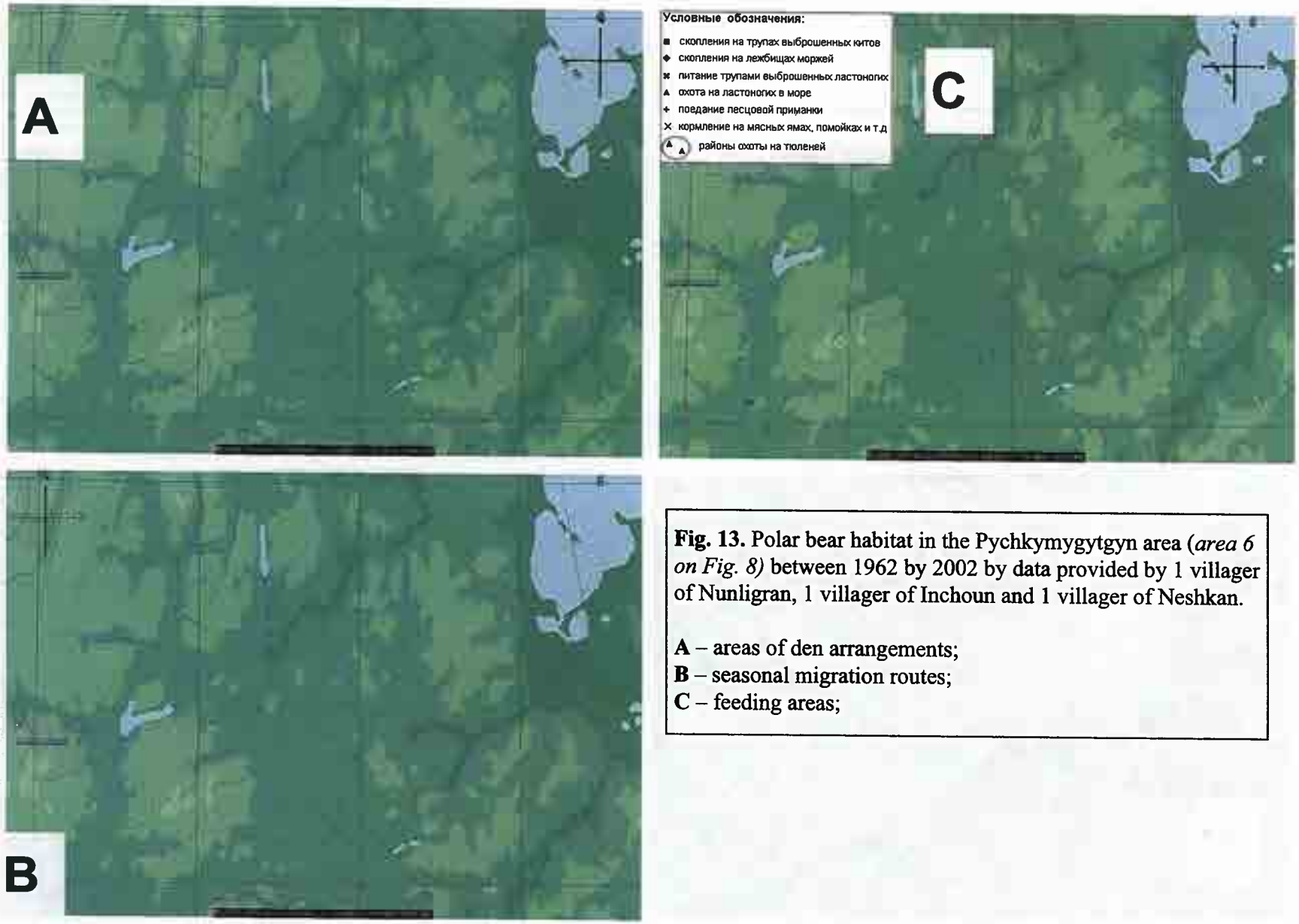


Fig. 13. Polar bear habitat in the Pychkymygytgyn area (*area 6 on Fig. 8)* between 1962 by 2002 by data provided by 1 villager of Nunligran, 1 villager of Inchoun and 1 villager of Neshkan.

A – areas of den arrangements;
B – seasonal migration routes;
C – feeding areas;

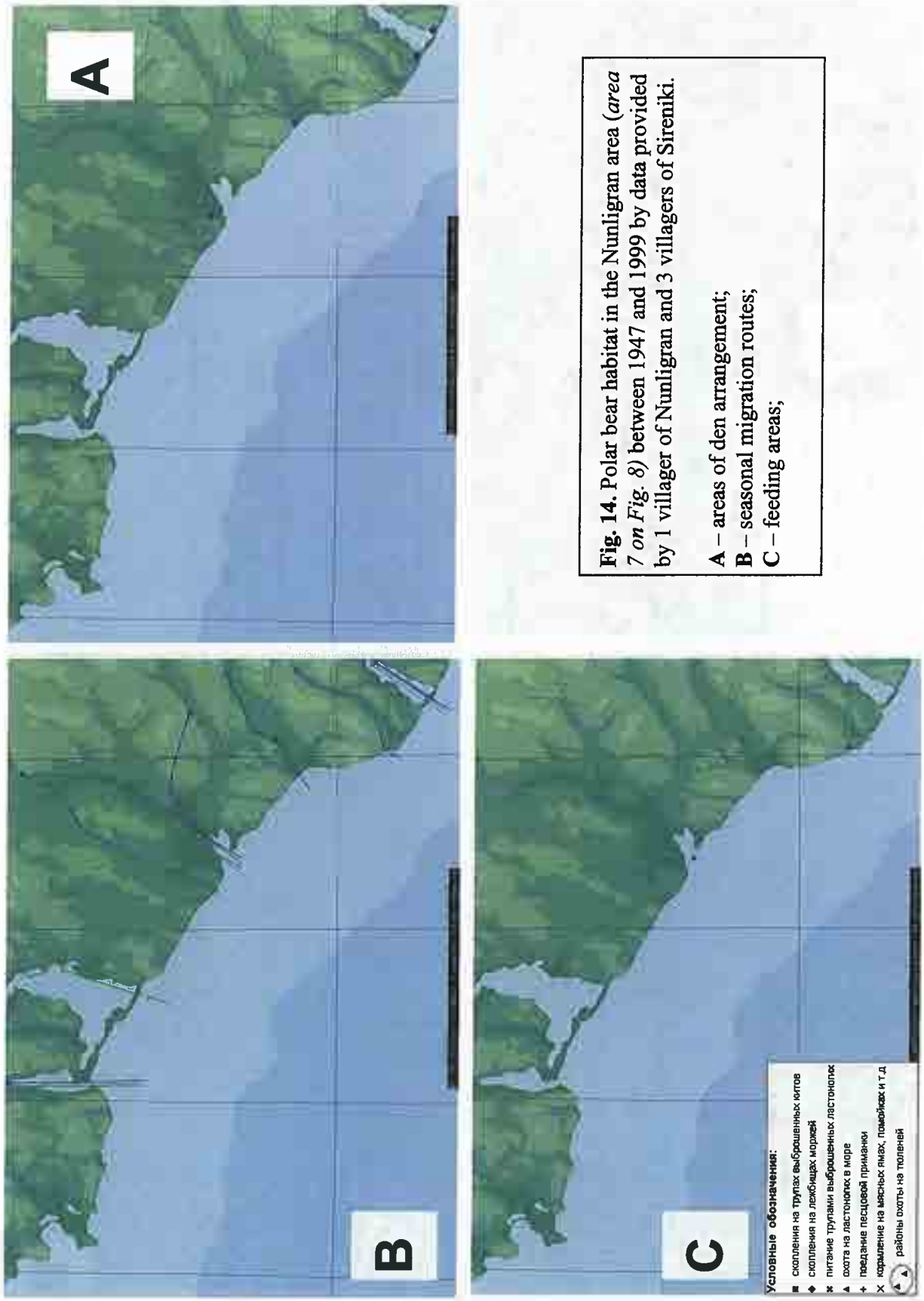


Fig. 14. Polar bear habitat in the Nunligran area (*area 7 on Fig. 8)* between 1947 and 1999 by data provided by 1 villager of Nunligran and 3 villagers of Sireniki.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

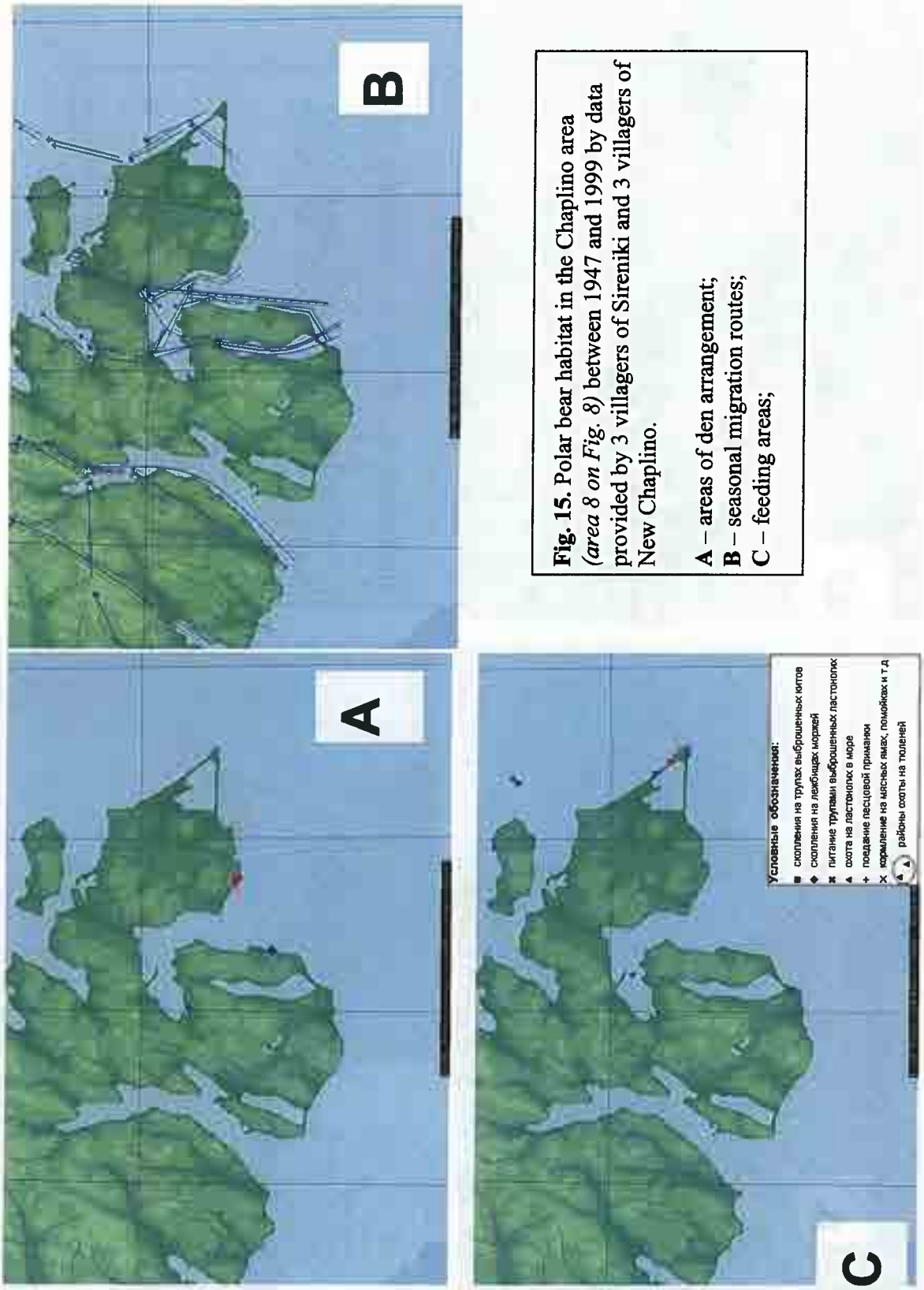


Fig. 15. Polar bear habitat in the Chaplino area *(area 8 on Fig. 8)* between 1947 and 1999 by data provided by 3 villagers of Sireniki and 3 villagers of New Chaplino.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

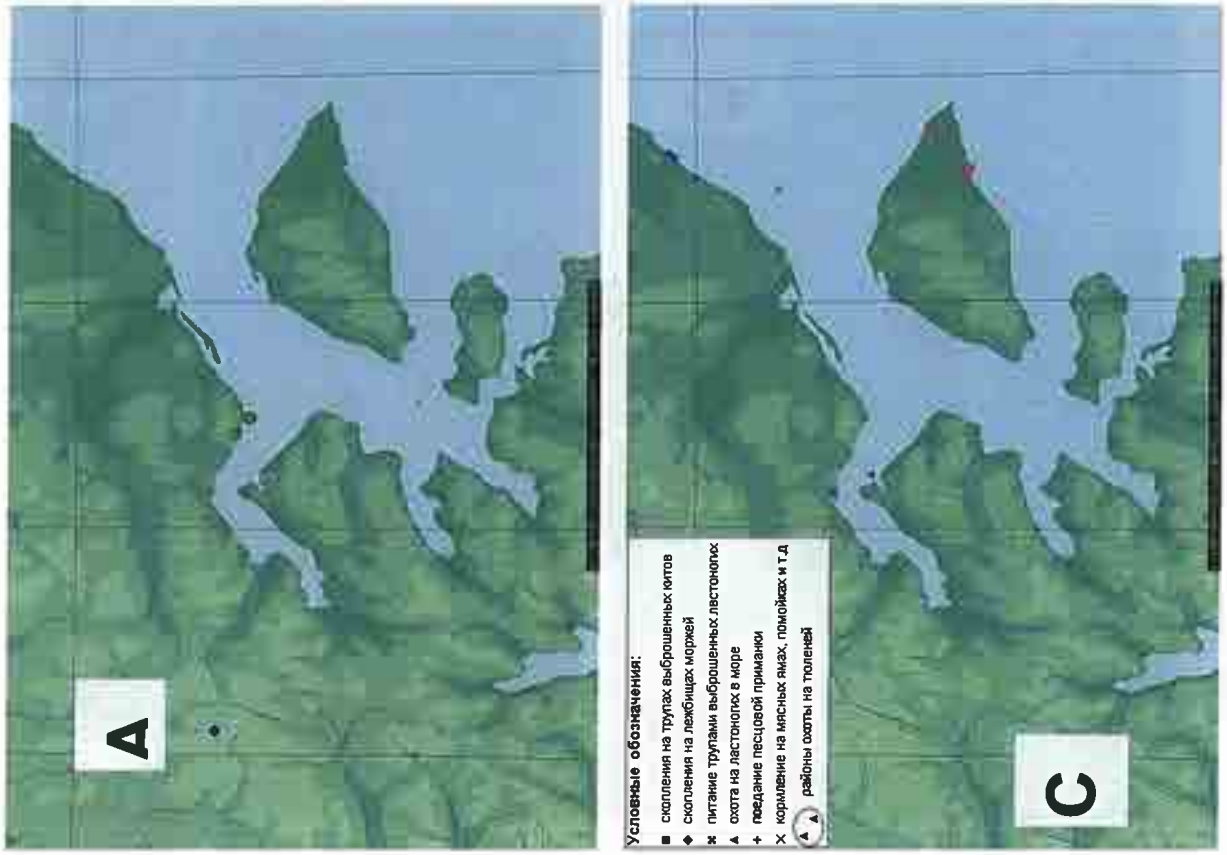


Fig. 16. Polar bear habitat in the Yanrakynnot area *(area 9 on Fig. 8)* between 1947 and 2002 by data provided by 3 Sireniki villagers, 3 villagers of New Chaplino, 3 villagers of Yanrakynnot and 2 hunters from Lorino.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

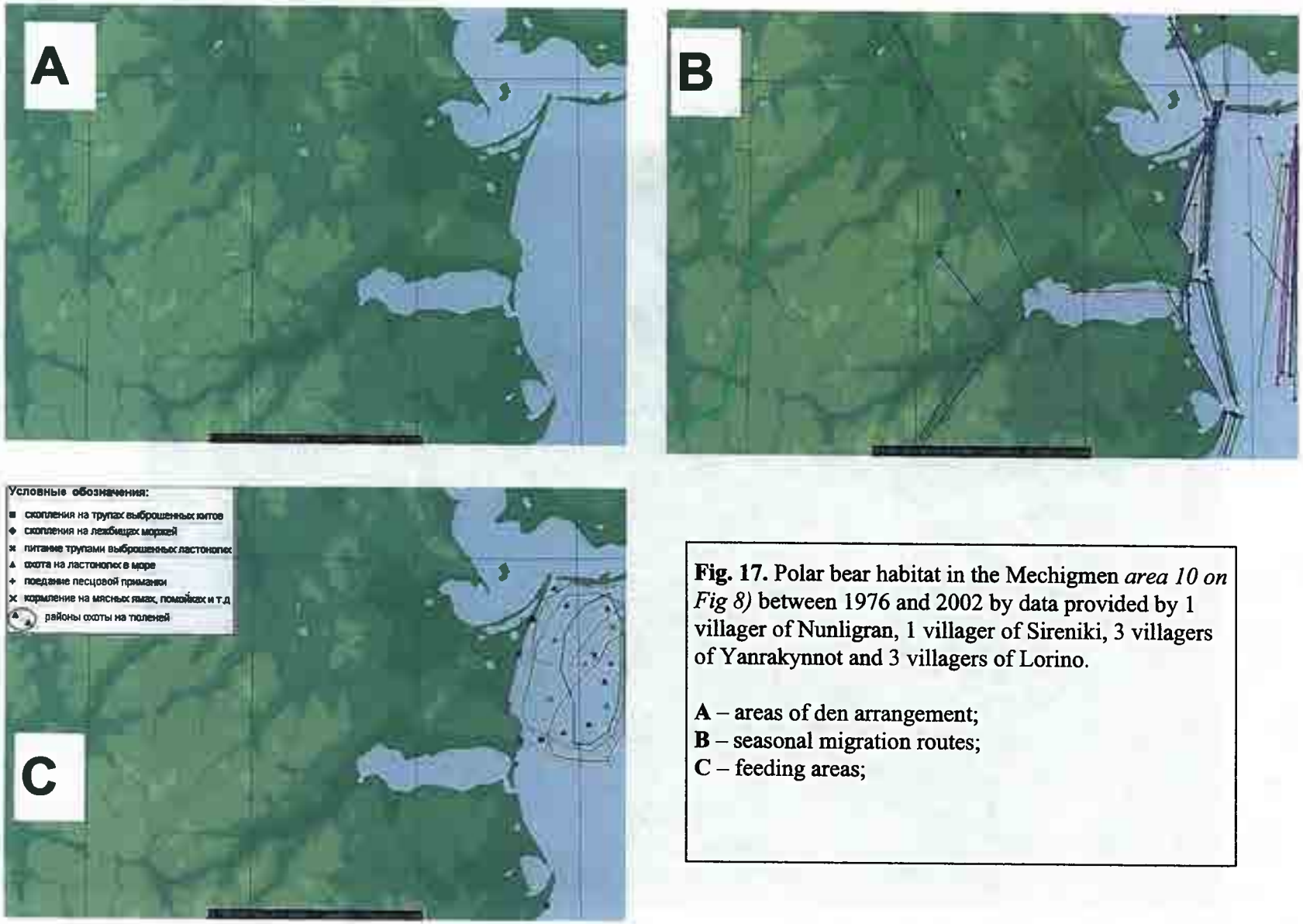


Fig. 17. Polar bear habitat in the Mechigmen *area 10 on Fig 8)* between 1976 and 2002 by data provided by 1 villager of Nunligran, 1 villager of Sireniki, 3 villagers of Yanrakynnot and 3 villagers of Lorino.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

Fig. 18. Polar bear habitat in the Yeonai area *(area 11 on Fig. 8)* between 1945 and 2002 by data provided by 1 villager of Nunligran and 3 villagers of Lorino.

