# Tundra Reindeer Herders

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Tundra Reindeer Herding

In the Russian Arctic, beyond the Polar Circle, the indigenous peoples of the North have created unique cultures that from ancient times have allowed them to adapt to very severe geographic and climatic conditions, and to firmly establish themselves on the vast expanses of the tundra. One of these unique cultures was tundra reindeer herding.

The rivers crossing the Polar Circle, such as Pechora, Ob, Yenisei, Khatanga, Anabar, Olenyok, Lena, Yana, Indigirka, Kolyma, and others, flow into the northern seas. In the summer wild hoofed animals migrate from South to North, from the taiga and forest tundra to the tundra, seeking safety from bloodsucking insects on the breezy tundra pastures.

Following the animals they hunted, humans migrated to the tundra as well and then gradually developed new methods of adapting to their severe surroundings in the Far North.

The Emergence of Tundra Reindeer Herding

Reindeer herding emerged on the territory of present-day Russia, presumably among the Samoyed and Tungus peoples of the Altai-Sayan highlands, and from there spread to the north of Eurasia, including Scandinavia, and also to the territories of today's China and Mongolia. The first domesticated reindeer appeared in North America (in Alaska) only in 1892.

Based on the archeological findings one can suggest that tundra reindeer herding had been practiced in the Russian Arctic for more than two thousand years [31].

The development of tundra reindeer herding became the stabilizing factor in the process of exploration of the Arctic by man. It guaranteed a constant source of food for the people who resided in those severe conditions, and reindeer skins served as an essential material for making clothes and keeping dwellings warm.

The Peoples Practicing Tundra Reindeer Herding

The following peoples practice reindeer herding in the Russian tundra: Saami, Nenets, Komi-Izhemtsy, Enets, Nganasan, Dolgan, Even, Yukaghir, Yakut, Chuvans, Chukchi, and Koryak (the peoples are listed according to their place of residence from West to East).

The traditional land use of the peoples is complex: aside from reindeer herding certain groups of these peoples also practice hunting, fishing, and sea animal hunting, which provide them with various sources of food and materials for household use.
Local and Ethnic Features Characteristic of Tundra Reindeer Herding

The estimated number of domesticated reindeer in the tundra zone of Russia is one million animals. The number of wild reindeer is almost the same. This creates a problem for reindeer herding in certain regions.

When a large herd of wild reindeer passes through reindeer herding territories, it often leads away some of the domesticated reindeer. In addition, wild reindeer hunting can sometimes supersede herding of domestic reindeer since the basic cost of reindeer meat acquired through hunting is lower than that acquired by annual culling of reindeer herds. In the second half of the twentieth century this happened in Taimyr, in certain areas of North Yakutia, and in Chukotka. In the tundra zones of European Russia and West Siberia there are very few wild reindeer left, and domestic reindeer herding is prevalent.

Specialists distinguish four types of tundra reindeer herding: Saami, Nenets and Komi-Izhemsy, Tungus-Yakut, and Chukotka-Koryak. They vary according to their methods of keeping reindeer, the means of transport used, the forms of nomadic dwellings, etc. [15].

Saami reindeer herding still preserves the tradition of allowing reindeer unrestricted or semi-restricted grazing in the summer. Due to the relatively high numbers of newcomers to the region, and because of the industrial exploration of the Kola Peninsula, the Kola Saami now have only small reindeer herds. The characteristic features of the Nenets and Komi-Izhemsy reindeer herding include a constant, round-the-clock watch over the herds and managing their migration and grazing with the help of reindeer driven sleds and reindeer herding dogs, the all-year-round use of sleds, and the non-use of riding and packing reindeer.

Their dwellings are cone-shape tents. The Nenets type of reindeer herding has spread from the Kola Peninsula throughout the entire European and West Siberian tundra, up to and including the Taimyr Peninsula.

On Taimyr and in the Anabarsky District of the Sakha Republic (Yakutia) the Nenets reindeer herding type borders the Tungus-Yakut type. The Dolgans, Evenks, and Evens still use riding and packing reindeer, but at the same time widely use harnessed sleds to transport cargo.

Tungus-Yakut reindeer herding, which is spread throughout Yakutia, is characterized by different methods of using reindeer for transportation (harnessed to sleds, and as riding and pack animals), widespread use of fences, use of various supplementary feeds, and milking the does.

