Effect of Environmental Awareness/Education and Tourism Development on Local Communities in Middle Siberia

Final Report

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State Nature Biosphere Reserve "Tsentral`nosibirsky"

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…the water as smooth as a blue mirror, reflecting the river bank with its great birches. To the east of us the black forest rises up a steep ridge, to stretch away over the boundless plains... One feels the unbroken stillness within that great forest-world... Ah, that forest; and here it is vaster and more infinite than any we have seen before, this endless taiga…"

Fridtjof Nansen. *The Land of the Future*, 1914.

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Content

Introduction

The link between conservation of biodiversity and the development needs of local communities - a central component of the biosphere reserve approach - is now recognized as a key feature of the successful management of most national parks, nature reserves and other protected areas. Each biosphere reserve is intended to fulfill three complementary functions: **a conservation function**, to preserve genetic resources, species, ecosystems and landscapes; **a development function,** to foster sustainable economic and human development, and **a logistic support function,** to support demonstration projects, environmental education and training, and research and monitoring related to local, national and global issues of conservation and sustainable development.

Physically, each biosphere reserve should contain three elements: **one or more core areas**, which are securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education); **a clearly identified buffer zone**, which usually surrounds or adjoins the core areas, and is used for cooperative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism, and applied and basic research; and **a flexible transition area, or area of co-operation,** which may contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainable develop the area's resources (7) .

Protected areas in Central Siberia harbour a tremendous variety of forest and freshwater ecosystems, mountains, steppes, bogs and other landscape types. They are an integral part of an elaborate Russia-wide system of protected areas, which is one of the oldest and largest in the world. Central Siberian protected areas are places of an outstanding natural beauty and a great majesty, where nature is able to flourish and evolve; and where the richness of life is respected and celebrated. The protected areas are also state-funded institutions which help sustain ecological values by preserving unique natural ecosystems, regulating recreational use, conducting scientific research, monitoring environmental changes and enhancing the ecological awareness of the public (3, 4)). There are any categories of Protected Areas here – the strictly protected Zapovedniks (Category 1a IUCN), the National Parks (Category 2 IUCN), different kinds of zakazniks (or refugiums, Category IV-VI IUCN).

Most of the protected areas in Central Siberia are remote and difficult to reach - offering the visitor a true wilderness experience. In the recent years, various facilities have been developed in

and near these protected areas providing a host of opportunities for ecotourism. Depending on the type and location of the protected area visitors can enjoy activities such as hiking, trekking, wildlife and bird-watching, boat cruising, white-water rafting or fishing - providing first-hand experience of the region's magnificent natural diversity (4).

The study area is the State Nature Biosphere Reserve "Tsentral`nosibirsky", which incorporates more than 2,5 million ha of the Yenisei River catchments area on the border of the Western-Siberian Lowland and the more elevated Middle-Siberian Plateau *(see scheme 1)*. The Reserve was created in 1985 to preserve typical landscapes and ecosystems of Middle Siberia. This is a sparsely populated forested area (taiga) on both banks of this large river, dissected by numerous tributaries between Podkamennaya Tunguska River to the south and the Yeloguy River to the north. All the rivers have exceptionally good quality water and are well-populated with fish. The high biodiversity of the area is brought about by the crossing over of several biogeographical boundaries, the principal one being the Jogansen Line that divides the Palaearctic into western and eastern parts.

The major population groups within the Nature Reserve are as follows:
Keto indigenous minority – less than 1100 people, most of them living in two villages within the reserve;
Evenks indigenous minority – a more numerous but scattered group of indigenous people;
People of Russian origin made up of three main groups:

- Siberian old-believers living in compact settlements in the most remote corners of Siberia;
- Professional hunters living a traditional lifestyle;
- People in new settlements mostly employed in support services related to local airports and river stations.

In the last few years, a rapid rise in interest by tourists in remote corners of the taiga has occurred. Local people and village administrations say that the very obvious increase in tourist numbers results in conflicts arising between local communities and those visitors who do not respect even the very simple and obvious rules of behavior in the taiga. Increasingly, for example, hunters' log cabins are being broken into and damaged, hunting regulations are being violated, poaching and unregulated fishing takes place, especially of such endangered and valuable species as lenok (*Brachymystax lenok)* and taimen (*Hucho taimen*), and there is a general increase in disturbance to wildlife. The reserve is divided into different zones with

differing regulations and levels of protection *(see scheme 2)*. Presently, only the strictly protected (or core) zone is protected from unregulated tourism, while all the other zones suffer from the impact of tourism to a greater or lesser extent.

All above-mentioned facts testify to a poor awareness and understanding of the environment amongst visitors. Further growth of uncontrolled and unsustainable tourism in Middle Siberia will likely cause undesirable environmental and social consequences for the reserve and for the region as a whole.

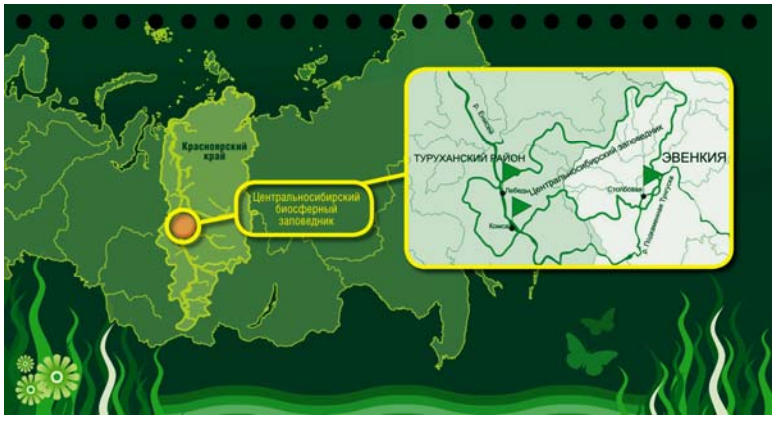
The objectives of the research:

- to identify and analyze the impact of environmental awareness/education and various kinds of tourism development on the ecological integrity of forest and water ecosystems in a vulnerable environment such as is found in Middle Siberia;
- to prepare recommendations for the incorporation them into the five-year management plan that is currently being drawn up;
- to improve the image of the biosphere reserve also to help the reserve play a much more important role in tourism development in the region and the local and regional economy as a whole;
- to publish the project's conclusions and recommendations in the local and regional media and to deliver them to relevant authorities.

3. Detail description of place for work.

The Biosphere Reserve "Tsentral`nosibirsky is situated in Turukhansky district (west part of the BR) and Evenkiysky municipal district (east part) of Krasnoyarsky krai *(see scheme 1)*. The territory of the Reserve at all is really huge – more than 2 500 000 ha.

Scheme 1. ***Geographical location of the Biosphere Reserve "Tsentral`nosibirsky"***



But also around reserve there are many interesting objects which attract tourists. So, the ancient Vorogovo village is one of the largest in Turukhansk district today. The Yenisei on the latitude of Vorogovo is up to 15 kilometers wide. The archipelago of Vorogovo islands is a heaven for fisherman. The most important place for sturgeon *(Acipenser baeri)* and starlet *(Acipenser ruthenus)* are breeding here up to the present time. The Osinovsky Rapids are a navigating channel testing the skill of the pilots and a legend in itself. A mighty stony ridge rises from the bottom of the Yenisei narrowing the channel, which is from 70 meters till 700 meters of depth. After 10 km from Osinovsky Rapids there are famous "Osinovsky Cheeks" (in Russian – "Scheki") – beautiful rocks along the both banks of the Yenisei. The length of them is 6 km and the depth here is up to 60 m. On the bottom of the river there is a steep declivity. The estuary of Podkamennaya Tunguska River comes into view almost immediately after the rock known as Korablik (in Russian – "Ship" because it looks like a ship). It is the third largest tributary of the Yenisei next to the Nizhnyaya Tunguska and Angara. It is not enough to call it a beauty – it is a magnificent phenomenon of nature. The navigation season here is very shot – about the month. In some 25-30 days the crew manages to take their ships loaded with cargoes over one thousand –odd km to the Vanavara settlement (nearest settlement to the place of fall down the Tungus meteorite).

3.1 General information about the Biosphere Reserve "Tsentral`nosibirsky"

Surface area:

core area - 1 020 419 ha,

buffer zone - 552 000*ha,

cooperation zone 746 000 ha + 126 900*ha

Total area: about 2 500 000* ha (*the territories of the buffer zone and cooperation zone have been developing now).*

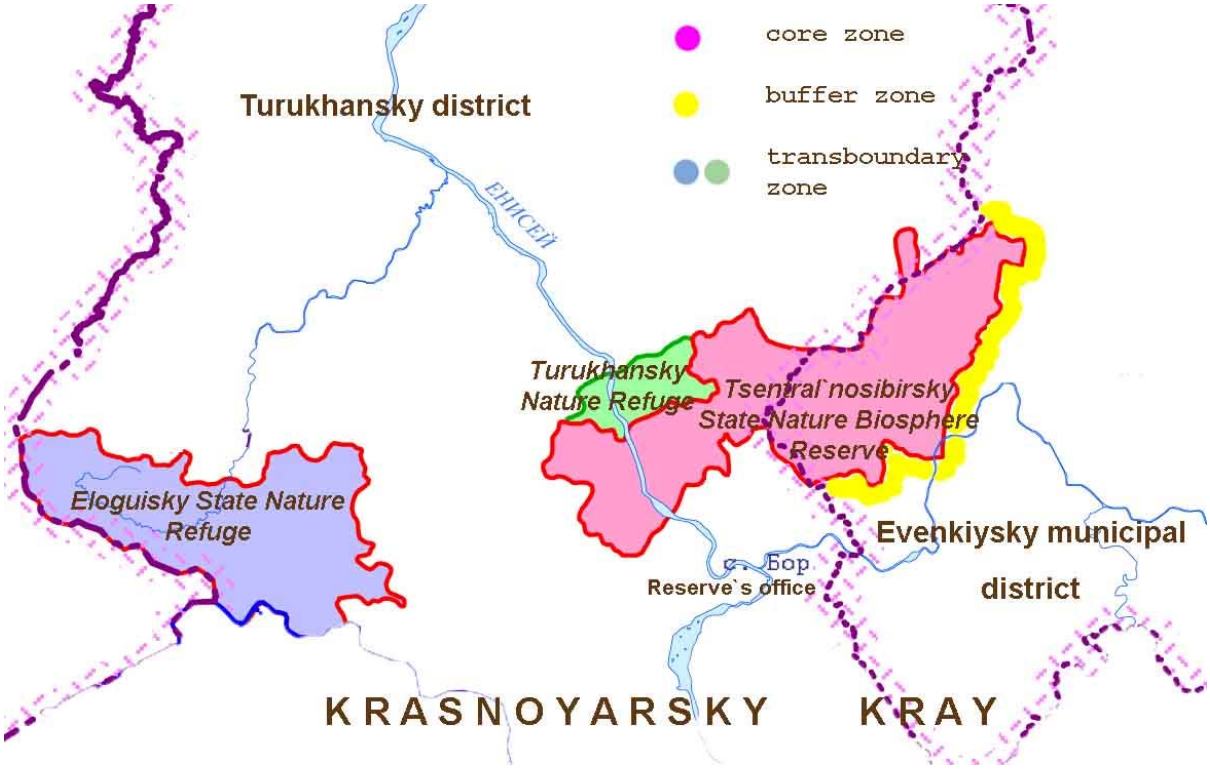
3.2 Protection classifications:

State Nature Biosphere Zapovednik "Tsentral`nosibirsky" belong to the Category Ia in IUCN classification (1 020 419 ha of core zone. It is State Nature Biosphere Zapovednik "Tsentral`nosibirsky" itself).

Buffer Zone is the Local Refuge of Evenkia. It is situated in Evenkyisky municipal district of Krasnoyarsky krai and belong to the Category IV IUCN.

Cooperation zone has got a cluster disposition and consist of State Ethnographic and Nature Complex Zakaznik "Yeloguysky" (746 000 ha) and Local Nature Zakaznik "Turukhansky" (126 900 ha) both belong to the Category IV IUCN.