There were no observations of dens in this area;
B – seasonal migration routes;
There were observations of feeding in this area;

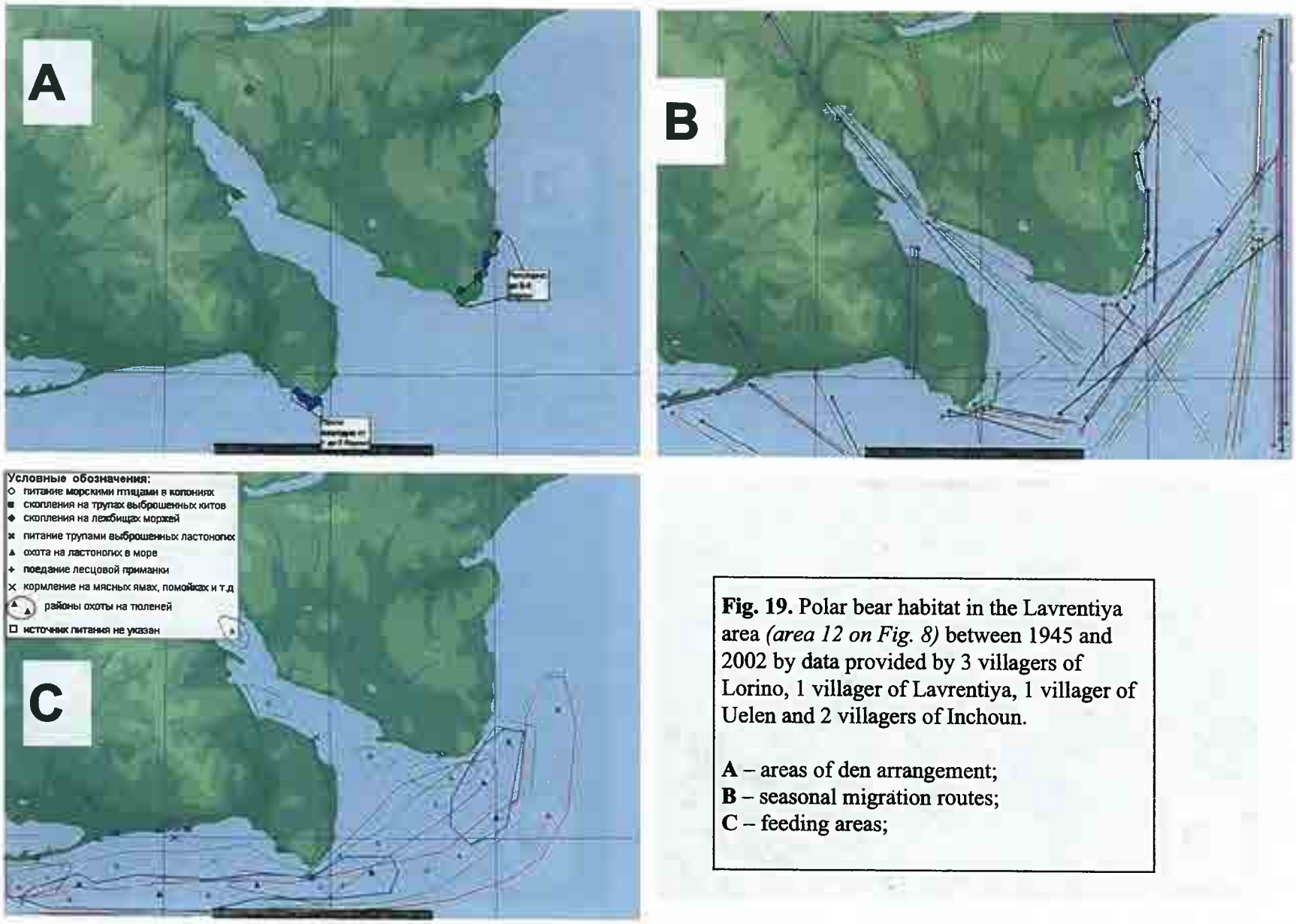


Fig. 19. Polar bear habitat in the Lavrentiya area *(area 12 on Fig. 8)* between 1945 and 2002 by data provided by 3 villagers of Lorino, 1 villager of Lavrentiya, 1 villager of Uelen and 2 villagers of Inchoun.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

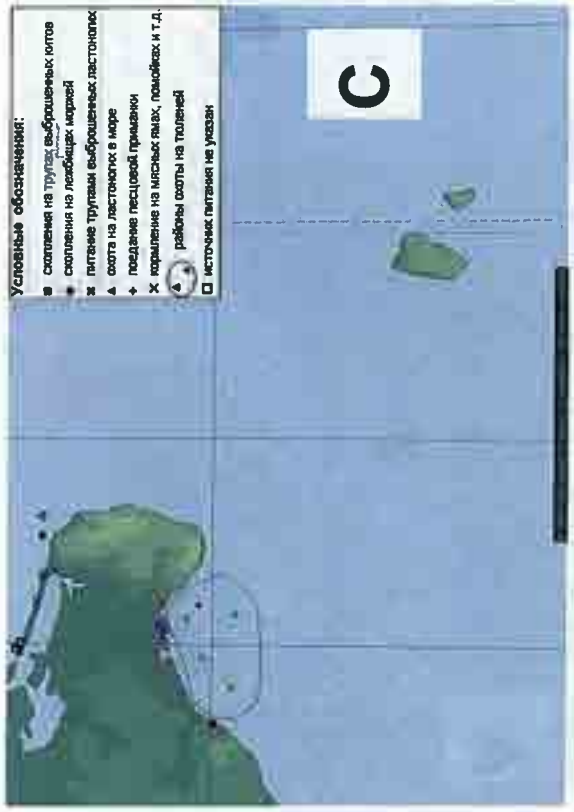


Fig. 20. Polar bear habitat in the Uelen area *(area 13 on Fig. 8)* between 1986 and 2002 by data provided by 5 villagers of Uelen and 5 villagers of
A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

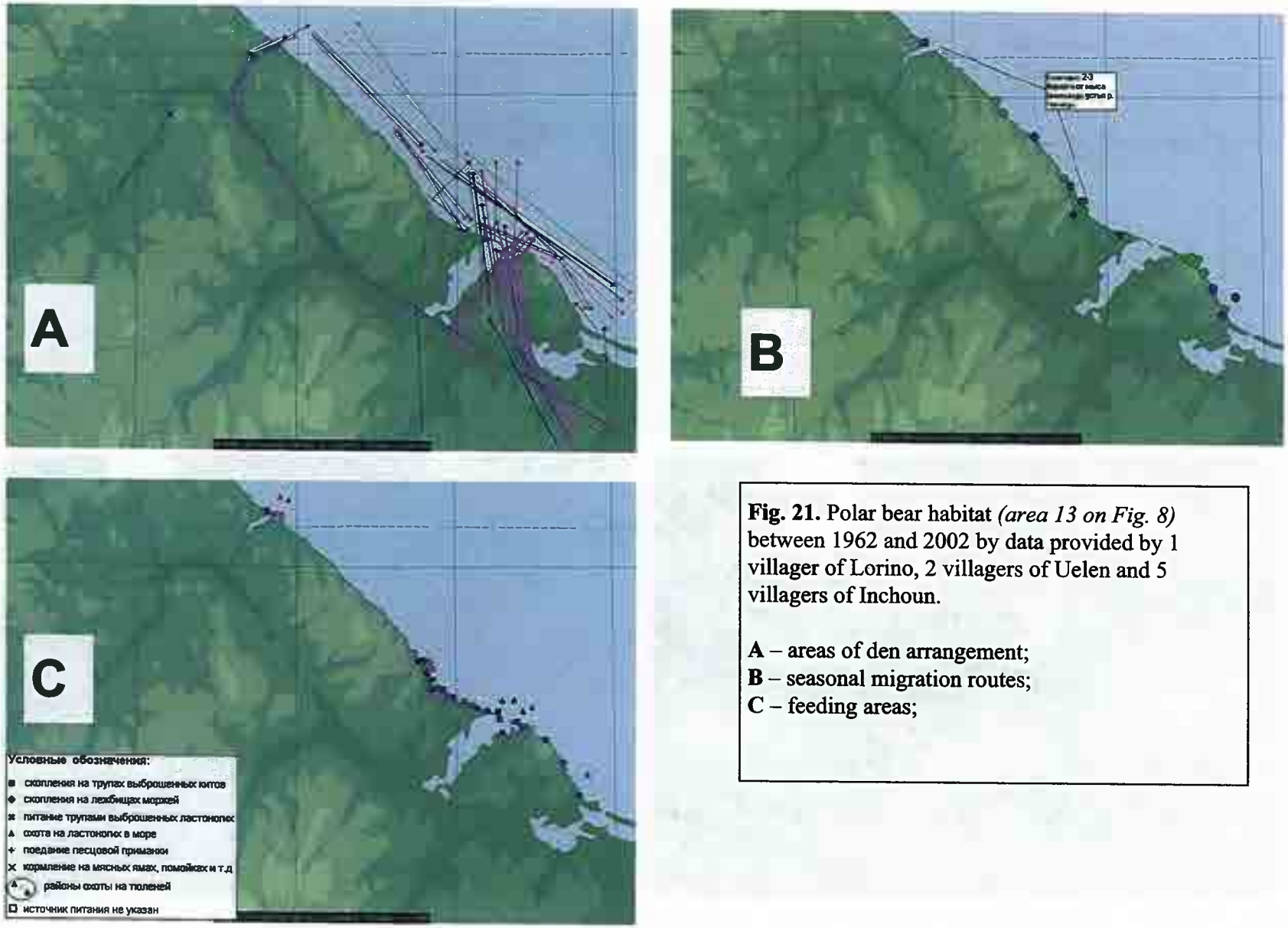


Fig. 21. Polar bear habitat *(area 13 on Fig. 8)* between 1962 and 2002 by data provided by 1 villager of Lorino, 2 villagers of Uelen and 5 villagers of Inchoun.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

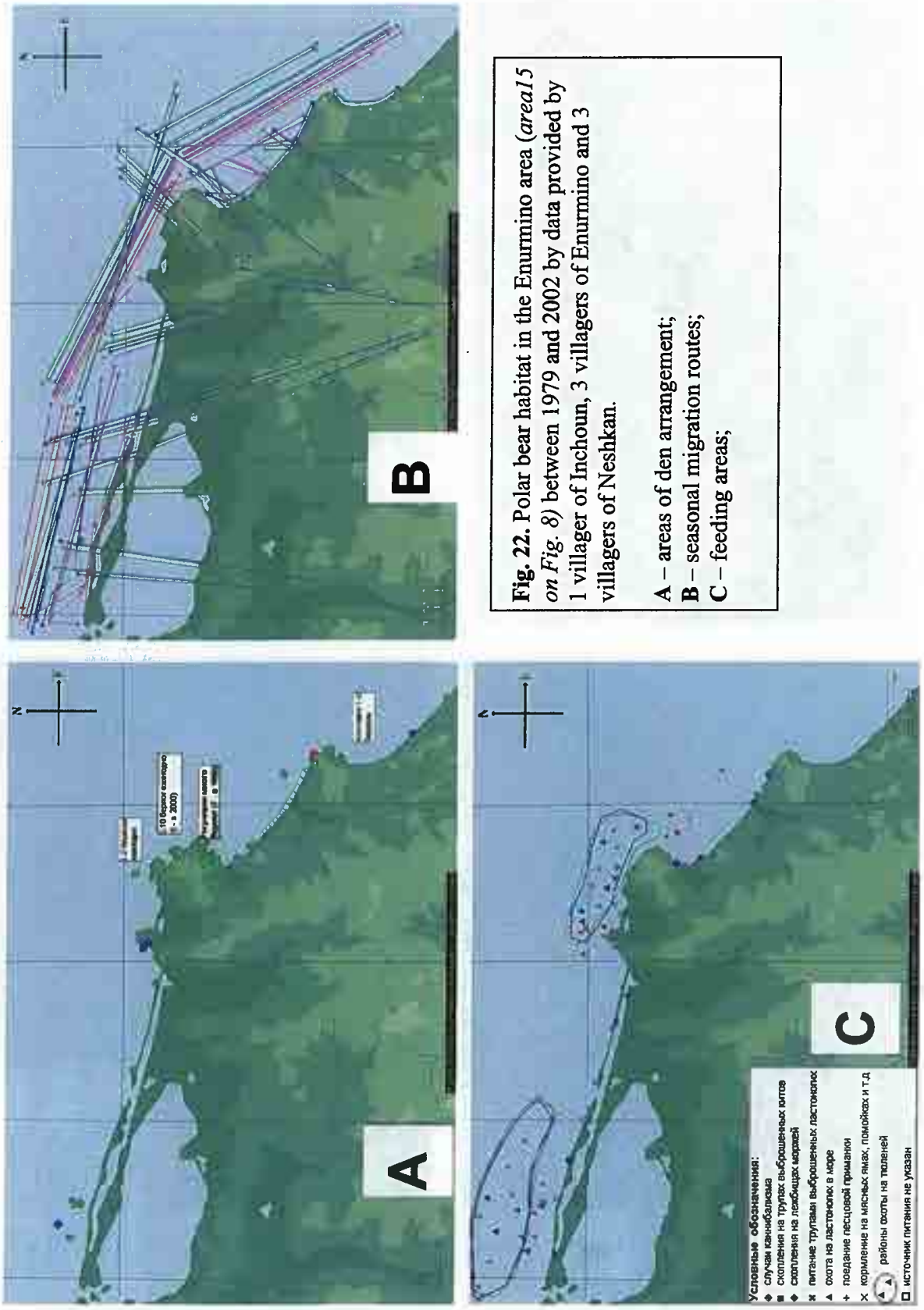


Fig. 22. Polar bear habitat in the Enurmino area (*area15 on Fig. 8)* between 1979 and 2002 by data provided by 1 villager of Inchoun, 3 villagers of Enurmino and 3 villagers of Neshkan.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

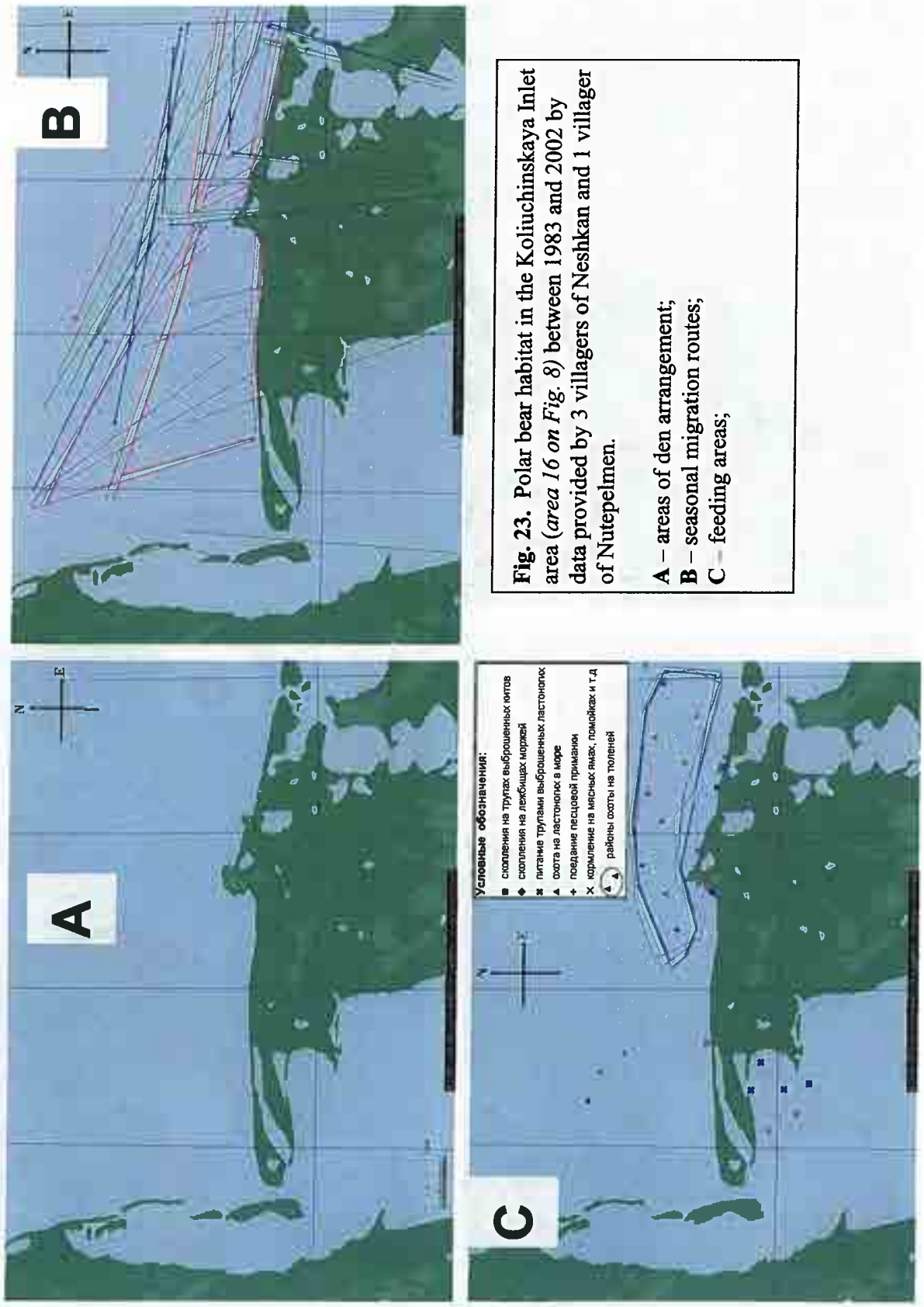


Fig. 23. Polar bear habitat in the Koliuchinskaya Inlet area (*area 16 on Fig. 8*) between 1983 and 2002 by data provided by 3 villagers of Neshkan and 1 villager of Nutepelmen.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