The sleds used in Chukotka-Koryak reindeer herding have an entirely different construction than those of the Nenets and Komi and are used only in winter. In the
warm time of the year the reindeer herders move on foot and do not harness reindeer even when moving from one place to another. The traditional dwelling is a tent called a *yaranga*.

The Chukotka-Koryak type of reindeer herding is spread from the Kolyma Lowland to Chukotka and northern Kamchatka, but in some settlements of Yukaghirs, Evens, Evenks, and Yakuts, this type of reindeer herding exists side-by-side with the Tungus-Yakut type.

**Tundra Reindeer Herding of the Nenets**

The Nenets are the most numerous reindeer herding people; they occupy territories from the Kola Peninsula in the west to Taimyr in the east. Nenets reindeer herding is closely tied to reindeer herding of the Komi and Komi-Izhemtsy ethnic group. This group of Komi learned the Nenets reindeer herding economy from the Nenets at the beginning of the eighteenth century, and by the nineteenth century, on the basis of that economy, had developed their own large-scale reindeer herds for trade as well as for food [7].

The Nenets type of tundra reindeer herding is also practiced by the neighboring Khanty and small groups of the Nganasan, Enets, and Dolgan. At present the total domestic reindeer population of the Nenets, Komi-Izhemtsy, and their neighbors is around eight hundred thousand animals.

At the beginning of the twentieth century, with the arrival of Soviet power, the nomads of Russia were forced to switch to a sedentary lifestyle. Reindeer herding collective farms and state farms were created for that purpose. Large settlements were built for reindeer herder families, and children were sent to boarding schools. However, despite this new system the Nenets still retained their family and clan traditions. Reindeer herding brigades consisted of relatives. As a rule the wives of the herders were tent-keepers, and the children did everything possible to return to the nomadic lifestyle if only for summer holidays.

During perestroika state farms and collective farms were dissolved, sometimes along with most of the reindeer that were “converted” into money. In the 1990s the number of domestic reindeer in eastern Russia diminished almost by half. However, in areas of the Nenets type of reindeer herding, in places where family and clan traditions of year-round nomadism were preserved, the number of domestic reindeer remained the same [39].

**The Traditional Land Use and Lifestyle of Reindeer Herders**

Based on the example of the Nenets, the Komi-Izhemtsy, and those neighboring peoples who also practice tundra reindeer herding, we can see that their lifestyle is
bound to the annual migration cycle of the reindeer. Their herds travel for more than a thousand kilometers every year.

The year of tundra reindeer herders is divided into winter and summer periods. Reindeer herders survive the severe winter frosts in the forest tundra and northern taiga. An abundance of reindeer moss and game is extremely important when choosing the place for winter camping. A winter tent is set up in one place for two weeks or more. Every day the herders make a long trip in order to go around the whole herd. The reindeer that had wandered away from the herd are brought back using herding dogs.

When there is no more reindeer moss left near the camp, the herd is driven to a new location. However, the tent stays in its place and is moved only when the distance between it and the new grazing area becomes too long. Deep winter snow and the ice crust that forms during cold spells after a thaw are extremely unfavourable for reindeer herding. At those times, many reindeer die of hunger not being able to get to reindeer moss through the deep snow.

In the spring the herds are driven to the North in order to reach summer pastures by April or May. After calving the herds continue to move towards the shores of the Arctic seas in order to get to breezy coastal areas of tundra before the bloodsucking insects come back. Those areas are also rich in fish and game.

In September and October reindeer bucks begin to fight for the possession of the does, after which the herd begins to move back to the forest tundra and northern taiga. Small groups of fishermen and sea animal hunters remain on the shores of the northern seas and river estuaries.

Eared seal skin is used for covering the bottoms of skis and sled runners. These skins are also used to make harness straps and formerly were also used to sew boots. Fishermen and animal hunters keep dogs to pull sleds, feeding them on fish and meat of the eared seal.

**Moving From Camp to Camp and Means of Transportation**

Reindeer herders accompany and protect their herds day and night, all year round, and set the course for the herd using herding dogs and reindeer sleds, or by walking around the herd on skis. The reindeer herders do not travel alone, but with their families, thus the young generation learns nomadic skills.