Scheme 2. Zonation of the Tsentral`nosibirsky Biosphere Reserve



3.3 Main functions of the Tsentral`nosibirsky Biosphere Reserve :

- √ Preserving biological diversity
- √ Scientific research
- √ Environmental monitoring
- √ Raising environmental awareness
- √ Assisting in sustainable regional social and economic development

The Tsentral`nosibirsky Zapovednik (Central Siberian Zapovednik if translated into English), one of the largest nature reserves in Russia, is special in many ways. The core area of the Reserve is 1 020 419 ha. The Reserve was founded 9 January of 1985. This protected area in the centre of Krasnoyarsk region covers a vast segment of Siberian taiga - the largest continuous boreal forest on our planet. Main ecosystems of the Reserve are different types of taiga forests, rivers, wetlands, rocky cliffs. The Yenisei River is the main river within the reserve, the second

largest river in Russia and the seventh largest in the world. The Tsentral`nosibirsky Nature Reserve is the only protected area in Russia where both banks of a large river are protected for a distance of 60 km. The river is 2-3 km wide and 6-17 m deep.

Tsentral`nosibirsky Zapovednik was the first in Russia established as the Biosphere Reserve and have taken this status in 1986. From the very beginning the Tsentral`nosibirsky Zapovednik was envisioned as a biosphere reserve beyond the influence of external pollution. Its borders were thus delineated so as to protect an entire watershed: the middle reaches and several tributaries of the Yenisei, a unique and unprecedented designation. This conservation regime insures that the Zapovednik comprises one of the cleanest and most pristine natural areas on Earth. It was duly included into the global network of biosphere reserves by UNESCO in 1985. The harsh climate of Siberia (average January temperature – 25^0C, and average snow cover over 1 meter high) has always limited any development in the region. The core area of the reserve is totally free from man-made features.

The Yenisei Biogeographic Border goes through the Reserve`s territory. Extensive Siberian lowlands lie to its west and the more elevated Siberian Plateau to its east. Whereas the western plains are characterized by swamps and slow-flowing rivers, on the eastern plateau swift rivers have cut their way through rolling emerald hills. The upper parts of the plateau are forest-free and dominated by mountain tundra and 'golets' - bare rocky caps with sparse alpine or tundra vegetation. The lower parts are covered by taiga woodland of predominantly Siberian Pine (*Pinus sibirica*) and Siberian Larch (*Larix siberica*). Both are frost-resistant trees well adapted to withstand the harsh conditions of north Siberia. The Yenisei Biogeographic Border divides Palaearctic region to the east and west parts whereupon the level of biodiversity here is really increased when compared with typical taiga.

Significant threats are posed by geological survey and mining operations, logging, poaching (elk and sable are the most vulnerable species) and unlimited fishing (Siberian taimen, lenok, sturgeon, starlet and conny are most vulnerable).

In the core zone there are no human activities. In the buffer zone there is the commercial hunting on fur-bearing animals and ungulates. Fishing, gathering of non-timber forest products and also all types of hunting take place in the cooperation zone where the number of sable and elk is stable and high now. Near the old-believers settlements there is agriculture and bee-farming.

The biosphere reserve "Tsentral`nosibirsky" plays an important role in long-term ecological monitoring and in research of the flora and fauna of Central Siberia. It runs several public outreach programmes promoting sustainable use of natural resources and ecotourism in the

outskirts of the reserve. There are plans to open a visitor centre with a local museum in the Bor village. The biosphere reserve also administers Yeloguisky zakaznik (habitat management area), where the main conservation objective is to preserve the traditional hunting grounds of indigenous Keto people. The zakaznik, which occupies 747,600 ha in the headwaters of Yelogui River (a tributary of Yenisei), represents a compact massif with typical landscapes and biodiversity of the Western Siberian Lowland.

3.4 Wildlife

The Reserve is home to:

- √ Over 630 species of flowering plants
- √ 7 species of coniferous trees
- √ 25 species of ferns, horsetails and club-mosses
- √ Over 260 species of mosses and lichens
- √ 45 mammal species
- √ 274 bird species
- √ 4 species of amphibians and reptiles
- √ 35 fish species
- √ Over 700 species of insects
- √ Over 420 species of spiders

Thanks to its geographical position on the border of the Western and Eastern Palearctic zones, and diverse landscapes - old-growth larch and Siberian pine forests, raised bogs, and rocky outcrops - the biodiversity of the biosphere reserve is much higher compared with typical Siberian taiga. Sable, squirrel, Siberian deer and brown bear inhabit the forests, a cold biome just south of the tundra where food is scarce for six months of the year and the temperature falls below freezing. More than 630 plant species are recorded here, including the rare beautiful Calypso orchid (*Calypso bulbosa*), Lady's Slipper (*Cypripedium calceolus),* Large-flowered Cypripedium *(C. macranthum).*

In late May and early June, a spectacular mass migration of birds can be witnessed here when tens of thousands of them head along the Yenisei to nest in the Artic north. Many like to stop at the lagoons and pools created by the thawing ice blocks and receding floods on the Yenisei, providing great opportunities to watch them – just as witnessed by the British ornithologist Henry Seebohm during his visit in 1877 and described in

his book "*Birds of Siberia*". Two of the best spots to see this exciting annual spectacle are the ranger's station at Lebed (Swan) and the field station at Mirnoye (to the north of the core zone of the BR in Zakaznik "Turukhansky"). Bird-watching is particularly nice and impressive at Lebed, where a temporary island is created during the flood period, luring thousands of birds to rest before their ultimate destination in the Artic. Many interesting birds such as Golden Eagle (*Aquila chrysaetos*), White-tailed Sea-Eagle (*Haliaeetus albicilla*), Osprey (*Pandion haliaetus*), Peregrine falcon *(Falco peregrinus)* and Black Stork (*Ciconia nigra*) nest in the Reserve.

The stretch of the Yenisei River protected within the nature reserve is one of the major spawning areas of Siberian Sturgeon (*Acipenser baeri*) and Starlet (*Acipenser ruthenus*) – the smallest species of sturgeon. The tributaries of Podkamennaya Tunguska - a mighty river in its own right - are important spawning sites for the highly valued Taimen (*Hucho taimen*), Lenok (*Brachymystax lenok*) and Arctic Grayling (*Thymallus articus*) whose numbers are declining outside the reserve. Spectacular cliffs line both sides of the Podkamennaya Tunguska. In places, the softer sediments have been eroded by wind and rain, revealing fantastically shaped pinnacles of basalt. These grey-brown rock pillars beautifully contrast with the enthralling splendor of the northern Siberian taiga.

The Reserve is home to 22 species of plants and animals listed in the Red Data List of Russia, including:

- 3 plant species (orchids)
- 12 bird species (including 5 nesters)
- 3 bumble-bee species
- 4 butterfly species

The Reserve is a crucial area for maintaining
populations of game species, such as sable, elk and reindeer and high value fish species, such as taimen, lenok and others.

3.5 Indigenous people

Settlements were always established near rivers, which still
play the major role in local transport. On the right bank
of Podkamenaya Tunguska, near the southern border
of the reserve, live Kets (also known as Yenisei Ostyaks). In the brilliant book '*Land of Future*' written by the Norwegian polar explorer Fridtjof Nansen, they are described as a northern nation of great hunters and reindeer herders. It is almost unbelievable that this vanishing nation, now

numbering less than 1100 people, was once the major tribe which inhabited almost the entire Krasnoyarsk region. Unfortunately, during last 100 years their traditional lifestyles were eroded and native culture suppressed. They survive only in two small enclaves, in Sulomay (Red Rock) village at Podkamenaya Tunguska River and in Kellog village at Eclogue River, 100 km north of the Yeloguisky zakaznik directed by biosphere reserve administration.

Further in the east and north of the BR live Evenks who are still involved in traditional activities as hunting, fishing and reindeer husbandry.

On the edge of the BR (for example in Sumarokovo, Kochumdek villages etc.), there are also several settlements of ethnic Russian Old Believers. When in the 17th century significant changes were introduced in the worship of the Russian Orthodox Church, most number of believers refused to accept them and continued to worship in the "old way": speaking old Russian, reading old books and drawing old icons, crossing themselves with two fingers instead of three, and keeping their beards. Because of persecution, many fled to various less populated parts of Russia, including the Siberian wilderness, to re-establish their livelihoods. The Old Believers in Central Siberia, who traditionally have large families, are mostly occupied in hunting and fishing. Also they plant vegetables and keep bees.
In Bachta, Bor, Sumarokovo and any other villages there are professional hunters live by traditional lifestyle. The most important species for hunting are sable and squirrel for fur and moose for food. All hunters have the individual plots with the numerous traps and log cabins.

3.6 Activities in tourism:

Tourists have never visited the Biosphere Reserve in great numbers. However in 1993-2003 there was a cruise motor ship “Anton Chekhov”. That ship was built in Austria in 1978. It had suites, one-berth-, two-berth- and three-berth cabins, sauna, a souvenirs shop, first-aid post, restaurants etc. The capacity of the MS “A. Chekhov” was 170 passengers.
The MS has stopped in Lebed - one of the sites for the reserve rangers. There was an excursion organized for tourist groups from the cruise ship. For this trip the people from the reserve have used the old trail followed about 2-3 km through the reserve’s landscapes. It was the great experience for the tourists (most of them were foreigners) to spend a bit of time in the virgin taiga. Unfortunately, in 2003 the MS was sold to the Volga River area. Since 2003 year there are no cruise ships in Krasnoyarsk region.

The other experience in tourism is related to free time of local hunters beyond the hunting period. In summer most of them have a possibility to organize trips for small group of guests in the cooperation zone of biosphere reserve and around it.

4. Methods and materials of investigation.

To estimate the perspectives of tourism development around the BR a questionnaire as well as the list of target groups to be covered was developed. This was done taking into account people's background, income, gender, age, how long they have lived in the Far North and other criteria (*see Annex 1).* The questionnaire was spread in local population by author of this project and her helpers - the members of the School Scientific Society. The sample interview method was used.

The data were given from the next important groups of people:

- Local authorities
- Office workers
- Professional hunters
- Teachers, librarians
- The medical professionals
- Managers
- Foresters
- Retiree and householders
- Scientifics and rangers from the Biosphere Reserve.

Based on the data collected from the Eco-educational Reports, the list of eco-education activities of Tsentral`nosibirsky Biosphere Reserve was developed. The author of this investigation is the chief of eco-education department of the BR that is why most of these activities are the results of her everyday work.

Based the experience of the Reserve staff and tourism experts the SWOT analysis was completed. New travel routes incorporating both nature and local lore/history specific features were developed for nature reserve visitors by the eco-education department of the Reserve.

Based on the literature review and Reserve staff experience were available to prepare the English version of leaflet for the BR.

For the collection of data and making pictures from the interesting tourist objects some field trips around and to the Reserve territory were organized

1. Trip along the Podkamennaya Tunguska river. Sulomai village (settlement of keto) and Kochumdek (settlement of old-believers) were visited.
2. Trip along the Yenisei river. Lebed and Komsa depopulated villages, Mirnoye biological station and Bachta village - settlement of hunters and fishermen - were visited.
3. Trip from the Krasnoyarsk to Bor by ship (Vorogovo village, Yenisei rock islands and other interesting objects for tourism were visited).

5. Results

5.1. Eco-tourism analysis

5.1.1 Collecting pictures

Over 200 photographs of the most interesting nature sites and objects (landscapes, plants and animals) and cultural monuments (a church in Komsa village, Sulomay traditional keto settlement, old-believers settlements etc.) were taken in 2009-2010. Some part of them attached to the final report.

5.1.2 Assessment of potential for tourism development in BR

The results you can see in the *Table 1* and *Table 2*.