Fig. 24. Polar bear habitat in the Vankarem area (*area 17 on Fig. 8)* between 1943 and 2000 by data provided by 2 villagers of Nutepelmen, 3 villagers of Vankarem and 1 villager of Amguema.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

Fig. 25. Polar bear habitat in the Amguema area (*area 18 on Fig. 8*) between 1943 and 2000 by data provided by 3 villagers of Vankarem and 1 villager of Ryrkaipiy.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

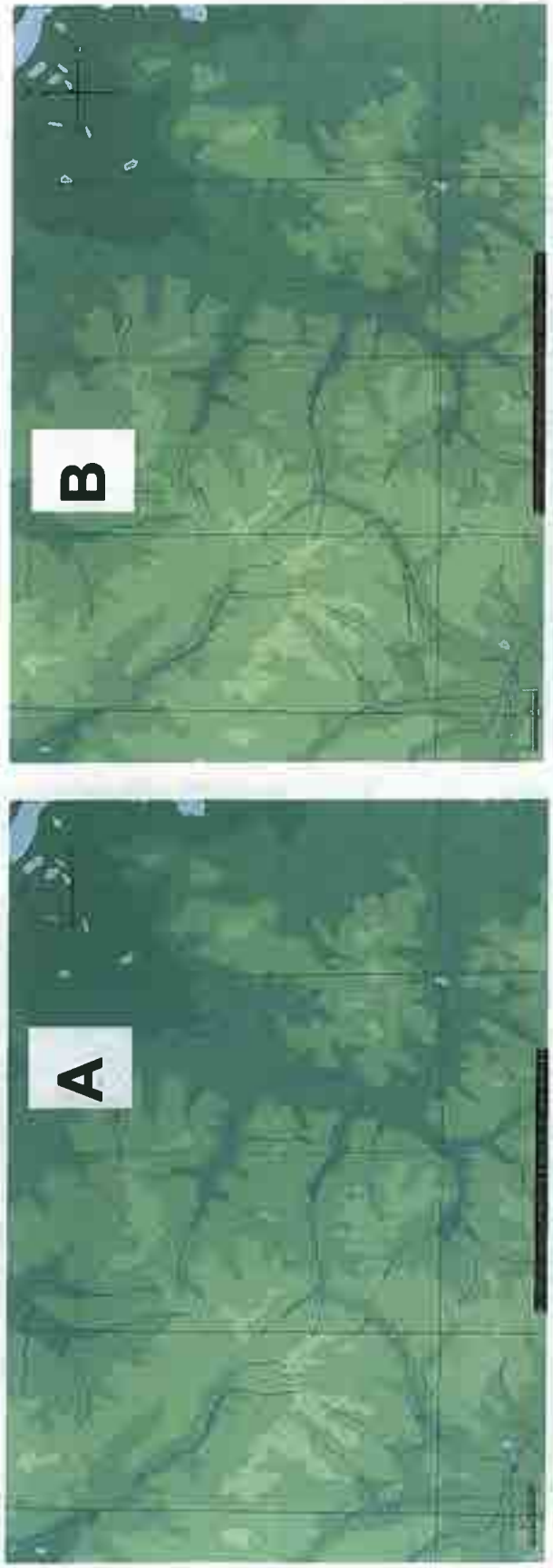


Fig. 26. Polar bear habitat in the Koivaelvaegytgyn area (*area 19 on Fig. 8*) between 1968 and 2000 by data provided by 1 villager of Ryrkaipiy.

A – areas of den arrangement;
B – seasonal migration routes;
There were observations of feeding in the area;

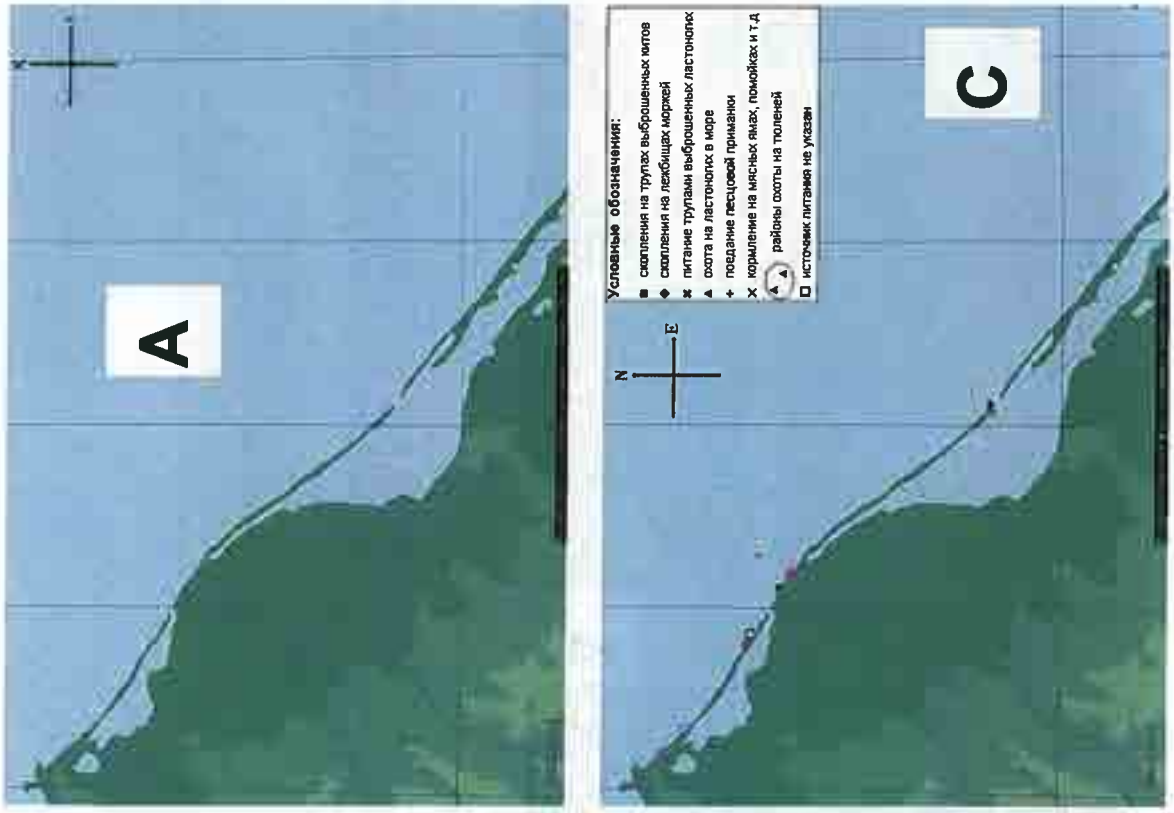


Fig. 27. Polar bear habitat in the Two Pilots Spit area (*area 20 on Fig. 8*) between 1971 and 2002 by data provided by 2 villagers of Ryrkaipiy.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

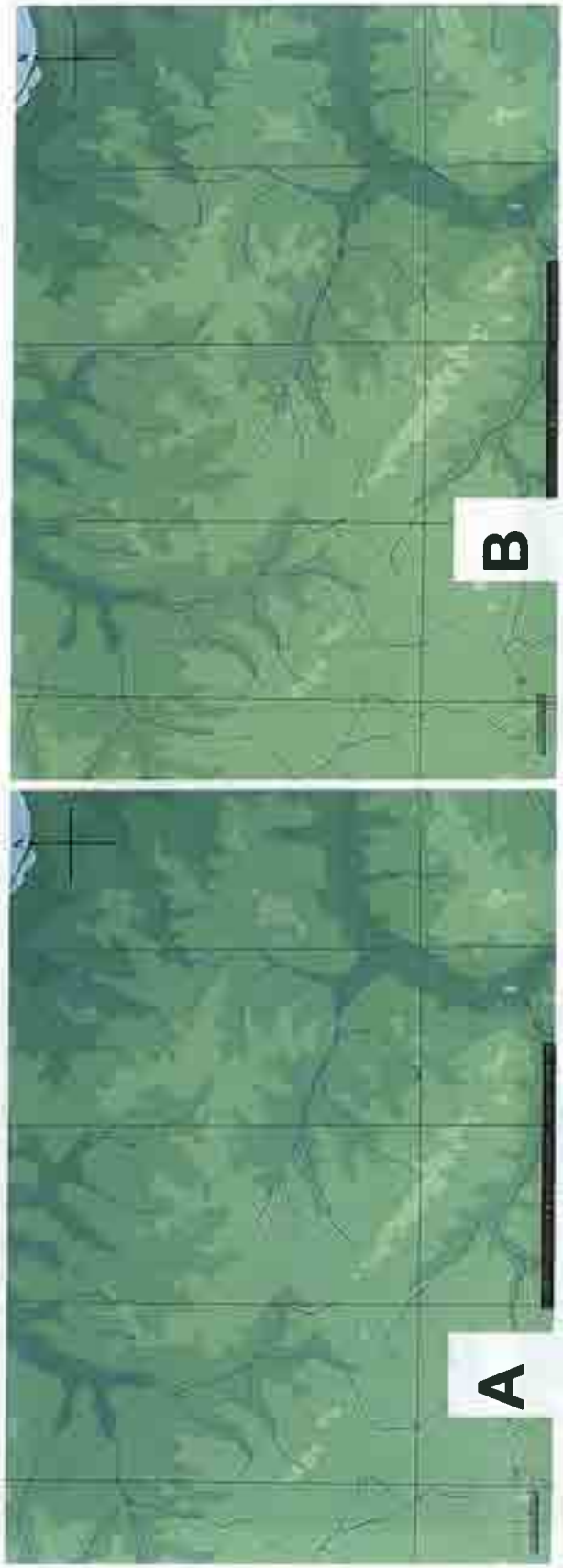


Fig. 28. Polar bear habitat in the Kyvekvin area (*area 21 on Fig. 8*) between 1971 and 2002 by data provided by 2 villagers of Ryrkaipiy.

A – areas of den arrangement;
B – seasonal migration routes;
There were no observations of feeding in the area;

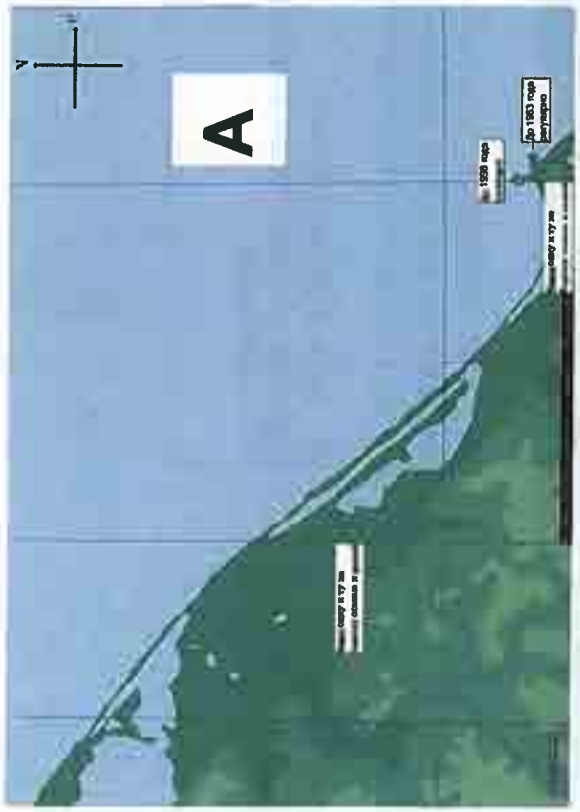


Fig. 29. Polar bear habitat in the Ryrkaipiy area (*area 22 on Fig. 8*) between 1963 and 2002 by data provided by 2 villagers of Ryrkaipiy.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

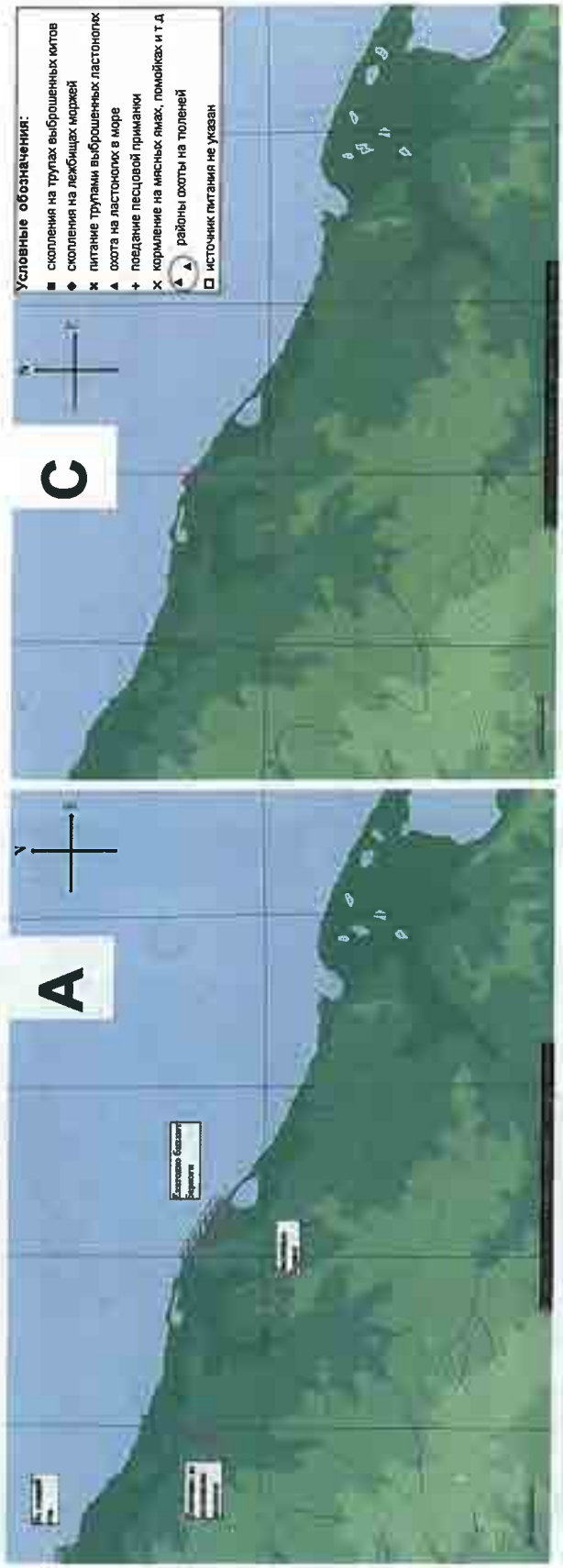
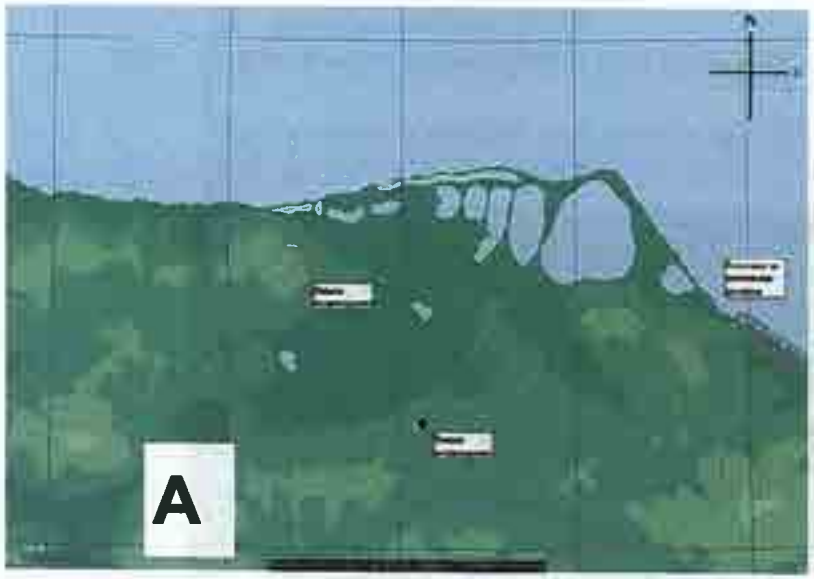
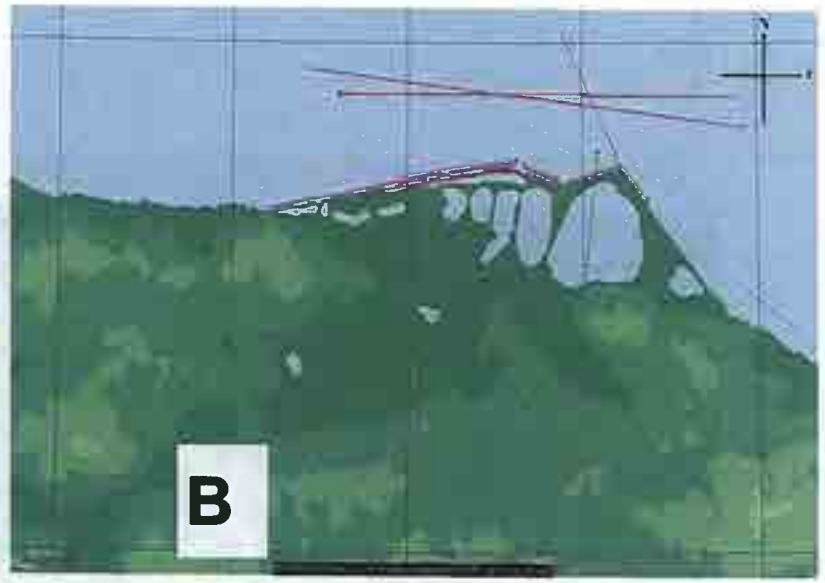


Fig. 30. Polar bear habitat in the Leningradsky area (*area 23 on Fig. 8*) between 1965 and 2002 by data provided by 1 villager of Ryrkaipiy and 2 villagers of Billings.

