Nomination

„THE PUTORANA PLATEAU“
(RUSSIAN FEDERATION)

For inscription on
THE UNESCO WORLD CULTURAL AND
NATURAL HERITAGE LIST

Prepared by:

Natural Heritage Protection Fund
Direction of the “Putoransky” State Nature Reserve
Dresden University of Technology
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Russian Institute for Cultural and Natural Heritage

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**EXECUTIVE SUMMARY**

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<th>State Party</th>
<th>Russian Federation.</th>
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<tr>
<td>State, Province or Region</td>
<td>Krasnoyarsky Krai.</td>
</tr>
<tr>
<td>Name of Property</td>
<td>“The Putorana Plateau”</td>
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</tbody>
</table>
| Geographical coordinates to the nearest second | The nominated property is located within the boundaries of the Putoransky State Nature Reserve and is bordered by the following geographical coordinates:  
- northern point is 69°53′30″ N, 93°28′30″ E;  
- southern point is 68°20′00″ N, 94°46′40″ E;  
- western point is 69°00′40″ N, 91°45′40″ E;  
- eastern point is 68°42′30″ N, 96°38′00″ E. |
| Textual description of the boundary(ies) of the nominated property | The boundary line of the Putoransky Reserve starts from lake Dupkun shore in the mouth of 2nd Gagarya river and goes against current till first from the mouth right nameless creek, then up the creek till its outflow, then along the watershed of basins of Nalednaya and 2nd Gagarya rivers. Then the boundary line comes to the watershed of Irkinda river from one side, and Nalednaya, Khibarba and Dapte rivers from the other side. Then it turns in the northern direction till the mouth of the right nameless tributary of Irkinda river located 22.2 km down the right tributary Kitobo-Chayakit. Then down the Irkinda river along the right arm of its delta till lake Kutaramakan. From here the boundary goes along the lakeshore in the north-eastern direction for 6 km, then crosses the lake in the north-western direction and comes out to the mouth of the nameless creek. Then the boundary line goes up this creek till its head, over the watershed till the head of the left nameless creek of Orokan river, and goes in the north-western direction till the height of 1079 m, then in the same direction it goes down to the mouth of three effluents of the Ulogar river. Then the boundary goes straightly to the north, then outlines the western periphery of two nameless lakes and comes out to the Tokinda-Evkit river, then along the river till its mouth. Then along the right side of Tokinda river for 4.7 km straightly till the mouth of the nameless creek, then along the creek till its head, then in the north-eastern direction straightly till the nameless lake, and along its western periphery in the northern direction across the pass it comes out to the bend of the head of the nameless creek which falls into the Sobach’e lake at the point located 7.5 km to the west of river Khoronen mouth. Along the creek the boundary goes down, then along the right arm of the delta it comes out to the lake shore, then along the shore it outlines the north-eastern part of the lake. Then the boundary comes out to the eastern arm of the mouth of the nameless creek which falls into the lake in the point located 2 km to the west from the mouth of river Khoronen, |
then up this creek to the left effluent from where the boundary line goes in the north-eastern direction to the dominating height of 1263 m. From this point the boundary goes along the watershed between upper streams of rivers Khoisy and Bunisyak from one side, and the head of Khikikal river from the other side, through points 1222, 1146, 1203, 1523 and comes out to the head of Bunisyak river, then goes to the north-west along the watershed of Bunisyak and Typtykin rivers and comes out to the lake in the head of Padey river, then outlines the lake from the east and goes down the Padey river till its junction into the Great Khonna-Makit river, then along its right side it goes 2 km up till its right tributary and along the tributary till its head. Then the boundary line goes in the same direction till the nameless lake, outlines it from the west, then comes to the right effluent of the Lesser Khonna-Makit river, then along the river it goes down till the mouth of the left effluent, then goes up this effluent till the nameless lake in the head of river Duluk-Ikon, outlines it from the west and the north and comes to head of Duluk-Ikon river. Then the boundary goes down the river till its confluence with Negu-Ikon river and along it to river Kaltama. Here the boundary line crosses the river and follows the left side down to the Ayan river, then goes along the left side to the longitude of the right nameless creek flowing into Ayan river 4.5 km down the Kholokit river mouth. Here the boundary line crosses the Ayan river and follows the Kholokit till its head, where it comes out to the watershed of Kholokit and Dakit rivers, goes over the primary heights of the watershed, comes out in the south-eastern general direction, comes to the nameless lake, turns to the south, follows through heights 1428, 1351, comes to the watershed of Chopko river to right nameless tributaries of Nirakchi rivers, then through heights 1438, 1531 follows till point of junction of three effluents of Deloguchi river, then to the south through dominating heights between heads of Amnundakta and Deloguchi rivers, comes out to the height of 1492, from where goes in the eastern direction through height of 1512, from there till the highest point of the Putorana cupola – the Kamen’ mountain. Here the boundary line comes out to the administrative boundary with Evenk Autonomous District, crosses it and goes along the watershed of Kotuy and Khusana rivers in the south-eastern direction till head of river Kokor, and then along this river to lake Kharpicha. Then the boundary line crosses the lake by straight till river Ektekok mouth, then follows up the river till its head, turns to the west, and keeping the general western direction goes along the watershed of right tributaries of Deloni river, then follows along the mountain range till the watershed of left tributaries of Yaktali river, comes out to the head of its lower left tributary, follows it down to river Yaktali and along its left side goes to Kureika river. In the mouth of river Yaktali the boundary line comes out to the administrative boundary of Taimyr and Evenk Autonomous Districts and along the fairway of river Kureika and Dupkun lake comes out to the mouth of 2nd Gagarya river – the starting point of the boundary line of the nominated site.
Annex A includes the following maps:
A2. Topographic map of the Putorana plateau, showing exact boundaries of the Putoransky Reserve and its Buffer zone. Scale 1:500,000, A1 size map;
A3. Scheme of the boundaries of the Putoransky Reserve and its Buffer zone, A4 size scheme.