Table 1. Assessment of the nature/local culture attractions of the BR from the point of view of visitors

Nature attractions	Degree of manifestation			Comments
	High	Mid-dle	Weak	
Diversity of landscapes and their attraction	√			Podkamennaya Tunguska and Yenisei Rivers. The BR is the only protected area in Russia where both banks of a large river are protected for a distance of 60 km. The Yenisei River here is 2-3 km wide and 6-17 m deep. Basin of the Stolbovaya River (canyons, rapids), outcropping of Siberian traprocks, Nature Monument "Sulomay Columns". The BR is one of the largest protected forest areas in the world. The Reserve`s landscapes are representative both for the Western and Eastern Siberia region. There are primeval fir, spruce, lurch and cedar pine forests, raised bogs, permafrost, bottomland and bedrocks landscapes. For 10 years experience with the cruise ship "Anton Chekhov" displayed high level of interest from the foreign tourists (Germany, Switserland, Italy, Japan, France) to the Middle Siberia Nature. Many of foreign tourists have been here once than came this way again. The visit to the Biosphere Reserve area and excursion to taiga were important attractions of the Yenisei cruise from Krasnoyarsk to Dudinka. Since 2003 there are no cruise ship on the Yenisei River that is why today there are no tourists from the ships. But Several regional tour operators based in Krasnoyarsk are planning to purchase a cruise boat to meet the increasing demand for cruise tours along the Yenisei River.
Level of Biodiversity	√			45 species of Mammals, 274 species of birds (11 of them are included to the Red Data Book), 35 fish species. Over 630 species of flowering plants,7 species of coniferous trees, 25 species of ferns, horsetails and club-mosses, over 260 species of mosses and lichens The Yenisei biogeographic border (the "Johansen-line", or Yenisei meridian) runs across the territory of the nature reserve, forming the main sector boundary of the Paleoarctic region that divides its flora and fauna into East Siberian and West Siberian. These natural geographic borders enhance the biological and landscape diversity of the conservation area.
Big mammals		√		In compare with typical forest landscapes there are the same possibilities to observe the big mammals – bear, moose, reindeer, sable, musk deer.
Interesting species of birds	√			Any species of birds are entered to the Application of SITES Convention. From them *Ciconia nigra*, *Aquila chrysaetos*, *Haliaeetus albicilla, Pandion haliaetus*, *Falco peregrinus* nest in the Reserve. *Haliaeetus albicilla* can be observed regularly in summer. From time to time *Aquila chrysaetos* and *Pandion haliaetus could be seen. Falco peregrinus* nests in the hard-to-reach places of the BR area. Here you can guarantee observe East Siberian and West Siberian species of birds in passage. The most interesting nesting species include the Siberian Blue Robin *(Luscinia cyane)*, the Siberian Rubythroat *(Luscinia calliope)*, the Great Grey Owl *(Strix nebulosa*, the Eurasian Eagle Owl *(Bubo bubo)*, the White's Thrush (*Zoothera dauma)*, the Great Grey Shrike *(Lanius excubitor)*, and certain species of waders and waterfowl. In seasonal passage or nomadic migration you may also encounter the Gerfalcon *(Falco gerfalko)*, the Baikal Teal *(Anas formosa*), the Lesser White-fronted Goose *(Anser erythropus)*, the Bewick's Swan *(Cygnus bewickii*), the Red-breasted Goose *(Branta ruficollis)*. Broad fronts of migrating birds and flocks of waterfowl can be observed on clearings around the biostation and "Lebed" cordon of the nature reserve.

Nature attractions	Degree of manifestation			Comments
	High	Mid-dle	Weak	
				Common species in summer are *Gallinago media, Gallinago stenura,* mergansers, nutcracker, *Larus minutus, Ficedula parva, F. mugimaki, Phylloscopus borealis, Ph. trochilloides, Ph. inornatus, Ph. reguloides* etc.
Possibilities to observe the wildlife		√		Mammals: in winter mooses concentrate along the Yenisei banks. In May - June the bears regularly go into the meadows around the "Lebed" kordon on the bank of Yenisei River. Birds: You can guarantee observe East Siberian and West Siberian species of birds in passage (May-June) on the "Lebed" kordon
Uniqueness species or landscapes components	√			Siberian traprocks make up one of the biggest trap province of the World. They are inimitable in its beauty rocks in the river values of Stolbovaya basin.
Virginity of Nature	√			The nature ecosystems of the BR are undisturbed. There are no people live in the core area of BR.
Possibilities for swimming	√			In July-August you can swim in Yenisei and its tributaries. The temperature of water is +16- +18ºC. Local people do it every summer.
Thermal water			√	Absent.
Diversity of conditions for active rest	√			Rafting along the mountain rivers, trekkings, snowmobile Safari are possible.
Other remarkable sights around the BR				
Cultural places of interest. Local customs, ethnography, traditional life style.	√			Some part of the BR area is situated on place of the expedition undertaken by Fridtjof Nansen, the famous Norwegian traveller, and described in his book "Land of the Future". Settlements of Siberian Old Believers (Kochumdek, Kuzmovka, Chulkovo), who have preserved their traditions since the times of Peter the Great, are situated around the BR body. You can also visit the local community of the Kets minority people Sulomay (or Kellog), and observe their culture and way of life. Meet with commercial hunters in Bakhta village, learn about their lifestyle, feel in your own hands the hunting and fishing tools that the practices of nature management in taiga have always relied on – their history goes back to the times when people lived in harmony with nature…
Paleontological & archaeological excavations	√			You can walk river spits made up entirely of ancient Paleozoic (Ordovician&Silurian periods) fauna – sponges, pearlworts, corals, and brachiopods – in Kulinna and Dulkuma Rivers. Burial ground of mammoths in Bachta village. Archaeological finds from Late Stone Age& Bronze Age in Podkamennaya Tunguska and Sumarokovo villages.
Seasonal prevalence				
Climate	√			Acutely continental climate
Tourist season		√		From May to September.
Abilities for increasing tourist season	√			from February to April. Very sustainable sunny weather, light frost, any possibilities to observe moose, reindeers, sable, capercaillie, hazel-grouse etc. Ice fishing around Reserve. Snowmachine tours.
TOTAL	**11**	**4**	**1**	

Table 2. Present-day infrastructure and services in the Tsentral`nosibirsky BR and an assessment of the need for further development in light of the Reserve's geographical location

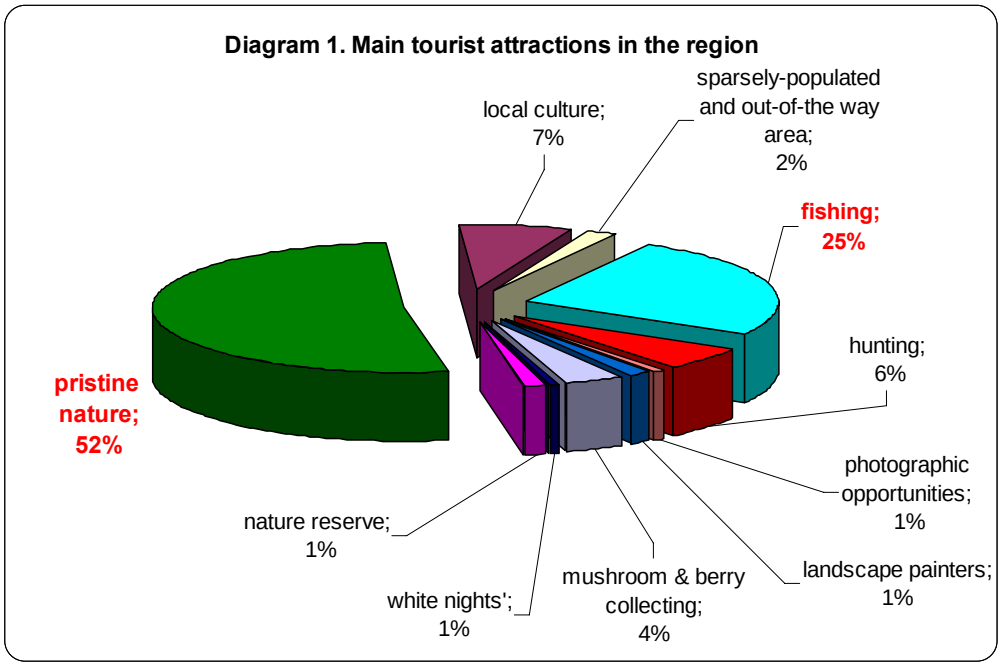
	Assessment Ranking			Comments
	High	**Medium**	**Low**	
Accessibility				
Distance from nearest international airport & large tourist centre			√	600 km from Krasnoyarsk
Time required to travel & convenience		√		1 hour 45 min by air. Krasnoyarsk-Podkamennaya Tunguska flight (twice a week). 16 hours by hydroplane boat from Krasnoyarsk (in summer only).
Seasonal limitations on moving around		√		Flights are all-year round. However, moving around the area is only possible from December to early-April & from late-May to September. During other times, the only option to move around is by helicopter.
Accommodation, internal transport & food				
Existence of or feasibility for providing adequate accommodation facilities & transport			√	There are no accommodation facilities within or adjacent to the nature reserve. The only option available is the Mirnoe Biostation of the Russian Academy of Sciences. This consists of basic hostel-type facilities, but the houses are in need of renovation & have no electricity, flushing toilets or showers. The most convenient form of transport is by helicopter. Another option is by motor boat, each of which can carry no more than 3-4 people with luggage.
Provision of tasty food that meets health & sanitation requirements		√		Food is prepared on-site. Quality is high. No special cooking facilities used.
Availability of knowledgeable & skilled personnel		√		There are several skilled guides speaking foreign languages. Training courses for both local guides & nature reserve staff are very much needed.
Safety & partnerships				
Personal safety & security	√			Tourists are briefed on personal safety & security. There is a reliable radio-link between the headquarters in the village of Bor & groups traveling within the nature reserve. Groups are accompanies by experienced guides & equipped with life-saving equipment when traveling on waterways. A police station is located in Bor.
Provision of basic medical care	√			An ambulance helicopter can be summoned by radio from each of the nature reserve outposts. Basic medical care is available in Bor.
Partnerships with tour operators		√		The Eco-tourism Development Foundation *Dersu Uzala* is the principal partner. A possible partnership is being discussed with the regional tour operator *Dyula Tour* which is interested in working with the Reserve.
TOTALS	**2**	**5**	**2**	

Evidently the present-day infrastructure and services in the BR are inadequate to unique nature and cultural attractions.

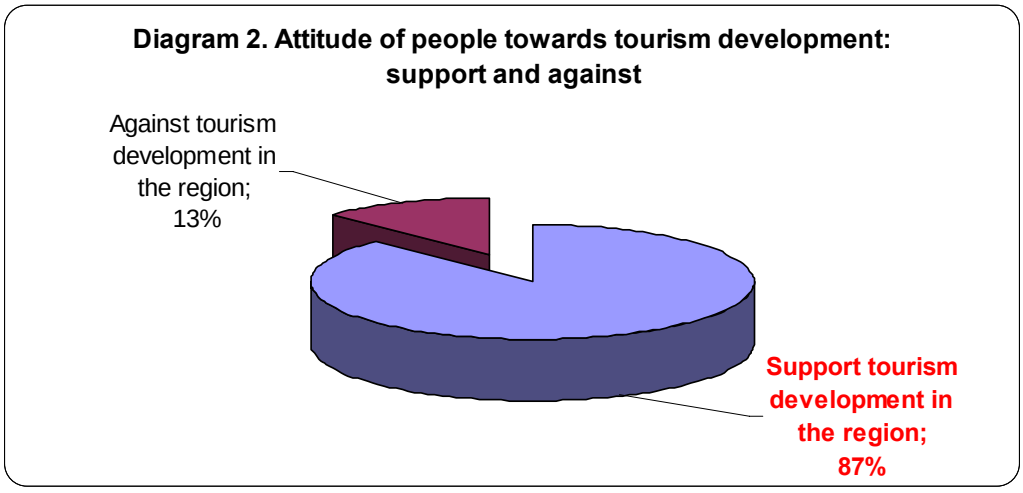
5.1.3 Processing of the information collected through questionnaires.

100 persons from local people of different income and social background were questioned (see Annex 1). 19% from them refused to answer the questions.

Al respondents believe the nature is the main attraction for tourists (see diagram 1).