A – areas of den arrangement;
There were no observations of seasonal migrations there;
C – feeding areas;





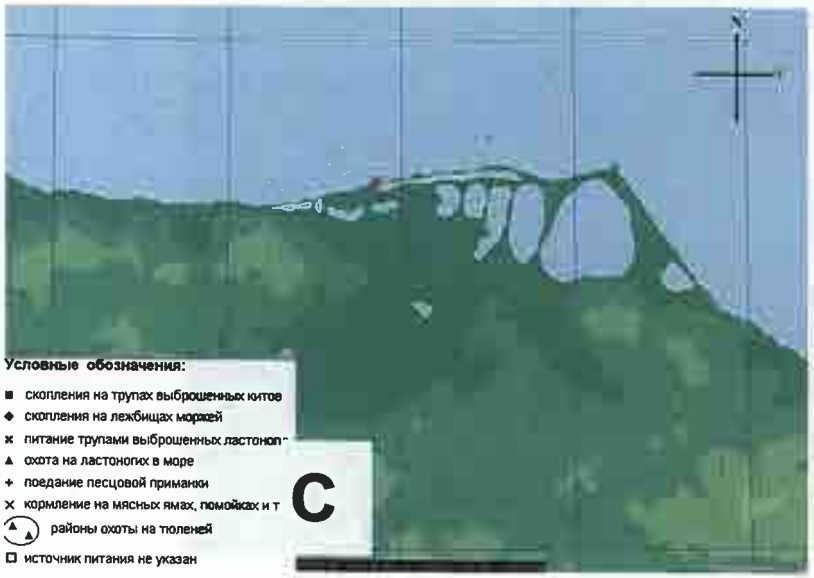


Fig. 31. Polar bear habitat in the Billings area (*area 24 on Fig. 8)* between 1965 and 2002 by data provided by 3 villagers of Billings.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

Fig. 33. Polar bear habitat in the area "South of the Pegtymel River" (*area 26 on Fig. 8*) between 1965 and 2002 by data provided by 2 villagers of Billings.

There were no observations of dens in the area;
B – seasonal migration routes;
There were no observations of feeding in the area;

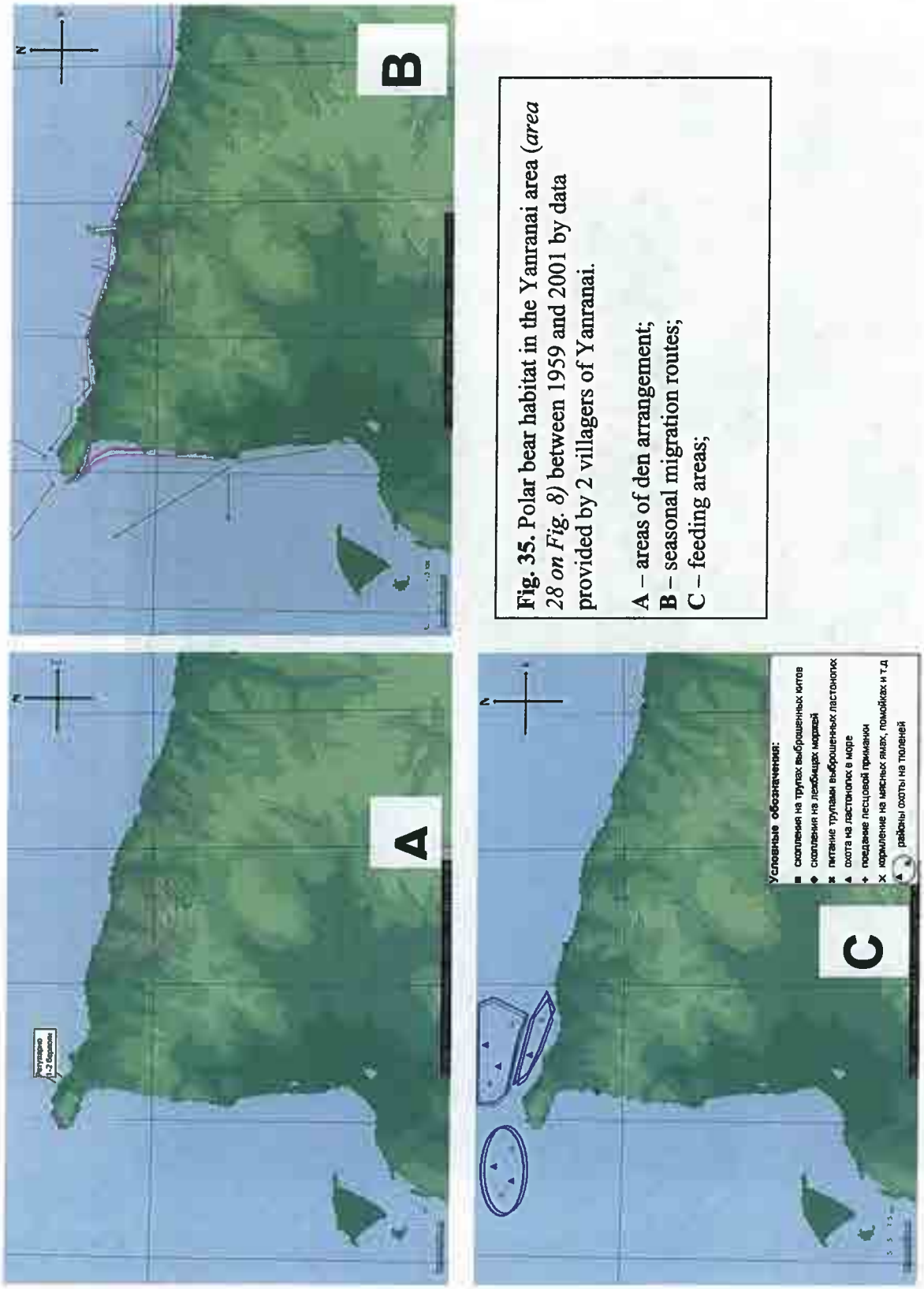


Fig. 35. Polar bear habitat in the Yanranai area (*area 28 on Fig. 8*) between 1959 and 2001 by data provided by 2 villagers of Yanranai.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

Fig. 36. Polar bear habitat in the Valkumei area (*area 29 on Fig. 8*) between 1965 and 2001 by data provided by 1 villager of Yanranai.

There were no observations of dens in the area;
B – seasonal migration routes;
There were no observations of feeding in the area;

Fig. 37. Polar bear habitat in the Paliavaam area (*area 30 on Fig. 8)* between 1975 and 2002 by data provided by 1 villager of Billings and 1 villager of Yanranai.

There were no observations of dens in the area;
B – seasonal migration routes;
There were no observations of feeding in the area;

Fig. 38. Polar bear in the Paliavaam area (*area 31 on Fig. 8)* between 1979 and 2002 by data provided by 1 villager of Billings.

There were no observations of dens in the area;
B – seasonal migration routes;
There were no observations of feeing in the area;

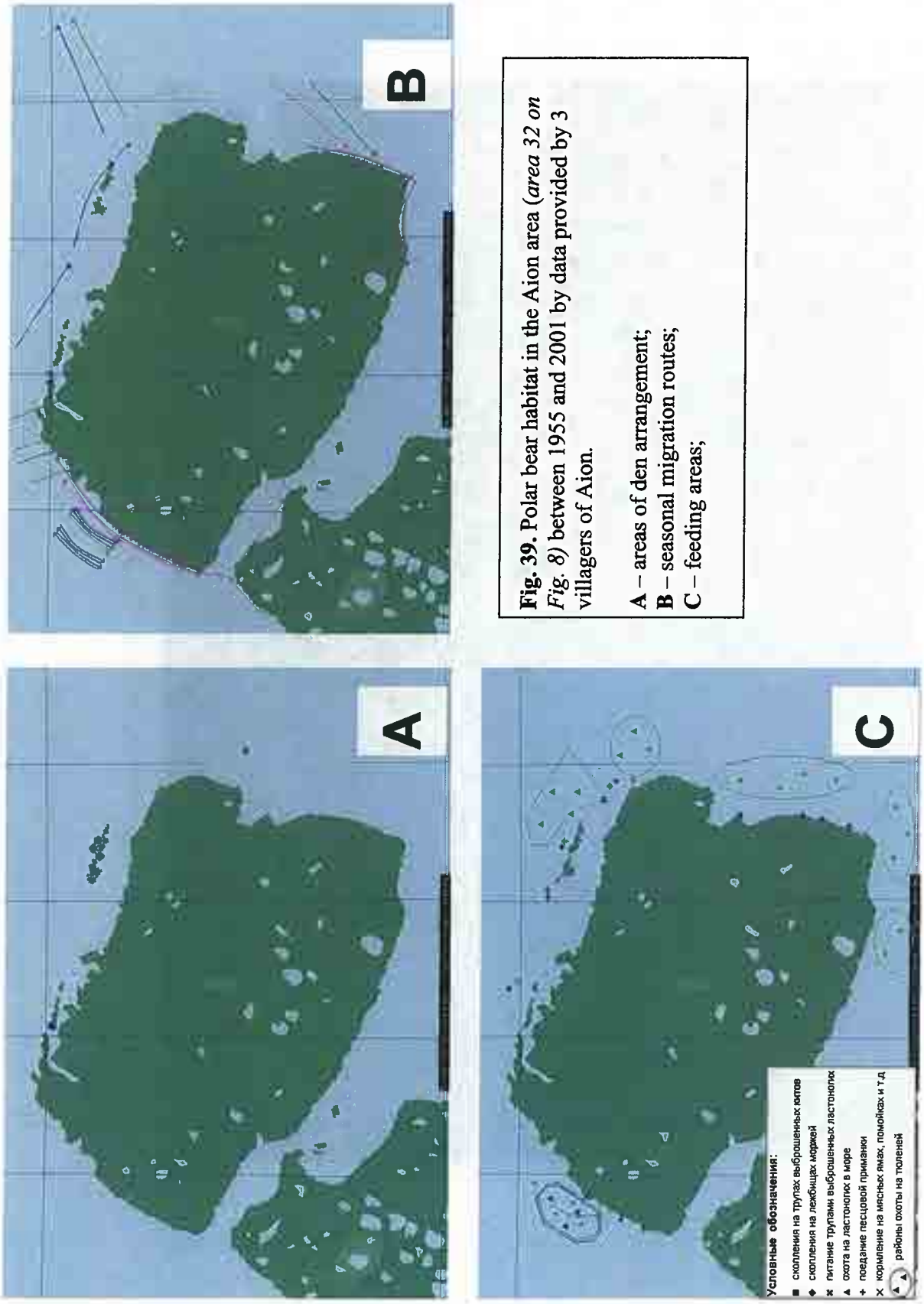


Fig. 39. Polar bear habitat in the Aion area (*area 32 on Fig. 8*) between 1955 and 2001 by data provided by 3 villagers of Aion.

A – areas of den arrangement;
B – seasonal migration routes;
C – feeding areas;

Fig. 40. Polar bear habitat in the Rauchua area (*area 33 on Fig. 8*) between 1962 and 2001 by data provided by 1 villager of Aion.

There were no observations of dens in the area;
B – seasonal migration routes;
There were no observations of feeding in the area;

Fig. 41. Intracontinental movements of polar bears between the Krest Bay (The Bering Sea) and the Chukchi Sea (*area 34 on Fig. 8)* between 1960 and 2000 by data provided by 3 villagers of Anguema and 2 villagers of Vankarem.

There were no observations of dens in the area;
B – seasonal migration routes;
There were no observations of feeding in the area;

Fig. 42. Areas with regular high density of polar bear dens over Chukotka in fall according to native peoples' traditional knowledge.

Fig. 43. Areas with regular high density of polar bear dens over Chukotka in winter according to the native peoples' traditional knowledge *(squares indicate findings of dens on sea ice)*.

Fig. 44. Areas with regular high density of polar bear dens over Chukotka in spring according to the native peoples' traditional knowledge (*squares indicate findings of dens on sea ice*).

Fig. 45. Areas with regular high density of polar bear dens over Chukotka in spring according to the native peoples' traditional knowledge.

Fig. 46. Movements of polar bears over Chukotka in fall according to the native peoples' traditional knowledge

Fig. 47. Movements of polar bears over Chukotka in winter according to the native peoples' traditional knowledge

Fig. 48. Movements of polar bears over Chukotka in spring according to the native peoples' traditional knowledge

Fig. 49. Movements of polar bears over Chukotka in summer according to the native peoples' traditional knowledge.

Fig. 50. Feeding areas of polar bears in Chukotka in fall according to the native peoples' traditional knowledge *(for notation conventions see Appendix 7)*.

Fig. 51. Feeding areas of polar bears in Chukotka in winter according to the native peoples' traditional knowledge *(for notation conventions see Appendix 7)*.

Fig. 52. Feeding areas of polar bears in Chukotka in spring according to the native peoples' traditional knowledge *(for notation conventions see Appendix 7)*.

Fig. 53. Feeding areas of polar bears in Chukotka in summer according to the native peoples' traditional knowledge *(for notation conventions see Appendix 7).*

Appendix 1.

QUESTIONNAIRE № 1

Given names, family name of respondent :

_____

Map Code:_____

Date of interview : _____ Started at _____ Finished at _____

Date of Birth:_____

How many years have you been living in this village? _____

Are you an active hunter? Yes/ No

When was the last year of active hunting for you? _____

Description of hunting areas: _____

1. Have you ever seen polar bear in a village? Yes / No

А) Location of bear in village_____

Б) What was attractive for a bear in the village (site of butchering of whales, walruses, rubbish dump,
etc.)_____

В) Month and year of observation _____

Г) How long did a bear stay in the village?_____

Д) Sex and age of a bear (age counting out should be done from an assumed date of birth on January, 1)

Adult male

Adult female

Young (Bear older than 2 years without a mother)

Teenager (Bear older than 2 years with a mother)

One-year old (the cub of second year of life with a mother)

The cub has borned this year with a mother

Age and sex have not defined.

Е) On the basis of attributes an age and sex of a bear were defined _____

_____

Ж) Behavior of a bear in a village _____

_____

2. Are their becoming more or less bears now than there were before? Are they becoming more well-fed or thinner, than before? In your opinion, what are the reasons for such changes?

_____

3. Have you had any concerns about the future of polar bears? What are your concerns?

_____

4. In your opinion, what should Russia and USA do together for conservation and welfare of polar bears in the future?_____ _____

Appendix 2.

INFORMATION ON DEN

Map code:_____ **page**_____

Identification sign	Name of the sign (polygon, dot, arc)	Location of den (area on the map)	Description of the place of observation (surrounding objects)	Time year/mon.	Exits to

Appendix 3.

INFORMATION ON FEEDING

Map code:_____ **page**_____

Identification sign	Location of the place of feeding (area on the map)	Description of the place of observation (surrounding objects)	Time of observation year/mon.	Source of feeding

Appendix 4.

INFORMATION ON SEASONAL MIGRATION

Map code:_____ **page**_____

Identification sign	Location of the migration route	Time of observation year/mon.	Movement direction

Appendix 5.

QUESTIONNAIRE № 2

1. Sourcers of your knowledge about polar bears.
1.1. Literature.
1.2. Mass media.
1.3. Parents and relatives.
1.4. From familiar people and friends.
1.5. School, educational institute.
1.6. Other.

2. My knowledge about dens of polar bear.
2.1. Have seen on the coast (mark place on a map).
2.2. In tundra (mark place on a map).
2.3. In other place (point out).
2.4. Time.
2.5. I've been told about a den.

3. Meeting with polar bear.
3.1. Place of meeting (mark on a map).
3.2. When.
3.3. Time, duration of meeting.
3.4. What were sex and age groups.
3.5. Features of animal behavior.

4. Case of polar bear coming to the villages.
4.1. Time, duration of staying
4.2. Places to visit (rubbish, meat freeze, burchuring site and so on).
4.3. Methods of scaring of polar bears from the villages.
4.4. Characteristics of animals behavior.

5. Case of polar bears congregations around beached carcasses of animals.
5.1. Places of animals washed ashore.
5.2. How many animals were on a site.
5.3. Characterestics of behavior of animals.
5.4. Other.