During the move, both in summer and in winter, reindeer herders use reindeer-drawn sleds. There are several types of sleds: men’s, women’s, children’s, and cargo. Each reindeer team has one specially trained lead reindeer that goes in front of a team of four to six reindeer. While traveling all of the possessions, cookware, clothes, tent poles, and tent covers are packed up and put on the sled.
A large nomadic family can have more than a dozen sleds. The sleds follow each other forming a caravan \textit{(argish)}. In winter, part of the men can follow the caravan on skis to look after the sleds and the reindeer herd. In summer, during river crossings, they use boats to lead the caravan and the herd. In the past the boats were dug out from a one-piece tree trunk, but now they mostly use inflatable boats.

\textit{Dwelling}

Upon arriving at the location of the new camp, the family puts up a nomadic dwelling – a tent \textit{(chum)}: long poles are set up in the form of a cone and covered with reindeer skin (canvas tarpaulin is now used in the summer instead of skins). The women set up the tent; the men help them only in bad weather, such as a snowstorm or rain.

In the center of the chum they set up a stone hearth (today it can be a metal stove). On the sides of the hearth they lay down floor boards for benches. The floor of the dwelling is covered with willow twigs on top of which woven mats are placed (now mostly boards are used instead), and on top of all reindeer skins - these serve as sleeping places. All cookware, dishes, and clothes are hung inside the tent on poles or ropes. What is not needed for that day remains unpacked and is kept on the sled.

Brush and deadwood served as fuel in taiga and forest tundra, while in the tundra it was driftwood and various bushes (willows, birch, and alder). In places where even bushes were scarce (in northern Yamal, for instance), black “moss” (a type of a lichen) was used instead.

The tent was illuminated by fat-burning lamps, candles made out of reindeer fat that had been frozen inside a reindeer esophagus, glassless lamps, or purchased candles, but most often only by the firelight. Today people use electric lanterns.

\textit{Division of Labour}

The women are responsible for keeping the dwelling in order, cooking, working with reindeer skins, using them to sew clothes and footwear, and gathering edible and medicinal plants and berries.

While reindeer herdsman watch over and herd the reindeer, they also hunt and fish. Killing and butchering reindeer as well as teaching reindeer to work in a harness are man’s responsibilities. Men train puppies to be reindeer herding dogs, make the tynzyan (a leather noose) for catching reindeer, and choose wood for making sleds, the khorei (long pole used to drive the reindeer), and tent poles. The men also make reindeer harness components out of leather, bone, and wood.
Starting from a young age, boys begin to help the herders in everything, and girls participate in all women’s activities. Thus, from the time they are very little, children start practicing and learning all of the skills necessary for leading the nomadic lifestyle.

**Traditional Knowledge in the Everyday Life**

Moving around the endless tundra without visible landmarks, especially in winter, in the period of continuous darkness, is very dangerous for an inexperienced person.

A person needs to have a deep-rooted knowledge of the characteristic features of the landscape in this vast terrain in order to lead the reindeer from pasture to pasture and to keep reindeer from dying of hunger, snowstorms, or black ice, during mountain crossings in winter or water crossings in summer.

Nomadic reindeer herders find their way using the details of the landscape and the direction of the wind, the sun, the moon, the stars, constellations, in particular the Milky Way which the Nenets call “The spine of the sky.”

In winter, if the sky is covered with clouds, they find their way by using… the grass. They only need to know in which direction the tundra grass laid down before the first snow in the fall. The Nenets dig through the snow and based on the direction of the grass can tell the four directions.

In winter the Nenets can also find their way by looking at the parandei (frozen ice “waves” formed during a snowstorm), and by the distribution of mosses and lichen [32].

At times the reindeer herder has to go alone in search of reindeer that had wandered off and then return with them to the herd. An experienced person will discern the direction of the herd’s movement by the old fire sites.

“First you check to see how long ago the fire was burning. It’s easy to tell. If the fire site is not covered with snow, then it’s only two or three days old. However, if the firebrands had time to dampen, then a lot of time had passed. Dry, and especially warm firebrands, are reassuring: they mean the camp was here not long ago. Before leaving the herder will place the firebrand in a way that will indicate the direction in which the herd is headed, and if there are trees nearby, he’ll place it among the branches. If you keep following the directions, you’ll catch up with the herd” [33].

Each year as he follows the nomadic route, the reindeer herder makes note of places where he can protect the herd from snowstorms, where it is safest to cross the river with the herd in the spring, etc.
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Looking after the Reindeer

The biological life cycle of the herd is safeguarded by the traditional reindeer herder knowledge in the sphere of veterinary care and breeding. Reindeer herders constantly watch over the reindeer and pick out the sick and the weak animals. In the summer they tend to newborn calves.