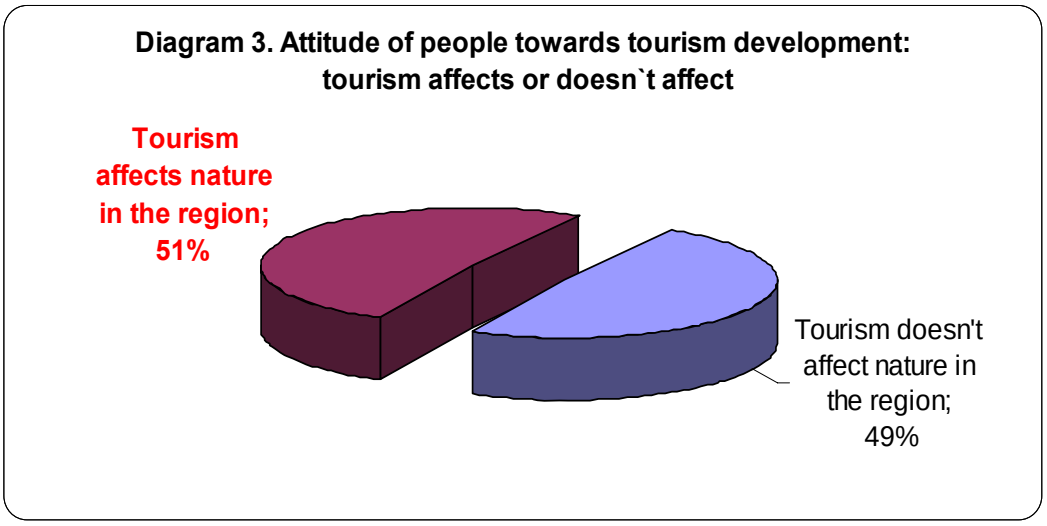


About 87% of respondents who consented to answer declare for tourism development around and inside the Biosphere Reserve (see diagram 2.).



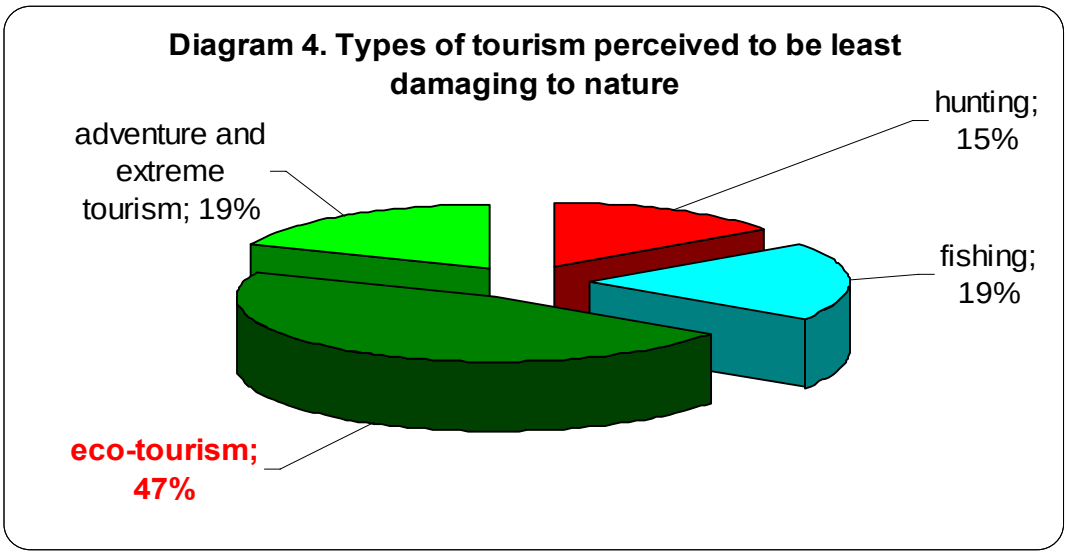
More than 51 % of respondents believed the tourism has already negative influenced for the nature (see diagram 3). Local people say that the very obvious increase in tourist numbers results in conflicts arising between local communities and those visitors who do not respect even the very simple and obvious rules of behavior in the taiga. Increasingly, for example, hunters' log cabins are being broken into and damaged, hunting regulations are being violated, poaching and unregulated fishing takes place, especially of such endangered and valuable species as lenok

(*Brachymystax lenok)* and taimen (*Hucho taimen*), and there is a general increase in disturbance to wildlife.



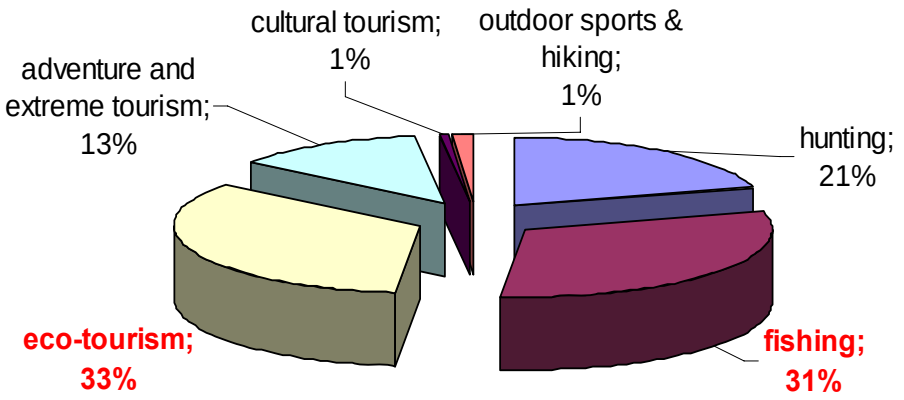
The local people believe the most important risk from tourism around the BR is the lost of local identity – especially for old-believers and professional hunters – and the degradation of virgin nature. And the most important positive impact for local people should be regular income from tourists in conditions of increasing unemployment.

Also were determined any types of tourism perceived to be least damaging to nature (diagram 4). The local people believe eco-tourism the most spare for North nature.



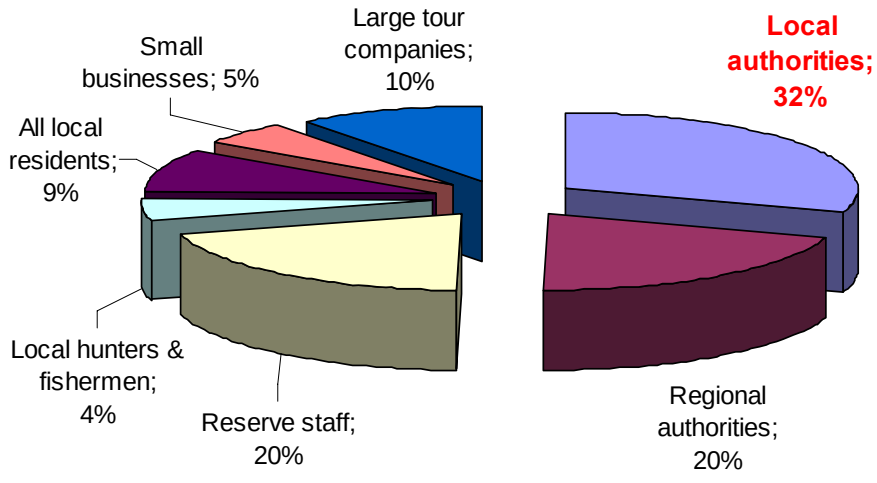
People were also asked what types of tourism should be considered for development in the region. Eco-tourism (33%) and fishing (31%) were selected.

Diagram 5. Types of tourism that should be considered for development



Also the question was who must develop the sustainable tourism in the region. Almost one-third fraction of respondents believes local authorities should be responsible for developing tourism on place (diagram 6). In equal part of voices have Reserve and regional authorities. Probably local people sure only authorities or reserve administration should organize the civilized tourism in the region.

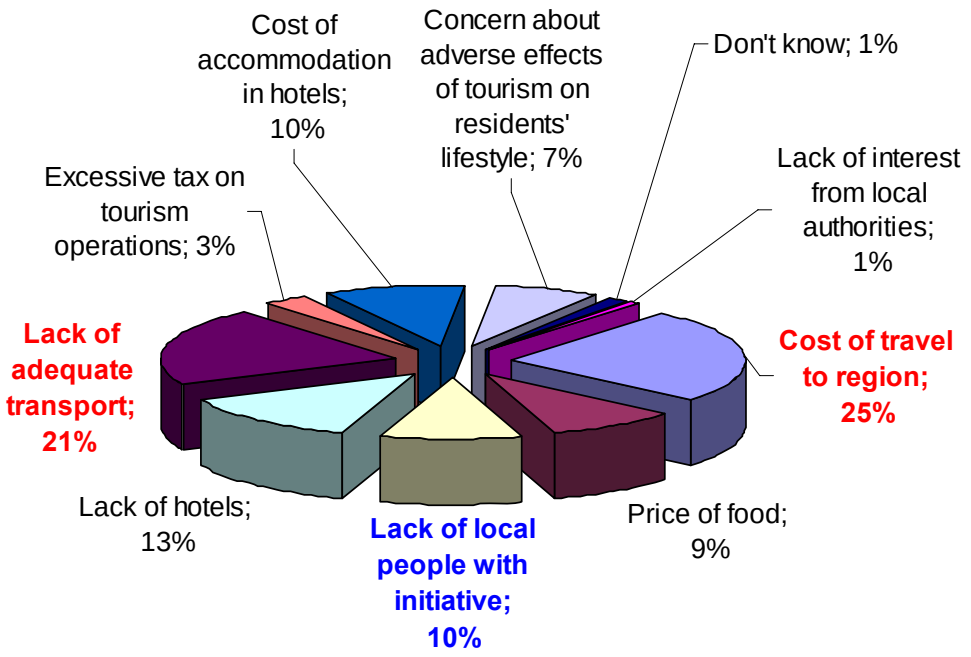
Diagram 6. Who should be responsible for developing tourism in the region



What are perceived main obstacles to tourism development in the region? See diagram 7. A quarter of respondents believe the costs of tickets to rich our region the most important issue for the tourism development. Really, if you fly Moscow-Krasnoyarsk-Podkamennaya Tunguska (the name of airport of the Bor village) and back the tickets cost may be changed from $1,200 till $ 1,900 subject to different reasons. Also usually the people here use motor boats no adopted for the tourist transportation that is why luck of adequate convenient transport is really problem for

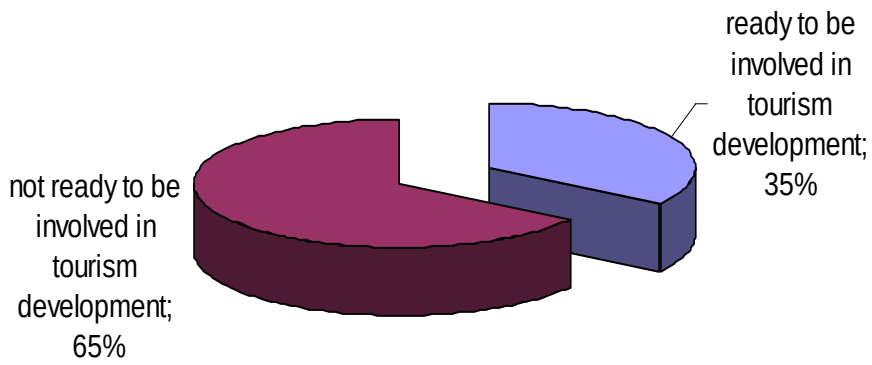
tourism development. In addition luck of local people with initiative is actually problem though level of unemployment is increase from year to year.

Diagram 7. Perceived main obstacles to tourism development; all respondents



The groups of local people who are ready to be involved in the development of tourism services within the district were identified (see diagram 8).