6. Methods of hunting on polar bears.
6.1. On foot in hummocks, in tundra.
6.2. On a dog sledge.
6.3. On a snow machine.
6.4. On a vezdekhod (cross country vehicle).
6.5. On whaleboat or other boat in the sea.
6.6. From a helicopter.
6.7. Hunted by myself.
6.8. Hunted by a person I've known.
6.9. I was told about a trophy.

7. Using of polar bear.
7.1. Meat.
7.2. Fat.
7.3. Skin.
7.4. Liver, etc.
7.5. Reasons for not using some parts.
7.6. Suggestions for a better using of products.

8. Way of cooking of polar bear meat.
8.1. Boiling.
8.2. Salting.
8.3. Jerking.
8.4. Other ways.

9. Methods of processing of polar bear skin.
9.1. Traditional sun-dried.
9.2. Wet-and-salted.
9.3. Chemical.
9.4. Other.

Appendix 6.

APPROXIMATE THEMES OF MONTHLY AND ANNUAL REPORT OF COORDINATORS OF THE "UMKA – NANUUK PROJECT"

1. How many interviews with hunters were done, specifically who was interviewed, what category from – elders, active hunters or young field men.
2. What interesting information was received from interviews of field men for last period (facts, accidents, stories, characteristics of animal's behaviour, feeding, etc).
3. To describe in more detailed the cases of making dens in this area and features of its location. Describe the cases of an appearance of female bear with cubs in your area, their behavior, dietary habits.
4. Describe a case of bear appearance in a village, what attracted a bear to a settlement – a rubbish dump, "meat holes", a butchering site, etc. Features of population behavior in case of bear coming to a village.
5 Are there cases of poaching in the territory of your village, your area? How has it happened, in what degree was it a provoked incident of an attack by a bear? Or was it an intentional pursuit of an animal with a goal to hunt a polar bear? How were the polar bear products used in such a case?
5. How were and how are the products of hunted polar bears used (meat, fat, skin, liver, etc) in your area?
6. What are the dietary habits of polar bears in your area, which of the marine mammals is a preferable source of food for bears according to the observations?
7. Describe ceremonies, customs and traditions of native peoples, related to polar bear, including ones which have not already cultivated at the present time.
8. Write down traditional rules of native peoples about safe behaviour of man in case of meeting an animal on the tundra, in ice, etc, for the prevention of aggressive behavior of the animal towards man.
9. Write down stories and tales related to polar bears with full information about a narrator.
10. Compile a thematic dictionary of traditional use by the native peoples of Chukotka of polar bears.
11. If possible, it is desirable to enlarge your information or report with interesting photos, videopictures, illustrations about polar bears.
12. What was done for the popularization of our work on the project among the population of the village, the area, including children (newspaper, radio, visits to school and other institutions, personal contacts, etc).
13. What organizational work was done under the project – meetings, negotiations, seminar with field men and other groups of population.
14. It is necessary for the results of the work to be mapped. Maps should be presented after familarising all the contributors with an explanatory report.

Comment: monthly and annual textual and financial reports should be done on separate sheets and signed by the project coordinator. Report should include the covering voucher.

Appendix 7.

NAME OF THE VILLAGE AND NUMBER OF THE RESPONDENT

First, middle, last name.

Map code:
Date of the interview:
Time of the interview:
Date of birth:
Years of stay in the village:
Period of regular hunting:
Hunting grounds:

DENS

MIGRATIONS

FEEDING

BEARS IN THE VILLAGE

BEARS IN THE REINDEER HERD

MORTALITY

HUNTING METHODS

USE OF THE PRODUCTS OF HUNT

CONDITION OF THE POPULATION

HOW TO SECURE ONESELF FROM THE BEAR'S ATTACK

CEREMONIES AND CUSTOMS

SOURCES OF MY KNOWLEDGE ON POLAR BEARS

SPOTTED SEALS

BEARDED SEALS

WALRUSES

BELUGA WHALES

WHALES

Appendix 8.

CONDITIONAL INDICATIONS FEEDING POLAR BEAR

- ✥ Cases of cannibalism
- ◇ Feeding on sea birds on the bird colonies on sea-shores
- ■ Gathering on carcasses of stranded whales
- ◆ Gatherings on walrus rookeries
- ✖ Feeding on carcasses of stranded pinnipeds
- ▲ Seal-hunting in the sea
- ✚ Feeding on polar fox bait
- × Feeding on dumps, meat ice boxes
- ▲▲ Areas of seal-hunting
- □ Source of feeding is not identified

Appendix 9.

ACTIVITY REPORT ON THE UMKA-NANUUQ PROJECT

for April-May 1999

prepared I.V. Tanko, coordinator in Providensky Raion

1. There were 8 respondents in total, among them:

- In New Chaplino – 2 hunters, 1 inspector of the Beringia Natural Park.
- In Yanrakynnot – 2 hunters (one of them is young), 1 reindeer herder.
- In Sireniki – 1 elder, a former reindeer herder.
- In Nunligran – 1 elder, a former reindeer herder, now a fisherman.

Total: 4 hunters, 3 reindeer herder, 1 inspector of the Beringia Natural Park.

2. An interesting fact from the interview taken in SIRENIKI -01.

March 1999. Outskirts of Sireniki. A dog-shed where kopalkhen (a piece of walrus hide with blubber and meat) was stored for sledge dogs. A small bear that came to the village started eating big pieces of meat and did not even touch the little pieces of meat chopped for the dogs. This might mean that the bears are used to eating the whole carcasses of walruses, bearded seals and whale instead of little pieces of meat.

An interesting case from the interview taken in NUNLIGRAN -01.

When I saw a polar bear for the first time, I was 15. Granddad Vutylgin said we had to follow the bear and I started chasing it. I had a little spear. The bear was going at a slow pace and I was running as fast as I could but I remained behind. The bear slid down the slope on the belly. I tried to turn him toward yarangas (transportable dwellings usually made of reindeer skins) but in 10 or 15 kilometers it was exhausted because it had recently came out from ice fields and was full. The bear fell motionless having drew his forepaws under his belly. Whenever I tried to get it with a spear, it started growling and it was scaring me. For quite a long time I had to wait for the elders who were far behind. The elders came with the rifles and they shot the bear but we could not turn the carcass over on the back. We had to go to the reindeer herders' stand for help. As many as seven people had to come to turn the bear on the back so we could start butchering it. The bear was heavy as a large walrus. It happened in the middle of November 1946.

3. As one elder says (NUNLIGRAN-01) all dens in our (Providensky – AK) Raion are shallow and temporary. They are used mainly for sleeping and waiting through the bad weather.
Only one den described by a reindeer herder (Yanrakynnot-01), which is located in the area of the Vankarem Hill is a permanent one. Different polar bear families settled there.

4. Almost all cases of observations of polar bears visiting villages are related to the presence of fur breeding farms, whale "graveyards", storages of reindeer meat and fish. According to a New Chaplino villager (03) polar bears are attracted by screaming of sea-gulls and silver foxes at feeding in the fur breeding farms.

5. A purposeful pursuit of polar bears.

6. Polar bear products:

- Meat – a meal that becomes especially delicious after a short storage in yaranga (according to all respondents)
- Blubber – raw material used for lighting, which gives neither soot nor smell (unlike ringed seal blubber) (NUNLIGRAN-01, YANRAKYNNOT-01. 02);
- Hides – used to make beddings for sledges and yarangas, which do not wear out for a long time. (SIRENIKI-01; YANRAKYNNOT-01; NUNLIRAN-01). Also used to make elbow and knee caps for spring seal hunt to reduce noise and improve sliding (YANRAKYNNOT-02, 03; SIRENIKI-02); to transport whaleboats, skin boats and gear to the fast ice edge (tokvag'ty). (The hides are laid under the boat with the coat on the ground and then the dogs transport the boat – AK). (YANRAKYNNOT-02, 03; NEW CHAPLINO-03)

7. Stranded walruses and gray whales on the coastal areas.

In tundra there are carcasses of reindeers torn by wolves, fish resources.

There are ringed, spotted, bearded seals on the fast ice edge harvested and left by hunters for further transportation to the village.

Hides and blubber of ringed seals stored in ice boxes near hunting cabins.

Appendix 10.

TECHNICAL REPORT ON UMKA-NANUUK PROJECT of the coordinator in Chukotsky rayon E.B. Siv-Siv

1. Collection of information about the use of polar bears and knowledge about them was conducted in the villages Neshkan, Enurmino, Inchoun, Uelen of Chukotsky rayon, that is in area with the highest distribution of polar bear. Villages are located on the route of polar bear migrations and in areas of their habitat for the centuries. The knowledge about polar bear habits, life, deseases, reproduction and the way of hunting have been gathering during ages. This knowledge has been passed down from generation to generation as polar bears were a product given by nature to people for subsistance. Polar bear meat was an important part of the nutrition of coastal people. Elders of the villages and most experienced hunters were interviewed.

2. During the interviews many interesting facts about polar bear were told. For example, how a bear walks on a thin ice. It is difficult even for man on a snow shoes and or a sledge to do it. It is interesting that the bear does not slow its speed . People say, in such a case a bear controls (his motion – AK) in a contact (with a help – AK) with supernatural power. Only few can contact to nature and if you can do it, then there are hidden opportunities, which are inaccessible to (ordinary) man's perception, could open (before man – AK). So, if somebody has hunted even the smallest game, it is necessary for him to perform some ceremonies according to the game (kind of hunted animal – AK). During a long distance migration overland, often on unknown environment, polar bears invariably reach the Arctic Ocean. A polar bear does not feed on the way, it walks with an empty stomach, eating only few grass.

During the time a female is on heat, 5-8 male bears can accompany her. The strongest animals move right up to her, putting their heads on her neck. The rest of animals (male bears – AK) are protected in this procession. The guards kill everything alive along the way. It could continue for a month.

3. Usually there are the dens with two chambers in our region. Though people have said that there were dens even with the larger numbers of "rooms". In the event of an attack (by man -AK) a female bear drives her cubs to a second chamber and then blocks the entrance to the den with her own body.

A female bear with a cub were observed on fast ice from 2 whaleboats near Cape Seshan in July 1993. The female bear was quite big and under 6 years old. The cub was small, just bigger than the head of its mother. When the whaleboats came close to her, the female bear always went into the water and cub sat on her neck. When whaleboat moved really close to them, the bear dived and the cub had been always staying on her neck. The ice was gone long time ago. There were only fast ice about 2 kms wide and 8 kms long. Many seals were on a fast ice and this attracted female bear and cub to stay in this area. She was seed during 2 week period at that place. While the female bear was hunting, her cub remained in the same place, apparently sleeping.

4. Until the 1990s, the appearance of a polar bear in a village delighted all the people. At that time people did not wish to use bear meat for food, because there were other kinds of meat available, sausage, etc in the shops. Bears were often had not driven away and the meat they stole was not been taken from them. Everything bears did in a village had caused amusement. At that time the protection of polar bears was discussed a lot as well as the meat carries many

illnesses and it was not possible to eat it. So bears were not hunted. Only if bears come close to the dogs or intended to come into a house they were frighten away with gunshots.

5-6. There 2 incidents when a polar attacked a dog sledge. In one case a dog sledge, was probably in the way of a bear. In the second case, a polar bear crossed the path of a dog sledge. Guns were used. Meat was comletely butchered. The skins were cut up and sunk. It was not a special hunt. These killings of bears were absolutely casual. In the accident one dog was killed and another was badly injured.

Usually the meat is used for food. Even fingers of bear clutches are boiled. Internal fat is melted and than used for cure of chilblains. With the use of melted fat no black spots remain on a skin. Only liver is not used. Elders say that somebody can lose their scalp after eating the liver.

7. Polar bear hunting walruses were observed opposite the village in November. Most often the hunts were unsuccesful. Though one time 2 large polar bears have hunted a small one year old walrus. It was observed from the shore, the bears were at the distance 4 kms. Then 2 other bears have been observed eating a large seal. They were eating it for half of a day, than it became dark. There was no opportunity any more to continue the observing the bears.

Mainly, hunting of a seal and beaded seal were observed. A bear eats an entire seal. The whole indigested bones from a seal spine were seen an excrements of a polar bear. Polar bears used to cut a beaded seal in a different way. They remove a skin from a head and peeled the fat from the entire skin and picked the meat from the bones. They do it after a good hunt.

In January & February polar bears are often seen at the carcasses of whale and walrus washed up (on a coast – AK) in a fall. A polar bear could pull out a whole large walrus from the sludge ice 2 metres thick.

8. When a bear is killed its head-soul goes to his environment. A bear head is oriented to the East – the place of birth all the living creatures. It's eyes are hung up to eye-sockets or they are cut up and put on a head or near by. A head is usually fed with some food (home made food – AK). A tale bone usually stays on the body, otherwise there will no luck. If a hunted bear is a female bear than it will bring a luck (in hunt – AK). There are some people that could not hunt a polar bear, but their relatives could. There are often people who can sense the smell of cooked meat through awall, so they could not eat that meat (may be, don't like it? – AK). Spiritual ceremonies of the feeding of polar bear skull in a dwellings are not practiced today. Coaxing of a bear head leaving it in its natural environment happens more often.

9. Safety regulations in case of meeting with a polar bear

Polar bears always avoid a man. Always. You shouldn't be scared of him. There was not a case when a polar bear was responsible for the death of a man in our region. Polar bears are usually attracted by the things that could be a food source. There are incidents which often happen when a polar bear pursues a man walking with a hunted seal. It is rare for a bear to take a seal from a man. If a bear could comes closer than 5 meters to a man than it is considered as an attack on that person. A gun could be used in such a case. It is could be a fired into the air or at the animal.

Once a polar bear persued a hunter, pulling a seal. The hunter did not have a gun. He was a smart person, so he has took off his kamleyka and kukhlyanka, hung up its on poles using for setting nets. The bear thought that there were many people, they are not going to leave and he decided to run away.

If a hunter is traveling at night, then he should unwind a rope about 30 metres long and pull it behind him. It will be a kind of safety net. If a bear will pursue you then he certainly will step on a rope. So you will find out that a bear is following you. Dogteam drivers did not use to do this.

There was a case when a polar bear attacked a hunter at night. The hunter had started to drag up a rope closer to him. The bear was coming closer and when there was only 2 metres left the hunter was attacked by the animal. The bear had already stood up on his back legs and at this moment the hunter had speared it through the heart.

This happened in the village of Enurmino. A polar bear had been running after a sledge with two drivers. When the bear had already caught up with one sledge, the driver hit the bear on the nose. The bear then stayed where it was.

In pursuit of a polar bear it is forbidden to follw his tracks. At the moment of closing in polar bear turns tround and always runs back on its tracks. If somebody gets in its way that person will be in a trouble.

According to belief, it is not allowed to to hunt a bear in a den. You always will be punished by nature, it is known. According to other belief, it is prohibited to shoot a female bear with cubs, just coming out of a den. It could causes trouble for a person. It is also imposible to take the skins, belonging to others. It is known for a long time.

10. In my childhood my grandfather Kejutul' told me tales. One of them was about a polar bear.

"Children had been toboganning. One lame boy with a walking stick were among them. Suddenly a polar bear appeared on top of mountain and started to come down. All the children ran home. The lame boy could not walk so quick so he has just stood in the same place. When the polar bear attacked, the boy put his stick into bear's mouth. But stick was thin and the bear easily bit through it. The bear attacked the boy again with its' mouth open . Then the boy attacked the bear. He has put his arm into the bear's throat and kept it there until the bear suffocated. So the boy achieved glory and the village had meat. After that the boy became healthy and a successful hunter ».

11. <u>Chukchi name for bears</u>.

1. *Umk'y - bear.*
2. *Nevumk'y* – female bear.
3. *Nenenel'yn* – nursing female bear.
4. *K'eyumk'ek'ey* – cub.
5. *Turk'liketyl'yn* – recently mature, 3-years old bear.
6. *Kyryn'y* – large bear.
7. *Kyryn'ayn'yi* – very large bear.
8. *Ymel'yn* – bear moving overland.
9. *Al'ek'atyl'yn* – bear moving on water.
10. *Gyrynvareryl'yn* – hunting bear.
11. *Evkil'yn* – feeding bear.
12. *Ylran* – den, snow shelter.
13. *Yllan* – place of laying on a snow.
14. *Umk'enel'gyn* – bear skin.
15. *Omk'arygyagyt* – waterproof boots from polar bear skin.
16. *Omk'arynnyl'gyn - mollusc is eating by an walrus*

13-14. When I've returned after the conferences I carried out explanatory work on polar bear problems on a community meeting level. I've told of the brief information about the intentions of both Russia and USA, about the agreements and the general information about the issues discussed during the conferences. Everyone always listens with interest. I've showed the video made by myself during the meeting in Nome and have distributed posters about polar bear. Everyone who was free at the time attended the meetings. Mainly hunters who also used to fish live in our village, so the information always reaches them.

Appendix 11

THE TECHNICAL REPORT ON THE PROJECT "UMKA-NANUUK" by V.I. Kavry, Coordinator for the Iul'tinskiy region

THE RECORDS OF THE SEMINAR MEETING OF SEA HUNTERS OF VANKAREM AND NUTEPEL'MEN VILLAGES REGARDING THE POLAR BEAR

THE AGENDA

1. Report on "Umka-Nanuuk" project.
2. On the Rules of the polar bear protection and hunting.
3. Suggestions on the polar bear management

1. REPORT ON "UMKA-NANUUK" PROJECT.

12 interviews with filling out answer-sheets were made. Only the indigenous people were interviewed in 5 settlements of Iul'tinskiy region:

1. Vankarem. 3 interviews with 2 elders and 1 young hunter.
2. Nutepel'men. 2 interviews with 1 working hunter and 1 young hunter.
3. Uelkal'. 2 interviews with working hunters.
4. Amguema. 3 interviews with reindeer herders.
5. Konergino. 2 interviews with 1 working hunter and 1 hunter and reindeer herder..

Total: 8 marine hunters, 3 reindeer herders, and 1 hunter and reindeer herder.

The survey was made on two answer sheets that were compiled into one document. The interview looked like a free conversation. It is presented in reports almost unchanged. Migrations, feeding and dens were marked on the map.