Before the mating period they identify the well-bred reindeer males. They identify the reindeer bucks that are capable of working in harness and castrate them. During the winter slaughter they sort out the animals by age and sex in order to have more does and less bucks in the herd. During the period of calving they separate female reindeer and the last year’s calves from the leaders and the bucks. The herders seek quiet spots, away from the wind, for the calving does.

Nutrition

The northern indigenous peoples have genetically adapted to digesting high-calorie food. Meat and fish dominate in the diet of the indigenous residents of the Arctic. Consumption of animal blood, raw fish and, in winter, frozen raw meat is a result of their adaptation to the surrounding natural environment.

Latest research on the northerners’ diet showed that the natural diet of the indigenous people of the North, which is based on high protein and animal fat, is the only possible way to maintain a person’s body energy balance in the harsh conditions of the North [35]. Protein and fat supply energy and have thermoregulatory, hormonal, and protective functions in the human body. A lack of these elements in nutrition leads to metabolism imbalance, chronic stress, and the search for psychological protection that is sometimes found in the form of alcohol consumption.

Switching to foods imported from the middle latitudes, and especially from other countries, leads to a significant rise of illnesses among the residents of the North [35]. The “civilized” type of nutrition has clearly been shown to be associated with higher levels of psycho-emotional pressure and stress [36].

Clothes

The Nenets traditional clothing includes a malitsa and a sovik for men, and a yagushka for women; pimy are the traditional fur footwear.

The malitsa (malitsya) is a long pullover piece of clothing made out of reindeer pelts with the fur on the inside, and with a sewn-on hood and gloves. Among peoples of the Kanin and Timan tundras, the common malitsa has a high round collar without a hood, which is substituted by a tall reindeer fur hat with a separate circular sewn-in top and short earmuffs. The trousers that went down to the shin in
the old days were made out of reindeer skin. In the second half of the nineteenth century trousers made out of cloth or cotton material became popular and have almost replaced reindeer skin trousers.

During bitter frosts and snowstorms the Nenets wore a sovik also known in Russian as goose, kumysh and sokui which was a clothing item worn with fur on the outside. It also had a sewn-on hood, but no gloves; the Yenisei, and sometimes the European Nenets, made their sovik with a hood.

Children younger than three or four years wore fur boots, fur overalls (with the fur on the inside), and a parka which had a similar cut to the malitsa, but had fur on both the inside and the outside. Today the children wear rubber boots in the summer. Children aged five or six and up begin to wear clothes that are almost no different from the clothes of the adults. Infants were put in wooden cradles and covered with a fur blanket.

For footwear the Nenets wore pimy (piva) – high fur boots made of kamus (reindeer skin taken from the legs of the animal), with soles made of brushes (the skin between the big and the small hoof of the reindeer), and less commonly out of skin taken from the reindeer forehead. Inside the pimy the Nenets put insoles made of dry grass. Pimy were worn with a fur stocking known to the Russians as chizhi, tyazhi and lipty.

Women’s footwear differed only by the details of the cut. In summer and fall the men wore pimy made out of eared seal skin or ordinary old, worn pimy, and also reindeer skin boots with a fur sole (tanggad). The clothes for this time of year consisted of a worn malitsa and cloth soviki. The Nenets did not have special clothes for the summer.

Women’s clothing, called paniitsa, or yagushka (pany), was made out of reindeer fur, with the fur on both the inside and the outside in the form of a button-down coat, with a reindeer or arctic fox collar and sewn-on gloves. In severe frosts a fur bonnet was their headwear. It was equipped with attached metallic (copper) badges and beads. In the summer they wore their old paniitsa or clothing of a similar cut [38].

Festive clothing differed from everyday clothing. Women’s festive clothing was richly decorated with fur ornaments, and the men’s festive clothing was of a lighter color. All fur clothing was sewn with thread made of reindeer sinew taken from the back and the legs.

The double-layered clothing with fur on the inside and the outside was adapted to the severe winter colds and had hygienic qualities. Even in the beginning of the twentieth century the men (along with the children) did not wear underwear and put malitsa directly on their bodies. The men had to move a lot while working with the herd. The fur hair collected the body’s sweat and dirt. Upon their return to the tent, the malitsa was thoroughly beaten with a special stick causing the tubular
reindeer fur hairs to break off, along with the beads of sweat and dirt, thus cleaning the *malitsa*.