Diagram 8. Readiness of people to be involved in developing tourism in the region



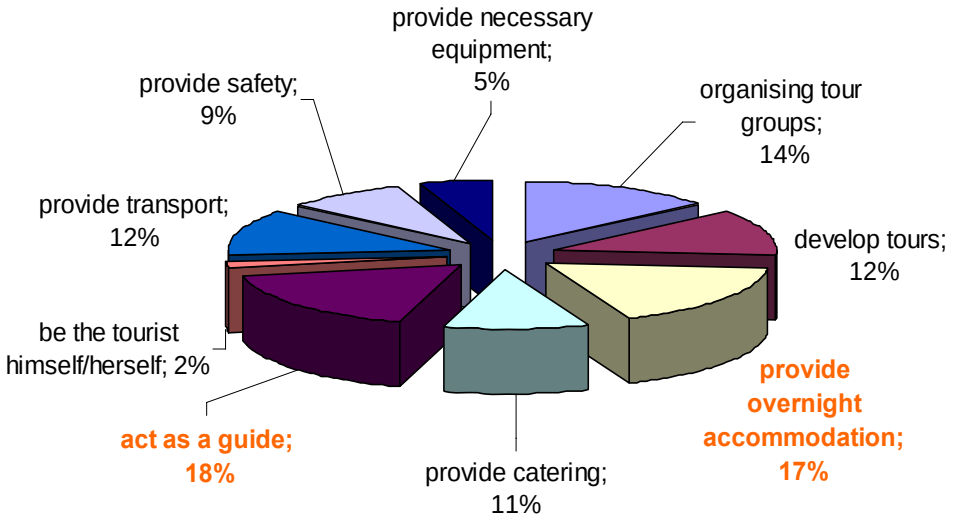
There are 28 persons from 81 who are ready to work in tourism. Their occupation there is in *Table 3*.

Table 3. Profession/Occupation of respondents

Occupation of respondents	Not ready to be involved in tourism development		Ready to be involved in tourism development	
	Number	Percent	Number	Percent
Office workers	11	21%	9	32%
Engineers	3	6%	2	7%
Hunters	8	15%	0	0
Cleaners	2	2%	1	4%
Medical professionals	4	8%	1	4%
Police & emergency workers	4	8%	0	0
Libarians	3	6%	0	0
Housekeepers	6	11%	4	14%
Teachers	9	17%	4	14%
Managers	3	6%	2	7%
Drivers	0	0	2	7%
Scientists & economists	0	0	2	7%
Foresters	0	0	1	4%
TOTAL	**53**	**100%**	**28**	**100%**

Active people who plan to work in the tourism development show their types of activities in this field – see diagram 9.

Diagram 9. How people wish to be involved in tourism development



Some data about education, sex and age of respondents presents in *Annex 2*, Diagram 10-13.

5.1.4 New travel routes incorporating both nature and local lore/history specific features were developed for naure reserve visitors (all details *see in Annex 3 and 4).*

The short description of the new travel routes are:

- **<u>Untrodden Route of Fridtjof Nansen (№3 on the scheme 3 below)</u>**

In the early-20th Century, the famous naturalist Fridtjof Nansen travelled through the area that would later become a nature reserve. This route follows the major rivers within the reserve, i.e. Enisei, Podkamennya Tunguska and Stolbovaya Rivers.

√ About 300 km in 10-12 days

√ Age 12 years and above

√ Hiking and waterways

√ Accommodation in tents and wooden huts

√ No more than 10 people per group

√ Includes visiting pristine landscapes, cliffs, traditional settlements of indigenous *Keto* people and old-believers, museum of traditional *taiga* life, scarps featuring remains of mammoths, the biological research station and other sights of interest

- **<u>Bird-watching tour (seasonal bird migration on the Yenisei River) (№4 on the scheme 3 below)</u>**

√ 14 days or longer, 100 km

√ Helicopter and boats

√ Accommodation at the biological research station

√ 14-16 people per group

√ From mid-May to mid-June

√ Migrating and breeding birds of western and eastern Palaearctic

√ Excursions within the Reserve and visiting the old-believers village and museum of traditional taiga life are optional.

Scheme 3. Ecological travel routes inside and around the Biosphere Reserve

Thus, four main tourist routes, incorporating both nature- and local lore/history-specific features, were developed for visitors to the reserve. The profile of each rout is described *in Table 4*.

Table 4. Tourist routes available in the Tscentral`nosibirsky BR

Routes	Distance	Transport	Number of persons per group
Route №1 **Travelling down the Kulinna River**	270 km	Helicopter. Rafting. Walking tour. Moto-boats.	8
Route №2 **Down the Birobchana River**	320 km	Helicopter. Rafting. Walking tour. Motorboats.	8
Route №3 **Untrodden Route of Fridtjof Nansen**	400 km	Cutter or motorboats. Hovercraft. Walking tour.	12
Route №4 **Bird-watching tour**	160 km	Helicopter. Cutter or motorboats.	15

The assessment of potential visitors in BR was taken into account:

- Attraction of the BR for this category of tourists;
- Potential level of demand;
- Level of potential income from this type of tourism;
- Compatibility of this type of tourism with nature conservation and eco-education in BR.

The results you can see in *Table 5*.

Table 5. Prospects for developing various types of ecotourism within the Tsentral`nosibirsky Nature Reserve and the Eloguisky Nature Refuge as related to existing routes

Scientific tourism	Educational tourism	Adventure and extreme tourism	Holiday tours and short excursionsions	Tours for children
Scientific expeditions with volunteers participation (routes №1-3)*	**Educational days-long trips (route №3)**	Rafting along the rivers from Stolbovaya and Eloguy basins (routes № 1-2)	**3-4 hours excursions to the Reserve for tourists from the cruise ships (part of route №3)**	**Summer expeditions for schoolchildren (route № 3)**
Field practices for foreign students	Cultural and ethnography	Snowmobiles tours (route № 3)	**1-2 hours excursions to the Nature Museum of the BR for local people and**	

Scientific tourism	Educational tourism	Adventure and extreme tourism	Holiday tours and short excursionsions	Tours for children
(routes №1-3)	tours*** (route № 3)		**tourists (Museum is situated in Bor village outside the BR area)**	
Birdwatching tours (route № 4)	Tour repeats the expedition undertaken by Fridtjof Nansen (route № 3)			
Plant-watching tours** (№ 1-3)				

***Bold script** – the tours with high potential of development;
**Common script – the tours with middle potential of development;
***Pale script – the tours with low potential of development.

Thus, excursions for local people and summer expeditions for schoolchildren have rated as priority work in spite of low income because these kinds of tourism improve public image of the BR.

5.1.5 SWOT analysis for tourism development was also completed in this project. It identified the strength, weaknesses, opportunities and threats for tourism inside and around the biosphere reserve (4). The results see in the *Table 6.*

Table 6 . Strength, weaknesses, opportunities and threats for tourism development in the Biosphere Reserve "Tsentral`nosibirsky"

Strengths	Weaknesses
- Largest extent of protected natural forest (taiga) and associated habitats (especially riverine systems) in Russian Federation (and a further 900,000 ha of two zakazniks to be added); - True wilderness experience; - The largest river in volume in Russian Federation (7-th largest river in the world); - Rich historical heritage of indigenous peoples and "old believers" communities; - Some background information and GIS available at www.centralsib.ru and any other sites; - Strong research history on biodiversity (Academy of Science biological station in Mirnoye. It is situated in cooperation zone of the Biosphere Reserve) gives a strong basis for ecotour design; - Skilled and enthusiastic staff of the	- Low level of central and regional governmental support; - No mobile phone connection or public internet access (except Bor village); - Lack of tourism support services such as transport, guiding, information centre, souvenirs; - Difficult climatic conditions and very short season (June to mid-September at most), with July/August period afflicted by abundance of sand flies and mosquitoes; - No tour trails are well-appointed; - Access to the core zone itself (more than 1 000 000 ha) permitted only for the groups with the special permission and they must be escorted by the reserve rangers; - Long and costly journey to reach the Biosphere Reserve territory (at least two days and some $800 per person from/to

Strengths	Weaknesses
Biosphere Reserve (zapovednik); - Four eco-tourist trails are worked up; - 10-years experience of the Reserve`s staff in working with foreign tourists from cruise ship; - Developed system for radio communications and rescue service in the Biosphere Reserve (zapovednik); - Reasonable hotel in Bor, with scheduled transport links (air, boat) from Krasnoyarsk; - Hospital located in Bor; - Basic accommodation facilities exist around the zapovednik which can be readily upgraded for visitors; - Local boat and helicopter transport available for hire; - Good cooperation with Bor municipality and local people; - Friendly local people.	Moscow); - Local living costs relatively expensive; - Keto indigenous people have not preserved much of their culture to demonstrate and there is a lack of local enthusiasm to revive it; - Insufficient budget funding of the BR – it covers less than 50% needs.
Opportunities	**Threats**
- Birdwatching tours based at Mirnoye biological station because of its location on the north-south Asian-Arctic flyway and east-west Palearctic bioregion divide; - Supervised adventure holidays (canoeing, hiking along the former post and trade tracks, survival training, snow-machine trips in March-April etc.); - Angling tourism improved (introduce competitions and encourage return of fish to the river) in the cooperation zone; - Volunteer participation in scientific research on ecology and wildlife; - Promotion of indigenous and local traditions, lifestyles and folklore for cultural heritage tours; - Creation of local museum themed on traditional livelihoods (hunting, fishing, forest products, building techniques, etc.); - Creation of a “brand identity” for the Central Siberian region based on positive aspects of the untouched wilderness, rivers, wildlife and link between Mongolian steppe and Arctic tundra.	- Legislation reform (Forest code, Law on self-government, Tourism law) inhibits investment; - Collapse of local communities from lack of government support and absence of strategy to conserve the culture; - Unregulated visitor access (including poaching) causing conflict with local people and tour operators; - Mineral exploration and mining in future.

5.2. Different forms of ecological education using by Biosphere Reserve staff are appropriate for realization of

GOAL III: USE BIOSPHERE RESERVES FOR RESEARCH, MONITORING, EDUCATION, AND TRAINING

OBJECTIVE III.3: Improve education, public awareness and involvement (7).

Recommended at the individual reserve level:

- Encourage involvement of local communities, school children and other stakeholders in education and training programmes and in research and monitoring activities within biosphere reserves.
- Produce visitors' information about the reserve, its importance for conservation and
- the sustainable use of biodiversity, its sociocultural aspects, and its recreational and educational programmes and resources.
- Promote the development of ecology field educational centers, within individual reserves, as facilities for contributing to the education of school children and other groups. *(7)*

The BR staff regularly organizes different forms of eco-educational work with the local people.

5.2.1 At first, BR staff **works with the hunters** who have their hunting plots around the core zone of the Reserve. Some of them now are really included to the monitoring of sable and moose deer, reindeer and other species.

5.2.2. The BR people regularly **give the lectures, seminars, "round tables" for the schoolchildren and teachers**, where the questions connect with conservation of nature would be discussed and the most important rules of the behavior in nature would be implemented. As children as adult people visit the small nature museum of the Reserve to be familiar with wild species of Siberian flora and fauna.

5.2.3 The third brunch of the eco-education is **the professional orientation for schoolchildren** who want to work in ecology in future. Every year in summer holidays 10-12 most active members of the Scientific Society of Schoolchildren have received the unique possibility to take part in Yenisei ecological expedition. Teen-agers with the Reserve`s guides move from the Bor to the Bachta village (more than 100 km!) through the Reserve territory by big boat, doing the stops for the night time and realizing the scientific investigation. Every expedition is for 9-10 days. In autumn and winter time participants prepare their first scientific

papers, take part in the scientific conferences for children. Thus for last 7 years more than 60 pupils have taken the same experience. Some of them are the students of the ecological institutes and universities now.

5.2.4 The next important part of work connect with **promotion the Reserve`s image in the Region.** It includes contacting with regional media, published the articles about nature conservation and the Reserve, improving of the Reserve`s site (www.centralsib.ru), promotion of nature exhibitions in Krasnoyarsk museums, organization of nature conservation actions, competitions, quizzes etc.

A leaflet for the State Nature Biosphere Reserve "Tsentral`nosibirsky" was designed and published in Russian in early-2009. Its English version was prepared in last 2009. It includes photographs made within the project and information about newly developed nature travel routes. Unfortunately, the booklet will be published only in November 2010, with printing costs covered from the BR's budget. The pattern is presented in the report as an *Annex 5*.

Articles for the Collected Papers of the biosphere reserve and for local media is the permanent work for the Reserve`s staff. An article summarizing the results of the survey are currently has prepared for the Collected Papers of the Krasnoyarsk regional Ministry of sport and tourism (6). A popular summary of the survey results for the local media has also prepared in May 2010.

In September of 2009 a new section on Ecotourism was created on the BR **website www.centralsib.ru (Ecotourism, http://www.centralsib.ru/zapov_ecotour.php)**. It includes information about four interpretative eco-trails within biosphere reserve. The information is currently available in Russian but we should translate it to English in 2011. About 40 photographs featuring the most picturesque BR sites and brief information about the biosphere reserve was made available on the **www.widenature.com** website in English.