Only marine hunters live in the villages of Vankarem, Nutepel'men, and Uel'kal'. In Konergino both reindeer herders and marine hunters live. Many former reindeer herders moved to the village. The interviewees have different levels of the traditional knowledge. It depends on the knowledge of their mother tongue, whether they have a dog sledge. The customs and traditions regarding the polar bear were preserved in Nutepel'men and Vankarem. In Uel'kal' and Konergino they were lost and are not used in everyday life. Only stories of the elders remained. Gradual loss of customs and traditions in the villages occurred because of the prohibition of hunting some animals, including the polar bear, as well as the Russian speaking population arrival to the villages.

During the short time of the interview many respondents cannot recall and tell everything right away.

The Chukchi names of polar bears by Vukvuvie.

1. Umky – a male bear.
2. Nevumky – a female bear.
3. Ysveg'ek – a female bear with three cubs.
4. Tyiol'yn – a female bear in the den.
5. Keyumky – a cub.
6. Tonnetat (Kytimtie – the village of Konergino) – recently left the female bear.
7. Turygryny – a male bear 3-4 years old.
8. Kyrynekey – a bear 5-6 years old.
9. Kyryny – an adult male 8-10 years old and older.

10. Nygsek – an adult male with white fangs.
11. Gymel'gyn – a bear migrating through the mainland.
12. Mervyl'yn – a hungry, skinny, exhausted bear.

Migration

The polar bear migration is observed all year round on the Arctic and the Pacific coasts.

Migration through the mainland.

Polar bears migrate through the mainland from November to the beginning of June. They move mostly northward, sometimes northeastward. There can be deviations. For example, according to a reindeer-herder whose name is Taeragtyn, he saw a polar bear who was going down the bank covered with ice to the river, it was going eastward near Chatal'vegyrgyn. Bears migrate on landscapes, they even climb stiff mountains. A few times the polar bear can be seen in November, December, January, and June. It is more often seen in February, March, April, and May. The main migration occurs from the end of March to the end of April, the peak of migration is in April and it lasts for about 7-10 days. During these 7-10 days they saw up to 10 various polar bears a day. Sometimes they move almost on the same path, sometimes on their own, or in groups of two or three, the distance between them was about 5 km (for example, Nutevgi's report).

Trying to be imperceptible the polar bear migrates at night and during snowstorms, during the day it rests. When the daylight becomes longer bears migrate at any time.

The migration through the mainland is annually observed in 2 regions:

A) Between the abandoned settlement of Vostochniy and the Kymyneyveem river mouth. The bulk of migrating bears are seen in the area between the Vel'may and the Kymyneyveem river mouths.

B) Between the Amguema river and Ekitiki Lake, the bulk of migrating bears are seen near the rivers Engyrgyn and Chantal'vergyrgyn.

Bears avoid the settlements located in the middle of the mainland.

Adult bears are indifferent to reindeer herds, and one-year-old cubs show interest to the reindeer, and observe them with great curiosity. Bears and reindeer are not scared of each other and the distance between them can reach up to 10 m.

A small amount of straw can be found in killed bears' stomachs.

On the Pacific ocean coast.

Polar bears are observed here in February. The main migration northward starts in March and April, and lasts till May. According to Yanki, a hunter from the village of Konergino, the migration is done in 3 stages and depends on the density of the sea ice cover. If the ice is drifted to the coast with southeastern and southern winds it means that mass migration will begin soon. This hunter divides migrations into the following stages: the large migration from the beginning of February till the end of March; the medium migration in April; and the small migration that takes place in May. The bears chaotically move northward on the sea ice. According to Leit's report from Uel'kal', he saw a female bear with 2 cubs in February, they moved towards the shore ice edge southeastward, in the opposite direction.

Migration in summer.

On the Arctic coast in June, July, and August the migration is observed from the southeast to the northwest. Usually the migrants are single animals or female bears with cubs. There are no mass migrations.

There is no migration on the Pacific Coast except the migrations of the polar bears that stayed for summer near the walrus-rookeries on the shore. Being afraid of hunters they leave northward.

Migration in fall.

In October and November there is migration only on the Arctic coast from the northwest to the southeast along the seashore. Mass migration lasts from the middle of October until the middle of November.

I will add my own information. Sometimes in fall there is no ice, and migrations start at the end of October, when sludge ice is taken to the shore by the sea. It gently floats on the water surface and to much surprise bears walk on it. Sometimes animals' fall through the ice with one of their back paws. Cubs even play on such ice.

There is no migration on the Pacific ocean coast.

The way the polar bear behaves when it sees a human.

If you know the habits, the peculiarities of the polar bear's behavior you can divide them into 4 groups: cowardly, curious, calm (deceptive), aggressive.

How to tell the intentions of the polar bear according to its behavior

1. The polar bear is cowardly by nature. When it meets a human and there is an opportunity, it tries to escape. This is the main reaction of animals of different sexes and various ages.

2. If a polar bear stretches out its neck to you and loudly inhales, it means curiosity. It is not dangerous and can approach you as close as to be at arm's length. Such bears are medium and large-sized animals.

I will add my own information. You can provoke the polar bear to be curious. Once I could not stop the dog's sledge that was longing eagerly to a group of polar bears. I stood up from the sledge, picked up a rifle and let the sledge go. It disappeared behind the turning, and the polar bears started running out of there one by one. In 10 meters from the sledge there stood a female bear with cubs eating walrus meat. The dogs were lying in a rolled in a ball and did not move. It turned out there were petrified and none of them could not stand up. The dogs were very happy to see me. I frighten the female bear away, I took off my white vest, under which I had red and orange overalls on, and started to untangle the dogs. Some of them had small scars. Then when I was repairing the sledge I saw that bears were approaching me quite fast with their necks stretch out to my direction in curiosity...

3. Calm (deceptive) behavior is the most unpredictable one. A bear can pretend not to notice you at all and slowly leave with its head down. Many people would consider such behavior "good" and they will want to come up to it closer and closer. No! Such bear shows that it is not happy with your behavior. It can be a hungry animal you caught unawares eating. Such behavior can be typical of any bear of any sex and age.

4. If a bear puts its head very low, snuggles up to the ground and at fast speed moves towards you, it shows aggression. Such behavior is very dangerous. But the bear never attacks right away. According to the words of the elder Vukvuvie from the village of Vankarem, the bear attacks with the third attempt. In his first two attempts it can come up to you as close as 2-3 meters, suddenly stop and leave slowly. It tells you to leave and by doing so it learns more about the enemy in order to make another attempt to attack. If it makes the second and the third attacks:

A) Do not panic, scream and try to run away.

B) If possible get on something high so you are taller than the bear.

C) Take something long (by Vukvuvie's experience) or take off a jacket or something and when a bear comes to you closer abruptly flip it up and rotate it over your head.

D) Vukvivie's advice. From other hunters he heard that calmly said words stop any animal's aggression. I will add: when sea hunters saw killer whales they treated them with respect, considered them as their colleagues. Once after successful walrus hunting we saw killer whales swimming towards a walrus-rookery. An old hunter addressed them with words: "Well, colleagues, we have hunted, now it is your turn".

E) If a bear yawns it means that it is indifferent to you.

I would like to note that it is not traditional knowledge but advice based on my and other hunters' personal experience.

The polar bear's behavior becomes aggressive only if the person, who does not know its habits, breaks the rules mentioned in "Precautions". The following types of polar bears can be aggressive:

1. female bears that protect their cubs.
2. a hungry, skinny, and exhausted bear near the food source.
3. male polar bears during the heat.
4. the polar bears caught unaware.

Precautions when seeing the polar bear.

Any advice of the elders is a law for the hunter. Such advice is always a warning against any accidents in hunting. It was not allowed to approach the polar bear unless it was necessary. Immeasurable curiosity and ignorance can lead to an accident. In order to avoid them, follow these precautions:

1. Do not approach the bear without a stick, rope.
2. Do not approach the bear for more than 15 meters.
3. Do not approach a group of bears during their heat (April, May).
4. Do not approach a female bear with this year's cubs.
5. Do not approach the polar bear being imperceptibly.
6. Do not approach the bear from below. In a deceptive spurt it can slide down on you.
7. Do not approach a feeding, hungry, skinny, exhausted bear.
8. Do not approach the bear imperceptibly from the seaside, pool of open water, ice edge, because the bear seeks protection in water and escaping it can hurt you.
9. Do not approach an ill, skinny, and hungry polar bear.
10. Do not follow the polar bear.
11. Do not stand on an adult polar bear's way when it migrates through the mainland.
12. Do not approach dens for curiosity.
13. Do not feed the polar bears.

Remember! Non-observance of these precautions can provoke the polar bear's attack.

Advice to a walking hunter:

1. Do not shoot the bear that stands with its head turn to you. If wounded it spurts forward.

2. Carrying a seal carcass, attach a sweep net rope 10 meters long. At the end of the rope attach a small piece of its hide.

3. When resting or spending a night stretch a sweep net rope around your place.

Dens.

Dens were observed only on the Arctic coast. According to the hunters in total there were found 62 dens at various times and places.

1. Koliuchin Island – 27 dens. Only in 1998.
2. Pynopil'gin Lagoon – 4 dens (Uvkytryn - 3, Kalelykytryn - 1).
3. Cape Kel'enevyt – 1 den.
4. Cape Onman – 4 dens (El'getan - 2, Nel'pyn - 1, Val'vekvesenvyn - 1).
5. Kemeney Mountain (Vatap) – 1 den.
6. Keygipekun Bay – 1 den.
7. Kuvliuknesken Lake – 1 den.
8. Emkekun Island (Karkarpko) – 1 den.
9. Cape Vankarem – 1 den.
10. Vankarem Lagoon – 3 dens (Notatkyn-1, Ylenmyn-1, Meynyvet-1).
11. Nusugytgyt Lake – 1 den.
12. Nutev'i Lagoon – 4 dens.
13. the log house and the lighthouse of Upril' – 1 den.
14. Yp'en (Open Mountain) – 7 dens.
15. At sea, in ice hummocks - 5 dens.

Rodion N. Vykvyrosgin, a hunter from Nutepel'men studied the polar bear dens. He reported that there are dens with one cell or many cells (up to 5). There can be bedrooms, playing rooms, and a toilet. Dens with many cells have several exits and entrances. He did not mention the size of the dens.

Feeding.

The polar bear's feeding can be divided into the following periods: 1) spring, 2) summer, 3) fall, 4) winter.

Spring.

Feeding can be observed on the Arctic and the Pacufuc coasts. The main food allowance is seal. Bears hunt at the ice edge, in pulls of open water and ice holes.

Summer.

When there is a lot of ice at the Arctic coast bears hunt along the coastline at the distance of 20 km away from the seashore The main food allowance is seal and sea hare. According to Vukvuvie he saw a polar bear and a walrus fight and both die on the ice. If there is no ice there are almost no bears. A few can be seen feeding on stranded corpses or at the walrus-rookery on Onman Cape. They feed on the last year's crushed walruses. In summer there are no walrus-rookeries here until the fall migration when there is no ice cover.

During the summer only 2-3 bears can be seen at the walrus-rookery on Meeskyn Cape on the Pacific coast. They feed on walrus cubs or animal corpses cast ashore.

Polar bears are killed at walrus-rookeries on both coasts.

Fall.

Feeding can be observed only on the Arctic coast. In October a great number of polar bears comes out to the shore because due to the ice shifts seal hunting is hindered. Polar bears accumulate around the carcasses of walruses and whales. At the beginning of the 90s near Nutev'i Lagoon they observed many male and female bears of various ages around whale carcasses (up to 100). If there had not been the hunters that scared them away there would have been a lot more polar bears. Currently such accumulations are not observed. On the one hand it is due to the polar bear population decrease, on the other hand polar bears are not let to accumulate in such great numbers.

Until the middle of November polar bears mainly feed on the corpses cast ashore, then they go into the ice fields and are rarely observed on the shore.

Marine mammals cast ashore.

If there are storms marine mammals are often cast ashore in the following regions:

1. Bykvev'yal' Lagoon.
2. Keigipekun Bay.
3. Nutev'i Lagoon.
4. Pynopil'gyn Lagoon.
5. Nusugytgyt Lake.
6. Rypatynopil'gin Lagoon.
7. Kuvliuvnesken Lake.
8. Kunergvin Lagoon on Kolichinskaya Bay.

Bears accumulate near the walrus-rookeris at:

1. Koliuchin Island.
2. Emkekun Island.
3. CapeKelenvyt.
4. Cape Vankarem.
5. Cape Onman (El'getan, Nel'pyn).

Here they feed on the crushed walruses.

Winter.

Near the Arctic coast the sea rarely opens from ice, mostly as far as 20-30 km away from the shore. Feeding of polar bears is not observed because on short winter days nobody hunts on the ice edge. Sometimes the Master of the Arctic comes here when the sea opens near the shore. The main food allowance is seal.

Visiting settlements.

Polar bears often visit settlements in fall. The village of Vankarem is located on the migration route and up to 10 polar bears come there during this period. The village is located on the tip of the sharp 7-km peninsula of Vankarem and bears come here any time, mostly when it is dark. All night you can hear dogs bark, people shooting, and in the morning several polar bear's footprints can be seen in the village center. There are footprints by which you can tell that the animal walked through the village without stops. But many animals are attracted by the smell of meat in the store-houses. At this time polar bears are skinny, many of them are not afraid of the human and are often killed.

There are cases when the bears that migrate through the mainland come to the villages. Again they are attracted by the smell of meat in private store-houses or warehouses. I will add my own information. Once in January of 1984 a female bear with two one-year-old cubs came to a house in the village of Vankarem and scared the dwellers. The female bear and one of the cubs were killed. The village administration prohibited to kill the second cub and it was frightened away with a cross-country vehicle. The bears were skinny, not afraid of the people, but their behavior was calm.

Poaching.

In our region there is poaching. Only the people from the village and sea hunters hunt the polar bear. During the hard economic transition times starting from 1989-1990 poaching appeared in Vankarem and Nutepel'men. At that time and now as well the regional officials have many other things to do besides the polar bear.

October and November are the most favorable months for poaching because a great number of bears comes to the shore. Earlier they were hunted only for meat but in the 90s there was a sharp increase. They killed dozens of polar bears only for the hide in order to sell or exchange it for electronics, snowmobiles, small-sized vessels, etc. They use mainly snowmobiles for hunting.

Some hunters from Nutepel'men annually hunt female bears in dens on Koliuchin Island. They ride dog sledges. It has become some kind of a tradition.

In fall when great numbers of polar bears appear on the Arctic coast strict hunting inspection should be carried out in the villages of Uelen, Inchoun, Enurmino, Neshkan, Nutepel'men, Vankarem, Shmidt, Billings, Yanranay, and Ayon.

The polar bear production.

Now the hides are only sold. They used to make curtains for yarangas, clothes, they insulated the souls in fur boots (it made them warmer and such soul did not break the thin ice). They sewed trousers out of small cubs. The hides were used as sitting placements in yarangas and on sledges. During Kemet celebrations they used hides as tablecloths for the sea thanks giving ceremony.

The meat is considered a delicacy. On the Arctic coast the polar bear meat is one of the main foods, it is eaten almost all year round. On the Pacific coast the bear's meat is eaten only during the migration from February until May.

They eat meat, fat, intestines, kidneys, and heart.

Liver, stomach, lungs, and head are not used for food.

Ways of cooking.

Sausage: Intestines are stuffed with small pieces of heart, kidneys, fat, and head meat and boiled for 1.5-2 hours.

Boiled meat: Frozen meat and fat are sliced and boiled for 1.5-2 hours. Serve with bouillon.

There are no other recipes.

Fat is a good remedy against chilblain. I can tell that once one man froze his hands. The people from the same village gave him the first aid and applied the polar bear fat on his hands. Despite the bad prognosis of the doctors and being afraid of amputation the man refused to go to the hospital and recovered.

In very cold weather fat is used as facial cream.

Rites, customs, and traditions

When hunting. If the bear was killed on the land it should fall with its head pointing towards the mainland. If opposite then it's a bad omen. The carcass should be moved towards the mainland, so the polar bear comes back to the shore and good luck stays with the hunters.

When cutting. The head is cut off and put on the north to the carcass. They peel off the meat, cut out the eyes and leave them hanging. Between the front fangs they squeeze a small piece of a seal, sea hare, walrus or whale fat. They cut small pieces of kidneys, heart and feed the sea and the sea spirits in gratitude. At the cutting place they leave only the head, the liver, and the stomach which must be ripped open.

Tradition. In the old times after hunting the first polar bear they used to arrange a joined dinner. The elder people liked to chat at the dinner table about the successful hunting and to praise the hunter.

Custom. It existed on both coasts. Having seen the polar bear they sent a young enduring hunter who knew the animal habits, to catch it and make it stay and drive it closer to the nomad camp. An experienced hunter followed him and killed the polar bear with a spear. The killed animal belonged to the person who was the first to notice it no matter who the hunter was. Yu.M. Kotgirgin, a hunter and reindeer herder from the village of Konergino, confirmed this story. According to him once a hunter did not give the polar bear to the owner. After several days that hunter died. The elders said it had happened because of breaking the custom.

I will add. Today reindeer herders and sea hunters have the following custom. After a funeral people wallow in snow near the grave imitating the polar bear. After the Kemet celebrations sea thanksgiving rite sea hunters do the same.

2. RULES OF THE POLAR BEAR PROTECTION AND HUNTING.

It is prohibited to hunt the polar bear:

1. without a license, quota.
2. in dens.
3. near dens from November until March.
4. if it is female bears with cubs of any age.
5. during their heat in April and May.
6. in summer, from June till September.
7. at mass accumulation places near carcasses of walruses and whales.
8. with guns of small destructive power.
9. at a distance at which you are not sure in success.
10. If you are not sure that the carcass will be transported home.
11. One hunter is not allowed to kill more than one bear at a time.
12. using motor vehicles, except snowmobiles.
13. for sports and leisure activities.
14. for the hides.
15. in natural parks and reserves.
16. if the bear has a scientific tag or equipment attached.
17. for under-aged persons.
18. during temporary prohibition of hunting in order to increase the population.
19. for people who do not have permission to keep and carry fire-arms.