Herders working a herd still wear *malitsa*. Members of nomadic families also prefer to wear their traditional clothing.

**Calendar**

The Nenets names for the months and the different seasons of the year correspond to the types of economic activities, and also to the life cycles of animals.

The Nenets year begins in October, during the reindeer driving season, and the time when a new generation of reindeer is born.

November is the month to begin hunting arctic foxes.

December is the month of lesser darkness.

While January is the month of great darkness.

February is the month of the eagle.

March is the month of turning towards warmer weather, and a month of no wind.

April is a month of fake calving.

May is the month of calving.

June is the month of ice break-up.

July is the mosquito month.

August is the month of the gad-fly, or the month of the swans.

September is the month of falling leaves.

Currently the Nenets use both traditional and modern calendar. Annual cycle rituals and rites of sacrifice are timed according to the traditional calendar [33].

**Traditional World View and Rituals**

The Nenets have a complex religious system that consists of a pantheon of various spirits and rules for engaging with them.

One of the most important figures of their religious pantheon is the spirit of the sky – *Num*: he created the world and everyone living in it. Every spring and fall the Nenets offer him a white reindeer as sacrifice.

The cults of master spirits are well preserved in the Nenets culture: *ya yerv* – the master of the earth, *iv yerv* – the master of water, *yakha yerv* – the master of the river, *to yerv* – the master of the lake, *pedarayerv* – the master of the forest, etc. The spirits *ya yerv*, the master of the earth, and *ya yerv nye*, the mistress of the
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earth, are very much respected. They are responsible for bringing luck in hunting, fishing, and reindeer herding. For this reason sacrifices are made to please them.

Underground live Nga - the spirit of sickness and death, and evil spirits small ngyleko – the sources of human diseases. They scared away by the ringing of bells and metal hangers on clothes.

The cult of the mountains and rocks has also been preserved in the Nenets culture. Objects of worship include certain boulders in the tundra and small peculiarly shaped rocks that are included into the set of family sacred objects [33].

Traditional knowledge about the history of the clan was passed down through clan songs and legends about the events of the past and stories about ancestors. Families kept clan sacred objects, home and family protectors called khekhe in the shape of wooden figurines or stones dressed in malitsa with different ornaments. Domestic protectors were kept in a special sacred sled and were given different objects and food as gifts [38].

Ancestor spirit worship in the Nenets culture was also tied to the burial rituals for the dead in special graves – kholmer. After a person’s death the Nenets made an image of his soul – nyttarma, and brought it gifts [38].

The shamans could cure, read fortunes, and foresee the future. Public shamanic rituals could relieve the feelings of anxiety, worry, and fear that most often come during the polar night period. This is what was written about that in the nineteenth century: “With the coming of the dark and cold season, when the animal hunting stops and the illnesses come, the Samoyedic people gather in a large group in one place and say: ‘that it’s time for the shamans to look at the road. It would be bad if people started dying [13]’.”

For public shamanic rituals the Nenets built a “clean tent” by a lake and set a wooden image of an idol inside. After sacrificing a reindeer, his head was put by the idol. The shaman entered the tent accompanied by his helpers and, after drinking the blood of the sacrificed reindeer, began to perform the ritual above the fire. During the ritual his helpers and elders of the tribe were present. The shaman played his drum and addressed the idol with a song, asking him in the name of the people. The present audience answered the shaman with a special cry. During the singing, the people heard the roaring of a bear, the hooting of an owl, and the receding voice of the shaman. This meant that the shaman was leaving for the heavens. After a while the voice returned to the tent, and then seemingly went underground. After his final return the shaman told of his travels and made predictions.

At this time the young people, dressed in their best clothes, began a celebration by racing on reindeer sleds, wrestling, and jumping over rope and sleds [13].
Festivals with games, reindeer sacrifice, and communal meals tied to new customs (but timed with traditional annual celebrations), for instance, the celebration of the Reindeer Day in August, and Reindeer Herder Day in late March, is still conducted at the camp sites to this day.

Due to the persecution the shamans experienced during the pre-Revolution and the Soviet periods the sacral side of the festival is concealed from the outsiders’ eyes to this day.