The results of the project are presented and discussed at different scientific and practical meetings, namely:

- Interregional Workshop "Functions of BR UNESCO in Nature Conservation and Transboundary Collaboration Development in Altai-Sayan Ecoregion" in Altaisky BR, September of 2009
- Regional Workshop "Ecotourism today and tomorrow" in Krasnoyarsk, October of 2009.
- First Regional Conference in Tourism Development in Krasnoyarsk, December of 2009.

- Workshop “Eco-tourism Development in BR” in Tsentral`nosibirsky BR, June of 2010
- First Meeting of Coordination Council of Tsentral`nosibirsky Biosphere Reserve in Bor, July of 2010.

5.2.5 Comparative new part of the educational work becomes **the trainings**. Today the Reserve regularly takes part in the trainings for ecology teachers in Krasnoyarsk (twice a year). In future we are going to organize the ecotourism training for the local people who is ready to take part in eco-tourism development in BR.
Totally every year 1500-2500 children and about 100 teachers regularly take part in the Reserve`s educational projects.

The impact of environmental education on the ecological integrity of forest and water ecosystems in a vulnerable environment of the BR is great so long as there are no illegal crossings of the Reserve frontier for last five years!

Conclusions

1) The biosphere reserve “Tsentral`nosibirsky” (BR) plays an important role in long-term ecological monitoring of and research on the Central Siberian flora and fauna. It runs several public outreach programmes promoting sustainable use of natural resources and ecotourism in areas adjacent to the reserve. The Reserve has a high potential for tourism development, although any tourism related activities must be carried out under strict supervision from the reserve`s inspectors and rangers

2) The BR area is very attractive for developing various types of ecotourism. The BR is one of the largest protected untouched forest areas in the World. Some part of the BR area is situated on place of the expedition undertaken by Fridtjof Nansen, the famous Norwegian traveller, and described in his book “Land of the Future”.The Reserve`s landscapes are representative both for the Western and Eastern Siberia region. There are primeval fir, spruce, lurch and cedar pine forests, raised bogs, permafrost, bottomland and bedrocks landscapes. The high level of biodiversity, Many Interesting species of birds is able to observe in the Yenisei fly way. Settlements of Siberian Old Believers, local minority Keto and Evenks, professional hunters are situated around the BR. Rafting along the mountain rivers, trekkings, snowmobile Safari are possible

3) Four main tourist routes, incorporating both nature- and local lore/history-specific features, were developed for visitors to the reserve. Two of them were worked out in this project integration. At present, the profitability of tours is quite low, this being due to the high cost of transportation, accommodation, meals, etc. However, there are several possibilities of reducing the costs and increasing the income.

4) The majority of local residents support the development of low impact-type tourism and are confident that regulated tourism can bring certain benefits to them and to the entire region. Half of respondents voted in favour of ecotourism being the type of development that affects nature the least. Less than a third of respondents believe fishing and hunting to be the main tourist attraction within the area, while most of them think that pristine nature and local lore attract tourists the most.

5) There are a number of issues constraining tourism development in the region. Many of them are difficult or impossible to remove, particularly the high cost of travel in reaching the

Reserve from large cities, the price of food, etc. However, working with local enthusiasts, re-investing in tourism development and securing support from the local authorities may help to remove or reduce the influence of many unfavourable factors. This can be achieved, for example, by preparing meals using mostly from local produce, creating and developing a network of bed-&-breakfast guesthouses, purchasing appropriate vehicles, etc.

6) Ecotourism development within the Reserve and its adjacent area is of substantial non-monetary benefit, particularly in the form of:

√ volunteer assistance

√ expansion of international contacts

√ raising environmental awareness amongst local authorities and the public-at-large

√ fundraising and support from sponsors for educational and monitoring projects within the Reserve

√ improving the image of the Reserve, and

√ helping the Reserve become a key player in regional tourism development.

Recommendations for management

(excerpt from the section on Environmental Education and Public Outreach in the Management Plan of theTsentral`nosibirsky State Nature Biosphere Reserve for the Period 2011-2015, prepared by author of this project)

To successfully address the needs of ecotourism development within the Reserve and its surrounds, it is advisable:

1. To develop a tourist package for the Reserve, to expand the list of tour operators which regularly receive information on tourism opportunities in the Reserve and to promote established tours on the websites of partner tour operators.

Primary focus should be paid to those operators working in the field of domestic ecotourism and companies bringing foreign adventure tourists into Russia. Potential partnerships can be established with Ltd. “RussiaDiscovery”, Ltd. “VICAAR” - International Projects and

Expeditions, Ltd. “RusAdventures”, Ltd. “In the World of Imaginations” and other tour companies.

2. To improve tourism infrastructure within the Reserve

The tourism infrastructure was subscribed in details in *Table 2*, part 5.1.2

As a necessary prerequisite for successful ecotourism development, the Reserve must acquire a new boat which can take 10-12 people at a time without it becoming uncomfortable.

To address the issue of comfortable accommodation within the Reserve, pre-fabricated houses can be purchased and erected on the Lebed outpost in the Reserve.

The natural and climatic characteristics of the Enisey River valley (ie. strong winds and numerous sunny days) allow one to use a combination of wind and solar power systems that produce environmentally-friendly energy.

3. To develop a visitor services system

It is necessary to provide regular training courses for both reserve staff and local residents on basic visitor-handling skills.

It is also necessary to make a list of all resources relating to transport, accommodation, tourist equipment and personnel resources available in the area.

A management GIS on ecotourism development should be created, initially for the Reserve itself and at a later stage for the region.

4. To assess the profitability of certain categories of tours and to promote them amongst potential target visitor groups

The first priority is to identify target visitor groups, to assess potential demand and profitability of various types of eco-tours. The first assessment of potential visitors to the BR see in *Table 7.*

Table 7. Assessment of potential visitors to the Tsentral`nosibirsky State Nature Biosphere Reserve and the Eloguisky Nature Refuge

	Russian & foreign researchers, volunteers, foreign nature study students	Specialized foreign tour groups, eg. birdwatchers, botanists, ethnographers, etc	Non-specialized tour groups of foreign ecotourists	Russian & foreign tourists taking cruises along the Yenisei River*	Middle-class Russian tourists from large cities spending vacations in wild nature
Average time spent within the area	14 days	14 days	12 days	4-5 hours	14 days
Acceptability of costs	Average	Low	Average	Average	Low
Purpose of visit to nature reserve	Study local flora, fauna & ethnography &/or participate in joint scientific field research	Visit these particular protected areas to learn about Siberian flora & fauna & indigenous peoples	Active cognitive tourism, intensive traveling around to see as many local sites of interests as possible	Cognitive tourism & recreation	Spending vacations in a wild & picturesque place & getting away from urban environment
Average number of visitors per group	6 people	15 people	6-10 people	120 people	5-8 people
Expected number of groups within the next 1-3 years	4-5 groups per season	1-2 groups per season	2-4 groups per season	10 groups a season from 2011*	4 groups per season
Required level of preparedness on the part of the nature reserve	Average	High	High	Low	High
Need for promotion (from a cost-benefit point of view)	High	High	High	Medium	High

** Several regional tour operators based in Krasnoyarsk are planning to purchase a cruise boat to meet the increasing demand for cruise tours along the Yenisei River*

It is very important to promote tours among schoolchildren and students from the Krasnoyarsk region (ie. Krasnoyarsk itself and other large cities), birdwatchers, plant enthusiasts, volunteers, nature study researchers and adventure tourists. These categories of tourists are generally not so

choosy with regards tour conditions and would really appreciate staying within an area of pristine nature.

Another important condition for tourism development in the region is the regular running of river cruise ships. Short excursions by such vessels bring regular income to the Reserve and involve very little service cost on the part of the Reserve.

The expected income from the different tourist groups you can see in *Table 8*.

Table 8. Estimated income from the tourist services in BR during one season

	Expected number of groups per season	Average number of visitors per group	Expected income from one person (in RUS RUB)	TOTAL expected income (in RUS RUB)
Birdwatching tours	1	15	21 300	319 500
Expeditions for volonteers	4	6	21 635	519 200
Scientific practices for foreign students	1	10	17 000	170 000
Educational days-long trips for Russian and foreign tourists	4	10	25 800	1 032 000
Rafting and other adventure tours	4	7	19 472	545 200
TOTAL expected income per season (in RUS RUB)				**2 585 000**

The largest source of income is expected to come from birdwatchers, plant enthusiasts, nature study researchers, rafters and participants on adventure tours.

Now it is necessary to calculate of return on investment on ecotourism infrastructure. The Reserve staff needs to make a list of necessary equipment, calculate the total cost of its. After that in would be able to have got a payback period on the equipment.

5. Human resources policy for the successful implementation of ecotourism programs (including working with local residents)

Nearly one third of respondents (local residents) believe that the institution capable of organizing and managing regulated tourism in the area is the Reserve. The socio-economic situation in the village of Bor, the largest settlement close to the Reserve, is presently somewhat unsteady. Due to the fact that Aero Navigation, the main job-creating enterprise in the village, was closed down in 2008/2009 and that work at several geological exploration companies was suspended, unemployment in the area has increased significantly. In addition, the low procurement price for furs does not let hunters earn an adequate income. The human impact on the natural ecosystem is also growing. It is necessary to offer local residents some alternative ways of securing their livelihoods. Development of planned tourism in the area is one of the most promising possible options.

The Reserve needs to pay special attention to improving the visitor-handling skills of those local residents who are keen to take part in providing services. First of all, a training program for potential bed-&-breakfast guesthouse owners needs to be organized. It is also advisable to further train graduates of the environmental education system (eg. primary and secondary school scientific societies and school field research expeditions) in order that they can become local guides.

Several types of local craft-making are common in the villages around the Reserve (eg. Bor, Zotino, Vorogovo and Podkamennaya Tunguska). These include bead-weaving, wood, stone and birch bark carving, applications using fabric and birch bark, soft and painted clay toy-making and craft-making using other natural materials. The ecotourism development program envisages organizing souvenir production that features the Reserve's logo, as well as providing assistance and support to local residents in the production and sale of handicrafts.

6. Effective management of visitor flow and monitoring of human-related pressure on natural ecosystems

At present, this is not relevant to the Tsentral`nosibirsky Nature Reserve. The number of visitors received each year is presently no more than 50 individuals. This is only 1% of the potential recreational pressure. The recreational capacity of the area, therefore, is not likely to be exceeded within the next 10-15 years, even if the most optimistic forecast of visitor number growth is realised.

7. Re-investing in tourism development

It is advisable to spend the bulk of the income generated through tourism from 2011 to 2015 on improving ecotourism infrastructure within the Reserve and further promoting the Reserve's brand.

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Annex 1

Questionnaire for local people

Family name: _____

First names: _____

Sex:_____ **Age:** _____

Present position:

_____

Education:

_____

How many years you have been living in Turukhanski district?_____

What interesting objects of the region you usually show to your guests? (not less than 3 positions)

_____

_____

_____

_____

What do you think about the behavior of tourists in our region? Is the sizeable press to the nature takes place? (Underline your response)

Yes

No

What do you think about the sustainable tourism around the BR? Is it possible to organize it? (Underline your response)

Yes

No

Strong positions for the tourism developing in our region are:

_____

_____

Weak positions for the tourism developing in our region are:

_____

_____

What transport you will use to show the beautiful places of Siberia to your guests?