It is prohibited:

1. to give licenses to non-indigenous people.
2. to be near dens for curiosity.
3. to eat the polar bear's meat without veterinary and sanitary expertise.

It is allowed:

1. to hunt on the Arctic coast from October 1 to March 31.
2. to hunt on the Pacific coast from March 1 to April 30.
3. to hunt on foot, a dog sledge or a snowmobile.
4. to hunt migrating bears on the land or ice fields.
5. One hunter can kill one bear at a time.
6. to catch cubs under 6 months old, unable to protect themselves in order to send them to zoos or scientific centers.
7. to pass the license from one hunter to another by the decision of the Polar Bear Commission.

3. SUGGESTIONS ON THE POLAR BEAR MANAGEMENT.

Only the sea hunters from the Chukotka Assoociation of Traditional Marine Mammals Hunters can manage the polar bear resources. In these regions there should be organized a polar bear data collection centers. The villages should appoint markers and to set the period for reporting.

1. REQUESTS AND DISTRIBUTION OF LICENSES FOR THE POLAR BEAR HUNTING IN COASTAL NATIONAL VILLAGES

The body in charge is the Polar Bear Commission elected at the general meeting for 2 years term out of the indigenous sea hunters. The Commission should consist of not less than 5 people.

2. PROCEDURE OF DISTRIBUTING LICENSES FOR THE POLAR BEAR HUNTING IN COASTAL NATIONAL VILLAGES

The licenses are distributed among all indigenous people who use the polar bear meat for food. Licenses are given for various periods of hunting on the Arctic and the Pacific coasts.

Talking about the traditional nature use we mean the nature use of our ancestors with their traditions, customs, hunting and food. That is why we should talk only about the traditional polar bear hunting. Despite the long prohibition of hunting the traditional food – the polar bear's meat – is one of the main foods on the Arctic coast.

Today the only keepers of our ancestors' customs and traditions are the sea hunters that have dog sledges. These people are always involved in the traditional economy. It was them who hunted the polar bears because hunting was always successful with a dog sledge. Dogs smell the polar bear at many kilometers and in most cases it leads to success. That is why such people should be the first to obtain the personal license with the right to own the hide. The money from the hides will be spent on organizing private hunting groups and they will have an opportunity to earn money for themselves. The sea hunters that do not have dog sledges should also have the same licenses and the money for the hides should be spent only on their needs. Other hunters who are far from customs and traditions are not allowed to hunt because they live on their own. They are not involved in traditional sea hunting. Today they do not care whether this hunting exists or it does not but tomorrow they can become rivals for the licenses meant for real sea hunters who feed the whole village population.

In Iul'tinskiy region there are 4 coastal national villages laying claims to the quota. We are proceeding from the total consumption volume because the polar bear meat is the main food for the Arctic coast population. The killed animal's meat is distributed among all the people.

Why is there such a big difference between the Arctic and Pacific coasts' volumes of consumption?

Let us take a look at the Iul'tinskiy region data that should be taken into account when distributing the quota.

ON THE ARCTIC COAST:

1. 97-98% of the indigenous population live in villages.
2. A dog sledge is a traditional means of transportation.
3. They hunt the polar bear all year round.
4. The polar bear's meat is one of the main foods.
5. In fall there are mass accumulations of polar bears.
6. There are several walrus-rookeries.
7. There is seasonal migration of polar bears all year round.
8. There are dens.

ON THE PACIFIC COAST.

1. 60-65% of the indigenous population.
2. They hunt the polar bear only in spring.
3. The polar bear migrates only in spring.
4. There is only one walrus-rookery.

For information:

There are 6 dog sledges in Vankarem. 130 people eat the polar bear meat including 45 children of school and pre-school age.

There are 10 dog sledges in Nutepel'men. 160 people eat the polar bear's meat including 60 children of school and pre-school age.

There are no dog sledges in Konergino. 45 people eat the polar bear's meat, including 4 children of school and pre-school age.

There are no dog sledges in Uel'kal' 20 adults eat the polar bear's meat. 20 adults eat the polar bear's meat.

In our village there is the following weekly demand in the polar bear's meat: 1 kg per adult, approximately 0.5 kg per child.

If to take into account the dates of the fall and winter hunting that I suggested for the Arctic coast then an adult needs 25 kg of meat per 6 months, a child needs 13 kg.

If to take into account the dates of spring hunting that I suggested for the Pacific coast, then an adult needs 8.6 kg of meat for 2 months, a child needs 4.3 kg.

1. Vankarem - 85 adults X 26 kg = 2210 kg, 45 children X 13 kg = 585 kg
Total: 2795 kg
2. Nutepel'men – 100 adults X 26 kg = 2600 kg, 60 children X 13 kg = 780 kg
Total: 3380 kg
3.Konergino – 41 adults X 8.6 kg = 340 kg, 4 children X 4 kg = 16 kg
Total: 356 kg
4.Uel'kal' – 20 adults X 8.6 kg = 172 kg
Total: 172 kg

So in total 320 people (211 adults and 109 children) eat the polar bear meat with the total demand in meat of 6703 kg. If an average meat weight of the polar bear is 300 kg then the quota for the Iul'tinskiy region should be equal to 34 bears (Vankarem – 14, Nutepel'men – 17, Konergino – 2, Uel'kal' – 1).

Let's assume they do not give the necessary quota to the region giving various reasons... It is understandable, I agree with you completely, as well as many other hunters but everyone does it his own way. If a person is used to eat 1 kg of meat when by the license he can eat only half a kilo, he will not eat another kind of food, especially for money. He will go and get himself another half a kilo of meat but nobody will ever find out about it. I think we should follow the principle "What does the fish want?" because by making a small quota trying to protect the polar bear we will not decrease its hunting. We are talking about the same thing, only my approach is different. If wen want to decrease the polar bear hunting significantly, at first we should supply the demand of the population. We can be sure this will decrease the number of killed polar bears and its illegal hunting will start to disappear. People will be interested in good state of the polar bear population. Then they will be able to regulate its hunting every year.

3. THE OWNER OF THE POLAR BEAR'S HIDE.

Only an indigenous person can own the polar bear's hide, who had a personal hunting license with the right to sell the hide.

4. THE POLAR BEAR HUNTING.

On the Arctic coast they hunt the polar bear almost all year round with a summer break when there is an abundance of other food. Today we suggest to hunt only for half a year from October 1 to March 31, to hunt the polar bear migrating on the land, sea and through the mainland.

On the Pacific coast the polar bear can be seen from February until May. It is hunted mainly during the mass spring migration in March and April. That is why we suggest to hunt the migrating polar bears from March 1 to April 30.

5. IT IS PROHIBITED TO HUNT THE POLAR BEAR:

From April 1 to September 31 on the Arctic coat due to the heat season in spring. In summer there is an abundance of other food, the hide is of bad quality, and it is difficult do transport and preserve the hide and meat.

On the Pacific coast from May 1 to February 29.

6. INITIAL PROCESSING OF THE POLAR BEAR HIDE.

1. The hide should be with claws and aural cartilage.
2. It should be removed of fat.
3. It should be soaked in sea water for 3-4 days.
4. The hair of the hide should be dried.
5. The inner side of the hide should be preserved with coarse salt.
6. The hide should be folded like an envelope.

Due to the lack of a quality hide processing technology we suggest the Chukotka Association of Traditional Marine Mammals Hunters to be in charge for further processing of the hide according to the contract of the owner.

7. REGISTRATION, MARKING AND CERTIFICATION OF THE POLAR BEAR HIDE AND HUNTING PRODUCE.

Registration of the hunted polar bear (quantity, place, date, sex, the size of the hide).
Veterinary expertise of the meat.
A tag is attached to the upper lip of the hide..
Issue of the hunting certificate (with the tag number).

Three copies of the protocol are issued for the Department of Agriculture of the Chukotka Autonomous District, for the regional agricultural administration and the owner of the license. The tag number is included into the protocol.

The protocols are verified by the stamp and signatures of the head of the village administration, members of the Commission and the license owner.

The owner should receive a veterinary certificate and a veterinary counter mark on each hide at the regional veterinary station.

We suggest to make tags of different color for each region.

8. RULES OF THE POLAR BEAR'S HIDE SALE.

We suggest to sell the hide at an auction that would give us the only opportunity for open partnership. Other ways of selling the polar bear hide are out of the question because they all lead to shade market, i.e. poaching where the price is usually very low – from 2 to 10 thousand rubles. There is demand in the polar bear's hides that is why there is increase in hunting that leads to the population decrease. Prohibition of sale will mean encouragement of poachers.

We are suggesting the Chukotka Association of Traditional Marine Mammals Hunters to sell the hides at the auction after concluding a contract with the owner. The contract should stipulate the profit distribution before the auction, irrespective of the future price. The contract conditions should be equal to everybody. Having such guarantee, the owner will submit the hide and we will have exact statistics of the polar bear hunting.

The money for the hide sold at the auction will be put on the owner's account or by requests will be exchanged for equipment.

9. NON-STAFF INSPECTOR.

A sea hunter who is respected among the population can become a non-staff inspector. His responsibilities are:

1. to elicit the facts of breaking the Rules of the polar bear protection and hunting..
2. to submit documents regarding these facts to the Polar Bear Commission.

The non-staff inspectors should be paid at the expense of the hide sale profits.

10. 10. ADMINISTRATIVE AND CRIMINAL PUNISHMENT FOR BREAKING THE RULES OF THE POLAR BEAR PROTECTION AND HUNTING.

The body in charge is the Polar Bear Commission.

For severe breach of the Rules of the polar bear protection and hunting the materials are submitted to the bodies of the Ministry of Internal Affairs.

Administrative and criminal punishment for breaking the rules of the polar bear's protection and hunting:

1. Notification.

2. Fines.

3. Eviction of the license for a period of 1 to 5 years..

4. Eviction of the license for 5 years with submitting the documents to the bodies of the Ministry of Internal Affairs.

11. HUNTER'S RESPONSIBILITIES:

1. To take a tooth in order to determine the age.

2. To measure the thickness of fat on the chest.
3. To take an embryo to determine the birth rate.

Failure in fulfilling the responsibilities due to any reason deprives the hunter of the license for 1 year.

Additionally:

1. To determine the potential polar bear hunters.

2. To decide whose gun will be used for hunting.

Appendix 12

THE ROLE OF RELIGIOUS RITES AND BELIEFS IN THE TRADITIONAL NATURE USE BY CHUKOTKA INDIGENOUS PEOPLES

(BASED ON THE POLAR BEAR AS AN EXAMPLE)

Anatoly A. Kochnev, Scientific Consultant of the Chukot Traditional Hunters Association for the project "Umka-Nanuuk". Senior Research Fellow, Marine Mammals Research Laboratory of the Chukot Pacific Research Institute of Fisheries and Oceanography

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To the memory of the hunters who shared their knowledge with the authors within the framework of the project "Collection of traditional knowledge of Chukotka indigenous peoples regarding the polar bear and its habitat", who passed away since the beginning of the project (1999). To Pyotr Typyhkak from Sireniki, Nikolay Kutylin from Novyi Chaplin, Sergey Kachak, Alexander Klimakov and Oleg Nitourgin from Uelen, Rodion Vykvyrosgin from Nutepel'men, and Yuri Kotgyrgyn from Konergino.

Introduction.

The knowledge of the indigenous peoples inhabiting this territory was never fully and systematically used during the whole history of the Arctic biological and ecological research. A gigantic amount of the local knowledge about the surrounding environment remained unclaimed despite the close connection of the traditional lifestyle with the wild nature. Only the last decade saw attempts of systemizing the traditional knowledge of Chukotka and Alaska indigenous peoples regarding the species that are most significant for the economy of national communities (Huntington, Mymrin, 1996; Mymrin, 1999). In 1994 within the project "The Ecological strategy of protecting the polar bear habitat in Alaska" the US Fish and Wildlife Service for the first time collected the local knowledge regarding the polar bear habitat in 12 settlements in Alaska (Kalxdorf, 1997).

In 1999 a similar project was began in Chukotka by the Chukot Traditional Hunters Association in cooperation with the Commission on Polar Bear "Nanuuk", Alaska. The US National Park Service financed the project. The main goal of the project was collection of the information about the use of Chukotka coastal areas by polar bears. At first the priority was given to finding the places of dens' concentration, feeding areas and the nature of seasonal migrations. While working on the project the goals were expanded and finally the collection of information was done according to the following outline:

1.Sources of knowledge of the interviewees regarding the polar bears and its habitat. (Finding sources of information regarding the polar bear used by the interviewees).

2. Den making areas. (Seasonal den observation rate. Segmentation of temporary and ancestral dens. Density of dens according to the relief and the remoteness from the coastal line).

3. Seasonal migrations model. (Seasonal dynamics and prevailing directions of migrations. Sex and age of the migrating bears depending on the season and location).

4. Feeding regions and sources. (Seasonal changes in feeding. Segmentation of various feeding types by seasons. Main hunting objects. Sex and age of bears using various feeding sources).

5. Natural death rate. (Observations of ill and exhausted bears. Dead bears finds).

6. Polar bear in villages. (Seasonal dynamics and the reasons of bears' visiting villages and pasture corrals. Sex and age of visiting bears. Description of conflicts).

7. Polar bears and domestic reindeer. (Reasons of polar bears' going to reindeer herds and their relations with domestic reindeer).

8. Traditions of the Chukot indigenous peoples regarding the polar bear hunting. (Description of customs, beliefs and rites regarding the polar bear. Their observance in the old times and nowadays. Traditional and modern hunting methods. Traditional and modern use of the hunting produce. Traditional and modern methods of avoiding conflicts with the polar bear).

9. The current state of the Chukot-Alaska polar bear population according to the interviewed hunters and reindeer breeders. (Statistics of the interviewees' responds on comparative observation rate and fatness of polar bears for the past 30-40 years).

10. Ways of management of the Chukot-Alaska polar bear population according to the local hunters and reindeer breeders. (Statistics of suggestions of the interviewees regarding protection and rational use of the polar bear).

The stage of field information collections was completed in 2002. Now we are working at the conception of the database and started analyzing the collected materials. This report comprises the preliminary overview of one of the research topics: the role of customs, rites regarding the polar bear in the traditional nature use by Chukotka indigenous peoples.

Material and methods.

The research was based on private conversations with the most active hunters and the elders from the national villages situated within the polar bear habitat in Chukotka. At the beginning we used an earlier made Alaska survey outline as an example (Kalxdorf, 1997).

Together with the American scheme of surveys, the hunters were offered applications developed by the Executive Secretary of the Chukot Traditional Hunters Association V.M. Etylin. These two methods were used for interviewing hunters in 1999-2000. The preliminary analysis of the data obtained at the intermediate stage showed that there were the same questions in both survey methods and they confused the interviewees. Another important defect was that the questions were simple or alternative that led to minimum information obtained. Due to these reasons we developed a different method of survey in which we combined both previous schemes, as well as added some new questions. The principle peculiarity of our method was that the interview was made in a free talk on a certain topic, and an interviewer asked concrete questions within this topic. For instance, in the conversation about traditional and modern use of the polar bear produce a hunter could forget to mention what organs of the polar bear were processed and the methods of their processing and preparation. In such cases the interviewer asked leading questions: "Did you use the polar bear intestines (heart, liver, lungs...) for food? How are they cooked? Do they eat them now?" etc. The survey was made according to such scheme in 2001-2002.

The procedure of our work was as follows. The Commission on the Polar Bear of the Chukotka Association of Traditional Marine Mammal Hunters appointed regional project coordinators in Chaunskiy, Shmidtovskiy, Iul'tinskiy, Chukotskiy and Providenskiy rayons of the Chukotka Autonomous District (Fig.1). The coordinators were to select and interview the most active, experienced and well informed hunters and elders in all villages of the region. Then the interview results and coordinators' reports were given to the manager and the scientific consultant of the project. Due to various reasons in two rayons (Shmidtovskiy and Chaunskiy) the coordinators did not start the work, that is why the Head of the project and the scientific consultant held the interviews. In the beginning of 2002 the preliminary analysis of the collected material showed the necessity to repeat the survey work in Shmidtovskiy and Chukotskiy rayons because the results could not be processed due to wrong methodical approach. Moreover 3 villages of those regions were not covered at all. That is why in 2002 the scientific consultant and the coordinator for the Iultinskiy region repeated the survey in these regions including the 3 villages earlier left out.

On the whole during the project we interviewed 53 people from 20 national villages of Chukotka (Fig.2). But due to different methodical approaches only 30 people from 15 villages

Fig. 1. The structure of the organizing staff of the project "Collection of traditional knowledge of Chukotka indigenous peoples regarding the polar bear and its habitat"

gave the information regarding rites and beliefs connected with the polar bear (Fig.3-4). Moreover, in analysis we used the technical reports of the coordinators of Iultinskiy and Chukotskiy rayons.

Results.

When analyzing the modern local knowledge about the rites connected with the polar bear, the main reference point was the description of the rite (the rite of thanks-giving) performed by the Siberian Eskimos-Yupik after killing a polar bear (Frolova, 2002).