**Sacred Places**

Traditional places of rituals and sacrifices are considered sacred. These places serve as a marker when travelling: for instance, sacred places with collected reindeer antlers can be seen from a distance. Graveyards and individual graves which are usually located in elevated areas, always by the lake or on a river bank, are also considered sacred [33].

“In winter, in the white silence of the tundra, especially in cloudy weather or on a sunny spring day, when the horizon melts with the earth, these places serve as a marker for any traveler. They can be seen from far off and can point out the way. Lonely graves, or graveyards on an elevated area, serve the same purpose. If it is a grave of an old person, people say: “my grandfather, or my grandmother showed me the way”[33].

In addition to family and clan sacred places, there were also public shrines. From the sixteenth century onward travelers noted the existence of the most famous shrine located on the island of Vaigach. The shrine included the seven-faced *Uesako*, dozens of wooden images of the *syadeyev* deities, and *Nevyekhekhe*, the mother of all domestic protectors (*khekhe*), in the form of a rock that stood in the middle of the island. Orthodox missionaries burned this pagan temple repeatedly, but the Nenets restored it every time.

It is believed that the territory around sacred places is protected by the spirits, so people must not make noise or say bad words, they “cannot tear a single blade of grass if they don’t want to bring misfortune” [13].

To this day tundra reindeer herders worship sacred places and are careful with the natural world around them. Thus, the territories around sacred places, in our modern understanding, become traditional natural reserves.

**Strategies for Adapting to the Changes in the Arctic**

Traditional land use is characterized by complexity, that is, the combination of different activities in different landscapes on the same territory.
Local groups of the indigenous peoples of the North can belong to the same ethnic group yet practice different economic activities. Typically these local groups are referred to as coastal (sedentary) and nomadic (reindeer herding). The coastal groups are mostly engaged in fishing and sea animal hunting, the products of which (meat, sea animal skins and preserved fish) they exchange for meat and reindeer skins produced by the reindeer herding groups. Such local groups with different economies can be found among many of the present-day peoples of the Arctic, such as the Nenets, Evens, Evenks, Dolgan, Chukchi, Eskimo, and Koryaks.

Judging by the petroglyphs of Chukotka located on the rocky banks of the Pegtymel River we can say that in the past the ancestors of the present-day Chukchi and Eskimos also combined reindeer hunting with sea animal hunting [11].

It appears that thousands of years ago the ancestors of these peoples combined different types of activity and switched from one another dozens of times, sometimes as a response to the periodical climate changes. In the last four hundred years such transitions have been recorded among the peoples of the North (the Nenets, Chukchi, Eskimo, and Koryaks) in written sources and were noted by ethnographers [7,18].

Thus, this complexity is one of the resources the traditional cultures of the Arctic peoples have for adapting to the changes of the surrounding environment.

**Climate Changes**

In the first ten years of the twenty-first century, the indigenous peoples of the North have witnessed changes in the timing and duration of ice formation and ice break-up on rivers. The rivers have begun to freeze later and thaw earlier, and the periods of winter reindeer migration has become shorter. Local people have had to change their deadlines and tactics for battling water obstacles along the route of the reindeer migration.

Due to the melting of the permafrost, swampy areas are increasing in reindeer pastures. From the south, grasses and bushes press more and more upon the summer pastures of reindeer moss which also diminishes their size. The number of blood-sucking insects is increasing, bringing anxiety and illnesses to the people and the animals.

Periods of thaw in winter are happening more frequently, and sometimes these are followed by snowstorms and black ice, maximizing the danger of hunger in large reindeer herds. During black ice, the reindeer hurt their hoofs trying to get food from under the ice, and this, in its turn, leads to necrobacillosis. All of these factors, coupled with the industrial development, create unfavorable conditions for
preserving and developing reindeer herding. However, at present a new important factor has been added to the natural factors in changing the environment.

**Industrial Development**

According to the official data, modern industrial development of mineral deposits in the Arctic and Subarctic (in the tundra, forest tundra, and in northern taiga) has negatively impacted forty percent of the reindeer grazing field and hunting grounds territories.

Each new oil and gas well, each pipeline, forces reindeer herders to change the migration route of their herds and has a devastating effect upon the resources for fishing, hunting, and gathering of wild-growing plants.