_____

_____

The most important cultural subjects for tourists are (mark "+"):

Settlements of old believers
Aborigine's keto settlements
Aborigine's evenks settlements
All of settlements

Most perspective form of the tourism for our region is (mark "+"):
Hunting tours (for example, on moose, north deers, bears)
Fishing tours (including fly-fishing)
Ecological tours (for to be familiar with culture and nature of the region)
Extreme tours (rafting, walking tours in wild nature, "Robinson" tours etc)
Others (specify)
_____

Minimum damage for the region nature is (mark "+"):
Hunting tours
Fishing tours
Ecological tours (for to be familiar with culture and nature of the region)
Extreme tours
Others (specify)
_____

Our most unsolvable problems connected with tourism are (mark "+"):
Costs for transportation
Costs for products
Costs for accommodation
Lack of hotels
Lack of comfort transport
Taxes
Lack of private initiative on place
Fear of destroying of traditional life style for the local population
Others (specify)
_____

Who must develop the sustainable tourism in our district of Siberia (mark "+"):
Administration of the Turukhansky district
Local authorities
Biosphere Reserve "Tsentral`nosibirsky"
Tourists Agencies in Krasnoyarsk, Moscow, St.-Petersburg
Business owner on place
Hunters outside the hunting periods
Other local people
Others (specify)
_____

Are you take part (or going to take part) in the developing of tourism in our district?
Yes
No

If yes, what you should do (mark "+")?
To make tours
To organize tour groups and get them on place
To work as a guide
To prepare the food
To provide with hotel
To provide the transport
To provide the safety
Others (specify)
_____

Thank you for the cooperation!

Level of education, sex and age of the respondents

Diagram 10. Educational level of respondents ready to be involved in tourism development

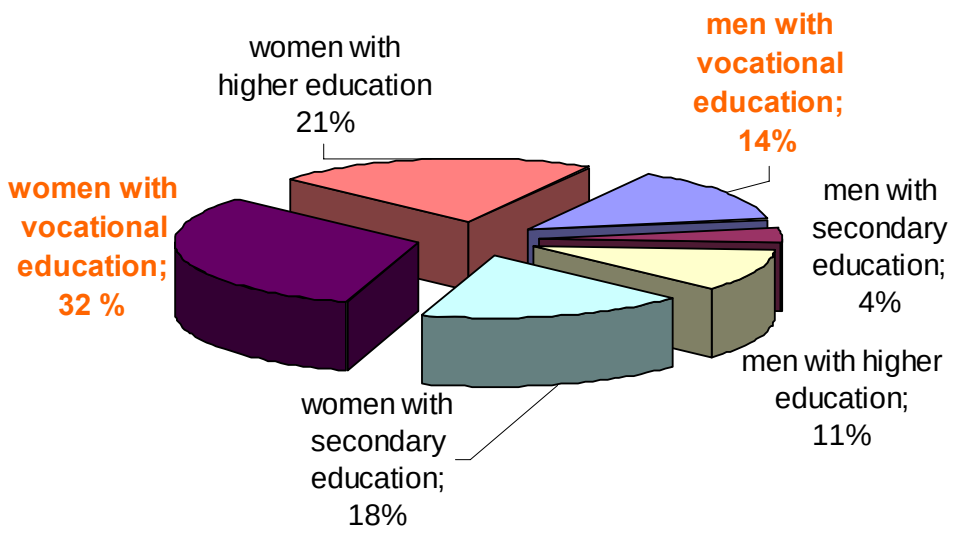


Diagram 11. Educational level of respondents not ready to be involved in tourism development

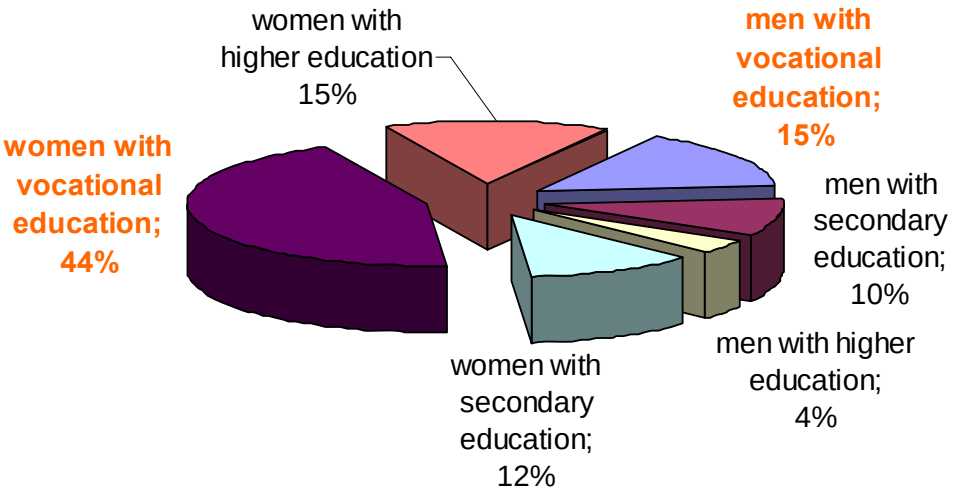


Diagram 12. Sex and age of respondents ready to be involved in tourism development

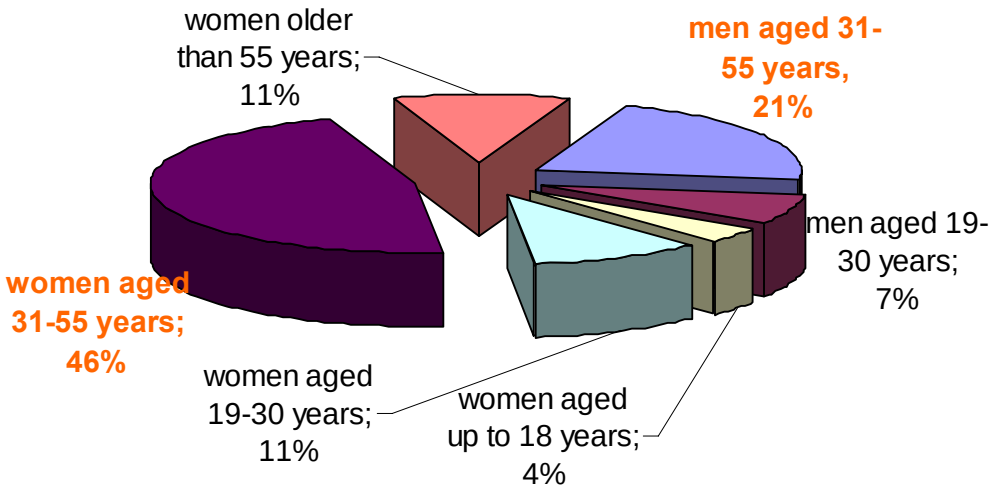
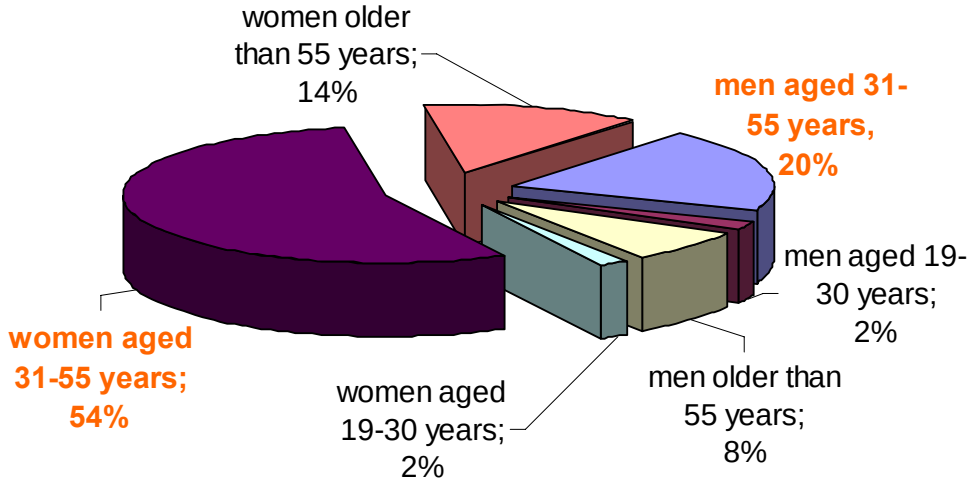


Diagram 13. Sex and age of respondents not ready to be involved in tourism development



Annex 3

Eco-tour №3

"The route untravelled by Fridtjof Nansen"

Complex ethno-ecological water/hiking route along Siberian heritage rivers – Yenisei, Podkamennaya Tunguska and its tributaries; part of this route repeats the expedition undertaken by Fridtjof Nansen, the famous Norwegian traveller, as described in his book "Land of the Future".

Tour duration: 15 days.
Difficulty level: The tour is suitable for adults without severe physical disabilities. Children of 12 years and older allowed.
Target audience: ecotourists interested in wilderness exploration and ethnography, the history of Siberia development, the life of the region's indigenous population.
Services: three meals a day, transportation, guides, visits to conservation areas, etc. Accommodation in hotels, guest cabins at the Academy of Sciences station, and in tent camps.
Dates:
July 10–25 (departure from Moscow: 9 July 23:00, arrival in Moscow: 26 July 8:30);
August 7–22 (departure from Moscow: 6 August 23:00, arrival in Moscow: 23 August 8:30).

You will find yourself far away from the urban noise and clutter, from the sterile apartments, McDonald's, conditioned buses, road patrol, and indulging personnel – once you have travelled here, you'll be able to continue this list... We barely offer any of the comforts that modern civilization provides in abundance… But you will have the unique opportunity to follow the route that Fridtjof Nansen, the great humanist and traveller, once dreamed of taking, and to visit places that man has not set foot on for a very long time; to learn to explore nature with the help of experienced guides, to see the unique Central Siberian Nature Reserve, to travel by boat and other watercraft. Believe us, you will remember this experience forever. You can walk river spits made up entirely of ancient

Paleozoic fauna – sponges, pearlworts, corals, and brachiopods. Summer can be warm enough for you to swim in the northern rivers – Yenisei, Podkamennaya Tunguska, and Stolbovaya. You can see with your own eyes the unique Middle Siberian landscapes, walk through the rocks, swamps, and fir and cedar forests… Explore the geological history of the Middle Siberian Plateau, observe evidence of volcanic activity. Watch cedar nuts, wild redcurrant, honeysuckle, blueberry, Arctic raspberry and cranberry ripening, and the various herbs that Siberian flora is so famous for, both in bloom and bearing fruit. Discover how rich and diverse the Siberian fauna is. Gain an insight into the world of Siberian Old Believers, who have preserved their traditions since the times of Peter the Great. Visit the local community of the Keto minority people, and observe their culture and way of life. Meet with commercial hunters, learn about their lifestyle, feel in your own hands the hunting and fishing tools that the practices of nature management in taiga have always relied on – their history goes back to the times when people lived in harmony with nature… You will never be the same after your journey here!

NOTES

- Tour duration and program can be adjusted upon request.
- Group size: 7–10 people.
- Climate peculiarities: very changeable weather (up to 3–4 times a day), lots of mosquitoes from mid-June till August.

Personal gear requirements:

Waterproof clothing and footwear, hiking boots, wool sweater, jacket, knitted cap, sun hat, sunglasses, sleeping bag, roll mat, mosquito repellent.

PROGRAM

Day 1: Arrival in Krasnoyarsk (morning). Accommodation at the hotel.
Excursion to “Stolby” Nature Reserve (40 km from Krasnoyarsk). Lunch at a city café.
Optional – visit Astafiev Museum, Krasnoyarsk Museum of Regional History.
Dinner at a city café. Night at the hotel.

Day 2:

Breakfast at the hotel. Excursion to Surikov Museum. Departure to airport.
Flight to Podkamennaya Tunguska (1h 40min). Hotel accommodation. Dinner.

Day 3:

Breakfast at the hotel.

Transfer by motor boats to the Evenk part of the Tsentral`nosibirsky Nature Reserve.

You can observe and take photos of colonies of little gulls and possibly white-tailed sea eagles along the way.

Bag lunch at the scenic “Podkamenskiye shcheki” rock outcrops. Free time, observation of rock pillars.

Arrival at the log-cabin of “Stolbovaya” nature reserve.

Setting up tents, settling in. Steam bath (Russian banya), dinner.

Day 4:

Breakfast at the “Stolbovaya”. Transfer by wooden boats or hovercraft upstream along Stolbovaya river (12 km). Explore local nature. Observe fish standing still in the crystal clear river water.

Bag lunch at mouth of Kulinna river. Go by boat/hike through the valley and mouth of Kulinna river, typical Middle Siberian landscapes, Paleozoic marine sediments (sponges, corals, pearlworts), dolerite “pillars” at the mouth of Stolbovaya river, wildlife of the nature reserve.

Return to “Stolbovaya” log-cabin. Dinner, night in the tent camp.