The rite is performed before cutting in order not to offend the bear's soul. The hunter addresses the head of the animal with the words: "You go back home. The road to my home is very bad, that's why visit us some time later". The hunter's relatives are waiting for him in the settlement. After the meat is given out the Polar Bear Holiday starts. The main rituals were as follows:

Fig. 2. Location of villages and distribution of the respondents of the project ""Collection of traditional knowledge of Chukotka indigenous peoples regarding the polar bear and its habitat"

- ***«Feeding» the bear.*** *The hunter, who killed the polar bear, gives it some fresh water* ***(ymisekuk).***
- ***Sacrifice to the "sea spirit".***
- ***The rite of the initiation to animal hunting.*** *Boiled bear's meat is served on an oval-shape dish (kaiukak). The oldest member of the family makes a teenager stand so that the dish would be lying on the floor between his legs, and whispers spells wishing success to the future hunter. After that they treat everybody with meat.*

- ***Visiting the sacrifice place.*** *On the second day men take a scull of the bear to the ancestral sacrifice place (Fig.7). The elder places it with spells and persuasive talks that the hunter was not killed for fun but for the people's prosperity. The holiday in honor of the distinguished guest is celebrated for several days. The host plays a tambourine, sings in order to please the animal soul, and improvises scenes of hunting in the ice fields. During the holiday the person who killed the bear does not leave the dwelling and does not go hunting.*

One respondents of our statistical sample (from Sireniki) was not specially asked questions regarding the thanks-giving rite, he just expressed his opinion on the oblivion of traditions by modern hunters. 29 people were interviewed in greater detail, and the information

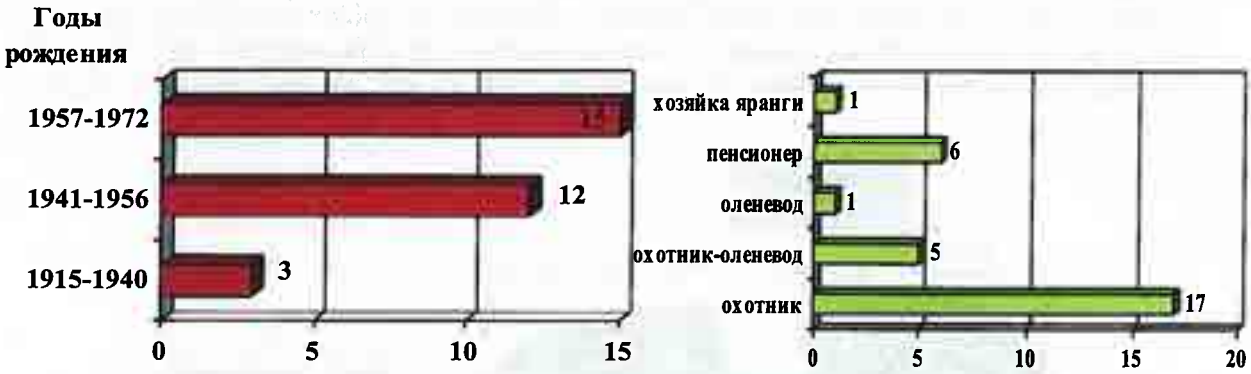

Fig. 4. Age **(A)** and occupation **(B)** of the respondents.

obtained from them was included into the overall analysis.

Only four out of 29 people (13,8 %) in good detail described the rite performed in the old times that was close to the "classical" rite (Fig.5). Still these 4 people's story details did not correspond to the available ethnographic description. Here is the most detailed description (the village of Lorino):

«They used to bring the bear's head to the yaranga and asked it questions. The scull not yet peeled from meat was put on the floor, tied to the crooks "ken'unen". The questions were

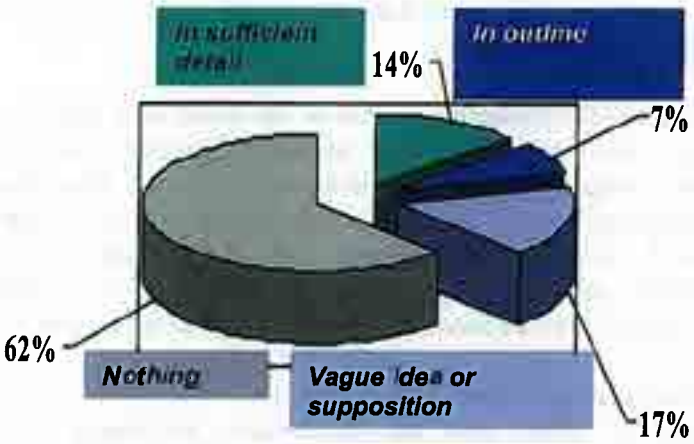

Fig. 5. Modern knowledge of the indigenous population of Chukotka about the "classical" rite of giving thanks to the polar bear.

about who was the first to see the bear, and the head answered. The hide belonged to the named person. If the head answered "yes", it was easy to lift, if "no", it was impossible to lift. If they asked about the person who shot, but was not first to see it, then the bear gave a negative answer. Not all the bears answered the questions, only every 4th or 5th male answered, but more

often female bears answered. Young people were not allowed to attend the rite, only the elder could talk with the head. I attended the rite only twice. They did not talk about anything else. They usually fed the head with dry reindeer meat (in small pieces) and gave water to it. Then they pricked the eyes, peeled the scull to the bone and took it to the hill. The scull was covered with stones so that dogs would not gnaw it. Sometimes they visited the hill to commemorate the sculls".

Two more respondents (6,9 %) told that in the past there was a celebration of the polar bear hunting in outline ("they played tambourine, danced"). In the interviews of 5 people (17,2 %) there are only weak echoes of the existence of such rite: vague memories of the stories told by deceased elders or their own suppositions made after finding old sacrifice places. For example, one of the respondents from Neshkan village told that there were heaps of old bear sculls on the nearby hill and concluded that they used to perform some rite with the sculls. Another respondent (from Uelen) told that before *"old people specially prepared a young*

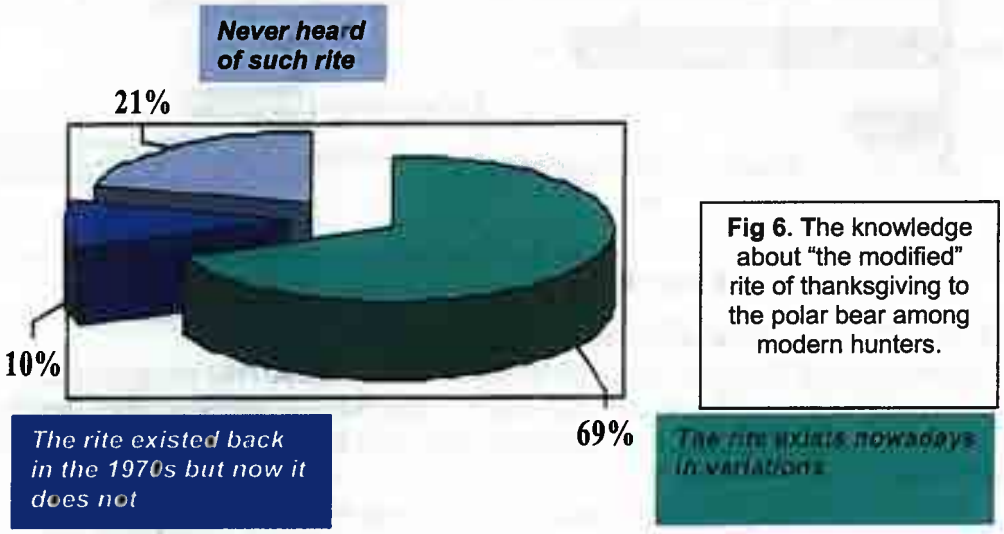

Fig 6. The knowledge about "the modified" rite of thanksgiving to the polar bear among modern hunters.

hunter for bear hunting". None of the interviewees mentioned "pleasing the bear's soul" when a hunter who killed the bear stayed indoors for several days.

To the question "Do they perform the thanksgiving rite to the polar bear nowadays?" most of the respondents (20 people, 69%) gave a positive answer (Chukotskiy rayon, the northern coast of Iul'tinskiy rayon, the village of Billings of Shmidtovskiy rayon). Three people (10,3 %) said that such rite was performed back in the 1970s (Chaunskiy rayon). Six people (20,7 %) do not know anything about such rites (the southern coast and the tundra zone of Iul'tinskiy rayon, the village of Uelen of Chukotskiy rayon, the village of Ryrkaipiy of Shmidtovskiy rayon) (Fig. 6). Three people who observe the thanksgiving rite noted that young hunters often neglect the rite.

The modern rite of the bear thanksgiving is described as follows:

«The rite is called "inegnintitku". When they cut the carcass, they turns its head eastward. After the cutting the head is separated and put on the ice hummock so that it looks at the east. The fleshy parts on the sides of the head are cut so they hang down. The eyes and the tongue are taken out. They give water to the head and put a piece of ice into the mouth. Then they put a small piece of dry reindeer intestines (in'eutet), which they usually carry with them. If they don't have intestines with them they usually put some food, for example, bread, candies into the mouth. Doing so in the Chukchi language they ask the bear to forgive them because he

did not kill it for fun but for food. They also say "these are you provisions (nyntak'avk'n) to eat on the way to the Upper World".

Fig. 7. An old place for sacrifice made of the polar bear sculls. It is located near the abandoned settlement of Naukan

This description is a synthesis of different most detailed stories of the Chukotskiy region hunters. It should be noted that the parts of the rite procedure differ from village to village and even within one village. Thus, sometimes they drown the head, and explain it by taking the bear's soul into its home environment. The direction of the bear's head position cannot be only eastward but also northward. If the bear was killed in the tundra, sometimes the rite is performed right on the hunting place, and sometimes its head is taken to the sea. The meat is sometimes not cut off the scull, and if they do, they can take it with them. Sometimes they can leave the eyes, they can just prick them or cut so they hang out of eye-sockets. They don't always give water to the head. They feed the head almost always. Some hunters claim that the food must be "homemade" or "not marine". Others feed the head with pieces of seal, walrus fat or even sea hare's skin belt or harness. If the hunter does not have food with him, he can put a broken cigarette, while other hunters claim that in any case it is prohibited to smoke and light matches near the killed bear. In some cases they put the food between the jaws, in others they put it near the head or under the head. They don't always say anything to the bear, especially the young generation of hunters. Some hunters say the following parting words to the bear: "This is yours, the rest is ours" (when they feed the head), "Come back as calm and not angry, don't attack during hunting", "Don't be offended, don't go far from our coast".

Apart from the thanksgiving rite there is a number of beliefs and customs regarding the polar bear. Many respondents told about them (14 hunters and both coordinators), however there are no beliefs common for all Chukotka. When one respondent recalled any belief, the others usually could not confirm its existence. When there were coincidences, different respondents had different interpretations. The most popular is the rite when the hide of the polar bear does not belong to the person who killed it but to the person who was the first to see or notice the bear, even if it was a child or a woman. Some respondents noted that the offender of this custom can expect death or an accident. 8 people and both coordinators of Chukotskiy and Iul'tinskiy regions told us about this custom. It is interesting that this custom is still common, although it is not always observed. By the way, the earlier mentioned "polar bear head questioning" was connected with the discussions about it. Other beliefs and customs told by the hunters are given below (in brackets we indicated the number of respondents that mentioned this belief):

1. *One can kill polar bears in very small numbers and only with permission of the eldest family member (1).*
2. *One is not allowed to approach a large group of polar bears (1).*
3. *One is not allowed to approach polar bears if they are in their heat (1).*

4. It's a bad omen if the killed bear falls on the ground with its head towards the sea. One should move the carcass to the land so that the bear would come back here (1).

5. Tailbones should be left on the bear's carcass, otherwise there will be no good luck in hunting (1).

6. If the killed bear is a female, hunting in the future will be successful (1).

7. The eyes of the bear are given to a pregnant woman so that the baby will be born healthy (2).

8. The eyes of the bear are given to a pregnant woman so that the bear would not attack her, since they say that bears scent pregnant very well (1).

9. One is not allowed to hunt the bear if his wife is pregnant. The animal will run away, anyway you will miss the target (2). If you kill the bear the child will be born ill (1).

10. If the bear is yawning, don't shoot. . The animal will run away, anyway you will miss the target (1).

11. If the bear yawns, the weather will be good (1).

12. If the bear yawns, the hunting will be successful (1).

13. If the bear yawns, somebody will die or have an accident (1).

14. If the bear yawns one is not allowed to shoot, otherwise there will be an accident with one of your relatives (1).

15. One is not allowed to shoot if the bear covers his head with a paw, otherwise there will be an accident with one of the relatives (1).

16. You are not allowed to shoot a sleeping bear (1).

17. You are not allowed to hunt the bear in its den (2).

18. You are not allowed to kill a female bear with cubs, especially in the den, otherwise there will be an accident with the hunter or somebody from his relatives (3).

19. If you had a dream that you were afraid of the polar bear, it means that soon you will unexpectedly meet a bear (1).

20. If you dreamt about a bear, the weather will be bad (2).

21. If you dreamt about successful bear hunting, the weather will be good (1).

22. If you dreamt about the bear you had wounded, and at the time your child is sick or you wife is pregnant, it means that this bear's spirit possessed the sick person. Then the hunter should feed the bear's spirit with something outside of the dwelling. In this case the sick child recovers (1).

23. If you dreamt about an ill or dying bear, it means that somebody from your relatives will die (1).

24. Some families have a sacred animal (often it is a polar bear) that cannot be killed and eaten by this family members (2).

25. The polar bear attacks only bad people, he does not touch the people with pure conscience (1).

26. One cannot feed the sledge dogs with the polar bear meat, otherwise if the dogs scent the bear, it is impossible to stop the sledge and they will take you to the bear (1).

Nevertheless, from all the diversity of beliefs and interpretations of the same fact initially there were several main beliefs. Nowadays hunters have a vague idea of them and everyone interprets them differently.

Discussion.

Our research shows that there is no polar bear thanksgiving rite in its initial state now. Although descriptions and memoirs of our oldest respondents, as well as the publications (Vlasova, 1935; Mineev, 1935, 1946; Ushakov, 1972) witness that this rite with small variations was performed by the Eskimos and the coastal Chukchee on the whole of the Chukotka coast from Anadyr Bay to Ayon Island during the first half of the 20th century.

Conditionally we can single out 3 stages of the European culture influence on the traditional culture and outlook of the indigenous peoples of Chukotka:

1. Orthodox missionaries (from the 17th century to the beginning of the 20th) did not influence greatly on the traditional outlook of the Chukchee and Eskimos.

2. Atheistic propaganda and collectivization (from the 1920s to the 1950s.) greatly damaged the traditional customs, rites, and beliefs. The polar bear thanksgiving rite (as well as other animals) hindered the goal set by the Bolshevik party intensive exploration of Chukotka natural resources. The first Boss of Wrangell Island Ushakov G.A. said (1972): "Having learnt about such rite, I got really worried. We were going to store a lot of meat, and if after successful hunting every hunter would entertain his bear with songs and dances for five days, it could affect the life of our small settlement. I decided to convince the Eskimos to give up that rite". Then he told about struggling with that "prejudice" in detail. The following Wrangell Island bosses continued this struggle (Mineev, 1935, 1946). However, despite intensive propaganda the polar bear thanksgiving rite existed in many Chukchee and Eskimo communities.

3. Industrial exploration of Chukotka (the 1960s until now). In 1956 the Council of Ministers of the Russian Soviet Federated Socialist Republic issued a special resolution "On measures for the Arctic animals' protection" that prohibited the polar bear hunting. Such severe punishments as fines lead to decrease of the aborigine hunting in Chukotka, however it did not stop completely. According to the hunters who took part in our research a small number of polar bears was hunted almost in all coastal villages of Chukotka during the whole 47 years of prohibition. But this hunting was secret that is why in some regions the thanksgiving rite was totally forgotten, and on the most part of the coast it undertook radical changes.

The metamorphosis of the thanksgiving rite occurred due to the following fact: in order to conceal the killing of the bear, the rite was performed right after it was killed, and the scull was left on the ice field or drowned. In most cases the hide was also cut into pieces and drowned or thrown away. Any celebration was out of the question. Our research showed the way the rite looks like now and most hunters in Chukotka observe it, although it's been a long time they cancelled the strict control over the polar bear hunting and nobody punishes the hunters. Today's hunters were born and grew up during the hunting prohibition and do not remember any other ways of performing the rite (Fig. 4a). Some of our respondents directly relate it with the fact that people fed the bear's head on the cutting place and left it in the ice fields. They were afraid that neighbors (firstly the immigrants) could notice them, or somebody could fine them and withdraw the hide. Others explain such way of observing this rite by returning the bear's soul to its native environment.

Such changes in keeping the thanksgiving rite damaged the ecological conscience of the hunters. The most important thing in the rite was that the hunter who killed the bear did not have the right to hunt another animal but was "pleasing the bear's soul" for several days. Such taboo made the polar bear hunting inexhaustible and supported a relatively stable number of the population. The lack of the rite in its original state lead to the fact that nothing prevents the hunter to kill any number of polar bears. It is not rare when during mass migrations and accumulations of polar bears near food sources a hunter kills several animals at a time.

Despite being diverse and variously interpreted the rest of the listed beliefs and customs have one very important feature. Fifteen of them (58 %) concretely say about limitations of hunting and using a certain category of bears. Even the relation of the child's disease with the wounded bear seen in a night-dream, make the hunter control his fervor and shoot only on a certainty. These taboos had a distinct nature protecting principle and did not allow exhaustion of the traditional nature use. Unfortunately all of them are lost now and kept only in the memory of the elder generation.

Conclusion.

Traditional lifestyle and religion allowed the indigenous people to live in relative harmony with the environment. A number of religious prohibitions and taboos limited the volume of the polar bear hunting and hindered the anthropogeneous influence on its population. The long-term moratorium on polar bear hunting in Russia (since 1956 until now), on the one hand, was useful and helped revive the Chukotka-Alaska polar bear population. On the other hand this prohibition lead to severe losses in the culture and ecological thinking of the indigenous peoples: the Chuckchee and the Eskimos. The generations of hunters grown during the memorandum are deprived of traditional internal restraining attitudes towards the polar bear. It can bring catastrophic consequences to the polar bear in the current economic situation, when its hunting is becoming one of the survival conditions of the indigenous people of Chukotka.

We believe that detailed studies of traditional rites and beliefs, their promotion among modern hunters are an important goal for the Chukotka Association of Traditional Marine Mammal Hunters (ChAZTO) and can be a valuable contribution to the preservation of the polar bear population in Chukotka and Alaska.

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