Every single one of the 103 members of the Nenets and Komi ethnic groups practicing a traditional lifestyle in the Nenets Autonomous Region who were interviewed in 2008 pointed out that the presence of industrial facilities has lowered the quality of grazing pastures, hunting grounds, and fishing spots, and negatively impacted areas for gathering berries and other wild-growing plants. It takes 50 years for tundra vegetation to recover (http://npolar.no/ipy-nenets).

**New Patterns of Adaptation**

The environment of the North is changing rapidly, mainly under the influence of the industrial development. The survival strategy for the local indigenous peoples is changing as well.

At the beginning of the 1990s, social organizations created by the indigenous peoples began to inform the general public about the high incidence of death among domestic reindeer due to the industrial development of the pastures.

As the herds moved along their traditional migration routes, they met obstacles in the form of pipelines and large territories of reindeer pastures that had been turned into impassable mud swamps that drowned reindeer.

In the beginning of the 2000s the negotiations with oil and industrial companies were initiated to discuss such questions as the necessity of building special pipeline crossings which would enable the passage of reindeer herds, and the necessity of working out agreements on compensation for the loss of pasturage. For their part, the federal administration, oil companies, and the many contractors engaged in construction work argued that they had no prior knowledge of the routes and duration of the reindeer migrations.

The Association of the Nenets People “Yasavei” compiled a database of the routes and duration of reindeer herd migration, the traditional places of fishing, hunting,
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gathering, as well as sacred places. Surveys and mapping were carried out by representatives of the indigenous communities who had gone through training in special seminars. The results of the project were posted on the Internet (http://npolar.no/ipy-nenets). This is an example of the new tactics of indigenous peoples in safeguarding their right to practice traditional land use.

Native leaders have become the initiators and leaders of the social movement to preserve traditional culture. Its representatives are gaining insight into the traditional knowledge of the nomadic peoples, gathering their folklore, describing their rituals, and creating maps of the sacred places.

Although in the past it was forbidden to disclose to “outsiders” the information regarding the sacred places, at present the strategy of protecting sacred places has changed. For instance, in 2000-2001 the sacred places database of Tazovsky District of the Yamalo-Nenets Okrug was created based on the mapping of objects of the tangible cultural heritage. This research of the sacred places was done upon the initiative of the President of the Association of the Indigenous Ethnic Minorities of the North, Siberia, and the Far East of the Russian Federation, S.N. Kharyuchi. The results of this research were published in a special book [12].

Today new celebrations have been created with the purpose of promoting traditional culture among the population of newcomers to the region: the Day of the Reindeer in August and the Day of the Reindeer Herder at the end of March.

These official modern celebrations are called khebidya yalya in the Nenets language, which translates into “sacred day” [33]. Present-day celebrations of the reindeer herders are a meeting of two cultures, nomadic and sedentary, when the reindeer herders demonstrate to the city dwellers the generosity and hospitality of the nomads, present the final products of their activity and also show off their prowess by organizing reindeer sled races.

**Conclusion**

At the beginning of the twentieth century practically all the Nenets led a nomadic lifestyle. However, by the end of the twentieth century only one out of three Nenets remained a nomad. Nevertheless, this is the highest percentage of a population remaining connected to the nomadic lifestyle among all indigenous peoples of the North.

Modern researchers view reindeer herding as the historical basis and a social resource for the stable spiritual and physical condition of the northern ethnicities. The fact that the Nenets people, by preserving traditional family-clan reindeer herding, have retained their language and traditions is the evidence and the confirmation of this statement [39].
Sources

1. Анабарский улус. Якутск, 2005.
2. Богораз В.Г. Чукчи. М.-Л., 1933.
3. Богораз В.Г. Оленеводство. Возникновение, развитие и перспективы // Проблемы происхождения домашних животных. М.-Л., 1933.
19. Миллер Г.Ф. История Сибири. М.-Л., 1941.


22. Мурашко О.А. Значение традиционных знаний для устойчивого развития коренных народов: пособие по сбору, документированию и использованию традиционных знаний для организаций коренных народов. М., 2007.


27. Попов А.А. Нганасаны. Материальная культура. М.-Л., 1948.


31. Федорова Н.В., Арефьева А.А. История Ямальского оленеводства, Салехард, 2011.


33. Харючи Г.П. Природа в традиционном мировоззрении ненцев. СПб., 2012.


35. Хаснулин В.И., Филипченко Р.Е., Хаснулина А.В. Полярный метаболический тип и подходы к коррекции дисадаптационных и
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