Day 5:

Breakfast at the”Stolbovaya”. Transfer by motor boats to the mouth of Kochumdek river, to the Kochumdek community of Old Believers (40 km). Learn about the life of ‘Bespopovtsy’ (denomination of Old Believers). Lunch in Kochumdek.

Return to “Stolbovaya” log-cabin. Steam bath. Dinner, night in the tent camp.

Day 6:

Breakfast at the “Stolbovaya”. Transfer along Podkamennaya Tunguska river to Bor settlement.

Visit the ethnic community of the Kets minority group along the way. Observe their day-to-day life. Learn about the problems of indigenous population. Bag lunch in a scenic spot.

Arrive at Bor settlement, hotel accommodation. Dinner at the hotel.

Day 7:

Breakfast at the hotel. Transfer by motor boat to the Yenisei part of the nature reserve.

Visit Sumarokovo village (transfer to Sumarokovo – 25 km). Lunch at the Komsa cordon (transfer 20 km).

Explore the area of the cordon – a former Russian village. Preserved traditional dwellings, wooden Orthodox church.

Transfer along Yenisei to the Lebed cordon (20 km). Setting up tents, dinner and night in Lebed.

Day 8:

Breakfast at the cordon. Forest hike along “Taiga and Its Inhabitants” ecotrail (2–3 km). Observe the tracks of bears, elks. Taiga herbs. Lunch at the Lebed cordon.

Transfer along Yenisei to the Academy of Sciences “Mirnoye” station (20 km). Accommodation in the station guest cabins. Steam bath, dinner.

Day 9-10:

Guided hike in the taiga and to the bird banding station near Mirnoye.

Spinning can be arranged upon request (pike).

Day 11:

Breakfast. Visit the museum of taiga nature management in Bakhta (20 km from Mirnoye).

Meet the founder of the museum– poet, writer, professional hunter Mikhail Tarkovsky.

Lunch in Bakhta. Return to Mirnoye. Steam bath. Dinner.

Day 12:

Day reserved in case of poor weather conditions. Additional excursions can be arranged.

Day 13:

Breakfast at the station. Return to Bor. Bag lunch on the way back.

Accommodation at the Bor hotel. Farewell dinner in Bor.

Day 14:

Breakfast at the hotel. Visit the nature museum of the reserve and the museum of local lore at the village Children Art Centre.

Lunch at the hotel. In the evening – departure for Krasnoyarsk. Hotel accommodation in Krasnoyarsk.

Day 15:

Early morning – departure for Moscow.

We hope you enjoy your stay and have lots of happy memories. You are always welcome here!

Annex 4

Eco-tour №4

"YENISEI FLYWAY"

A special tour for birdwatchers with stationing at the Academy of Sciences field base and visiting the Tsentral`nosibirsky (Central Siberian) Biosphere Reserve.

Tour duration: 15 days.

Difficulty level: suitable for adults without severe physical disabilities. **Target audience** – ecotourists interested in birdwatching.

Services: three meals a day, transportation, guides, visits to conservation areas, etc.; accommodation in hotels and guest cabins at the Academy of Sciences station (hostel level of comfort, with one large living/dining-room, steam bath, 2–4 person bedrooms).

Dates (one tour per season):

16–30 May

We are happy to welcome birdwatchers in one of the largest nature reserves of Russia, spread over the vast expanses of Central Siberia! Tsentral`nosibirsky Nature Reserve lies on the crossroads of geographic zones:

- *West Siberian Plain and Central Siberian Plateau;*
- *Ob and Angara provinces of the Eurosiberian region;*
- *The Yenisei biogeographic border (the "Johansen-line", or Yenisei meridian) runs across the territory of the nature reserve, forming the main sector boundary of the Paleoarctic region that divides its flora and fauna into East Siberian and West Siberian. These natural geographic borders enhance the biological and landscape diversity of the conservation area. Here you can observe East Siberian and West Siberian species of birds in passage. The most interesting nesting species include the Siberian Blue Robin (Luscinia cyane), the Siberian Rubythroat (Luscinia calliope), the Great Grey Owl (Strix nebulosa), the Black Stork (Ciconia nigra), the Eurasian Eagle Owl (Bubo bubo), the Peregrine Falcon (Falco peregrinus), the White-tailed Eagle (Haliaeetus aibicilla), the Golden Eagle (Aquila chrysaetus), the Osprey (Pandion haliaetus), the White's Thrush (Zoothera dauma), and certain species of waders and waterfowl. In seasonal passage or nomadic migration you may also encounter the Gerfalcon (Falco gerfalko), the Baikal Teal (Anas formosa), the Lesser White-fronted Goose (Anser erythropus), the Bewick's Swan (Cygnus bewickii), the Red-breasted Goose (Branta ruficollis), and the Great Grey Shrike (Lanius excubitor). Broad fronts of migrating birds and flocks of waterfowl can be observed on clearings around the biostation and "Lebed" cordon of the nature reserve.*

In addition to the main part of the tour, you can see with your own eyes the unique Central Siberian landscapes, walk through the rocks, upland swamps, and fir and cedar

forests… Discover how rich and diverse Siberian fauna is, and observe some of its representatives. Gather insight into the world of Siberian Old Believers, who have preserved their traditions since the times of Peter the Great. Learn about the history of the settlement of Siberia. Visit the local community of the Kets minority people, and observe their culture and way of life. Meet with commercial hunters, learn about their lifestyle, feel in your own hands the hunting and fishing tools that the practices of nature management in taiga have always relied on – their history goes back to the times when people lived in harmony with nature…

NOTES

- Tour duration can be increased up to 30 days upon request.
- Group size: min. 10 people.

Climate:

The ice drift on Yenisei begins in May, and in mid-May there is still a lot of snow. Day temperatures vary from +5°C to +20°C. Night temperatures: around 0°C. Ground frosts are common.

Personal gear requirements:

Warm winter coat and cap, waterproof clothing, warm waterproof footwear, wool sweater and wool socks (2 pairs), sleeping bag. Personal binoculars and other birdwatching equipment recommended. Mid-July is when Ixodes ticks are especially active, hence special protective clothing and gear are highly recommended (these can be purchased upon arrival if ordered in advance), as well as tick repellent. Sun hat and sunglasses will be helpful.

TOUR PROGRAMME

Day 1, Fri.: Arrival in Krasnoyarsk (morning).

Lunch at the airport.

Flight to Podkamennaya Tunguska (1h 40 min). Accommodation at the hotel. Dinner.

Day 2, Sat.:

Breakfast at the hotel.

Transfer by helicopter to the Academy of Sciences “Mirnoye” station (20 km). Accommodation in the station guest cabins.

Short excursion around the station.

Steam bath, dinner.

Day 3, Sun. – Day 12, Tue.

Observe birds in passage, visit the bird banding station on the left bank of Yenisei. Learn about the work of the biostation.

Day 13, Wed.

Transfer by motorised water vehicles to the territory of the nature reserve – ”Lebed” cordon (20 km).

Guided forest hike along the ecotrail “Taiga and Its Inhabitants” (2–3 km). Learn to “read” bear and elk spoor. Observe bears from a view tower.

Day 14, Thu.

Breakfast.

Transfer to Bor by motor boat. Accommodation at the hotel, dinner.

Day 15, Fri.

Breakfast at the hotel. Visit the nature museum of the reserve and the local lore museum at the village Children Art Centre.

Lunch at the hotel. Evening – flight to Krasnoyarsk.

We hope you enjoy your stay and have lots of happy memories. You are always welcome here!

Annex 5

The English version of leaflet for the Tsentral`nosibirsky Biosphere Reserve

TSENTRAL`NO SIBIRSKY STATE NATURE BIOSPHERE RESERVE was established in 1985;

It is one of the largest protected forest areas in the world;

Recognized in 1986 as a UNESCO Biosphere Reserve

Dear guests,
Please remember that you need to obtain a special permit to enter the Reserve!

The Central Siberian State Nature Reserve is interested in cooperating in the fields of

- Conservation
- Research
- Environmental Education and Awareness
- Training in Nature Science
- Sustainable Natural Resource Use in Adjacent Areas

Please see more details on the website www.centralsib.ru

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csgbz@mail.ru

STATE NATURE BIOSPHERE RESERVE

«TSENTRAL`NO SIBIRSKY »

...the water as smooth as a blue mirror, reflecting the river bank with its great birches. To the east of us the black forest rises up a steep ridge, to stretch away over the boundless plains... One feels the unbroken stillness within that great forest-world... Ah, that forest; and here it is vaster and more infinite than any we have seen before, this endless taiga...”
Fridtjof Nansen, Through Siberia, the Land of the Future, 1914.

2010

THE RESERVE WAS CREATED to preserve typical landscapes and ecosystems of Middle Siberia

TOTAL AREA IS 1, 020, 410 ha

THE ELOGUISKY NATURE REFUGE falls under the jurisdiction of the Reserve and is 746,000 ha in size

MAIN FUNCTIONS OF THE RESERVE:

- **Preserving biological diversity**
- **Scientific research**
- **Environmental monitoring**
- **Raising environmental awareness**
- **Assisting in sustainable regional social and economic development**

- The Yenisei River is the main river within the reserve, the second largest river in Russia and the seventh largest in the world;
- It is 2-3 km wide / 6-17 m deep
- Tsentral`nosibirsky State Nature Reserve is the only protected area in Russia where both banks of a large river are protected for a distance of 60 km;

THE RESERVE PROTECTS:

- *Over 120 km2 of the Yenisei River surface area;*
- *Over 12 km2 of the Podkamennaya Tunguska River surface area;*
- *Entire basin of the pristine Stolbovaya River;*
- *Upper reaches of the Eloguí River*

THE RESERVE IS HOME TO:

- *Over 630 species of flowering plants;*
- *7 species of coniferous trees;*
- *25 species of ferns, horsetails and club-mosses;*
- *Over 260 species of mosses and lichens;*
- *45 mammal species;*
- *274 bird species;*
- *4 species of amphibians and reptiles;*
- *35 fish species;*
- *Over 700 species of insects;*
- *Over 420 species of spiders.*

The Reserve is home to 22 species of plants and animals listed in the RED DATA LIST of RUSSIA including:

- *12 bird species*
- *4 butterfly species*
- *3 bumble-bee species*
- *3 plant species (orchids)*

The Reserve is a crucial area for maintaining populations of game species, such as sable, elk and roe deer and high value fish species, such as taimen, goldilocks and others..

TOURIST ROUTES AVAILABLE IN THE TSENTRAL`NO SIBIRSKY STATE NATURE BIOSPHERE RESERVE

Untrodden Route of Fridtjof Nansen

In the early-20th Century, the famous naturalist Fridtjof Nansen travelled through the area that would later become a nature reserve.

This route follows the major rivers within the reserve, ie. Yenisei, Podkamennya Tunguska and Stolbovaya Rivers:

- About 300 km in 10-12 days;
- Age 12 years and above;
- Hiking and waterways;
- Accommodation in tents and wooden huts;
- No more than 10 people per group;
- Includes visiting pristine landscapes, cliffs, traditional settlements of indigenous *Keto* people and old-believers, museum of traditional *taiga* life, scarps featuring remains of mammoths, the biological research station and other sights of interest.

Bird-watching tour

Seasonal bird migration on the Yenisei River :

- 14 days or longer, 120 km;
- Helicopter and boats;
- Accommodation at the biological research station;
- 14-16 people per group;
- From mid-May to mid-June;
- Migrating and breeding birds of western and eastern Palaearctic;
- Excursions within the Reserve and visiting the old-believers village and museum of traditional taiga life are optional.

Travelling down the Kulinna River including hiking through the Reserve:

- 10-12 days long, about 80 km;
- Age 16 years and above, requires basic physical ability;
- Helicopter, boats and rafts;
- Includes rafting or kayaking through two challenging rapids, hiking from the base and back, a motor boat trip;
- Living in tents;
- No more than 8 people per group;
- Sights include pristine landscapes (notably those formed by permafrost), old-growth forests dominated by fur and Siberian pine, alpine areas, lower Palaeozoic sea deposits, dolerite pillars, animals and plants.

Down Birobchana River

Similar to the downstream Kulinna River tour, this tour includes rafting and hiking for participants of 12 years and above and does not require any special abilities.