Situated on the natural border between taiga and tundra, Putorana Plateau is marked by rich diversity of well-preserved subarctic tundra and forest tundra ecosystems, which are currently underrepresented in the World Heritage list. The nominated property is located in the Eastern Palaearctic where the minimal density of natural WH sites is observed in comparison with other biogeographical regions of the planet, and in the north of Siberia - one of the most extensive gaps on the global WNH sites distribution map. And the last but not the least, the nominated property amply represents the subarctic tundra – an important member of the Polar Deserts/Tundra Biome, which is currently underrepresented in the World Heritage List. The inscription of the Putorana Plateau in the World Heritage List would fully commensurate with the policy of the World Heritage Center and serve the interests of the Global Strategy launched in 1994 for a more Balanced, Representative and Credible World Heritage List.

The Putorana plateau, the major part of which is occupied by the Putoransky Reserve, is a giant (with area of over 2.5 million ha) basalt trappean highland, which is not disturbed by the human activity and presents an outstanding universal value from the point of view of science and conservation.

The nominated property is distinguished by an outstanding peculiarity of relief which has an exceptional value both from scientific and aesthetic points of view. Numerous waterfalls, which differ by their shape, height and power of torrent, give the territory an outstanding aesthetic significance. Scales and number of waterfalls are impressive (the highest density of waterfalls in Russia and possibly in the world).

The landscape of intercontinental lake fjords is very picturesque. Unusual and very beautiful are trappean relief forms, ragged by deep canyons. By their size some canyons can be compared to the Colorado Grand Canyon.

The number of plateau lakes is over 25,000. These lakes are the largest in Siberia after Baikal and Teletskoye lake, the depth of most of them reaches 180-420 m. Altogether lakes make the second largest sweet water reservoir in Russia after Baikal. Many of the lakes of the Putorana are located wholly or by their most significant part within the Reserve’s area (Kutaramakan, Ayan, Djupkun, Kharpicha, Sobach’e) and its buffer zone. The plateau
has a cupola shape and, as the Reserve’s area occupies the large central part of the cupola, all lakes are filled mostly from the Reserve’s area.

The Putoransky Reserve is a territory, where one can observe a large variety of important natural regularities and natural phenomena and watch the course of natural processes in three-dimensional measurement: in latitudinal and longitudinal directions and within various altitudinal zones from the bottom of canyons up to the basaltic cupola of the Plateau.

The plateau is the only habitat for one of the worlds largest poorly studied mammals – the Putorana bighorn sheep, which 15 000 years ago was separated from the main population and formed the subspecies. Large part of the Putorana bighorn sheep population dwells within the Reserve (50% of the population, i.e. about 2800-3000 specimens).

The Putorana plateau is located within the global transcontinental birds’ migration route (Central Asian migration route). Numerous water reservoirs of Putorana are of vital importance for thousands of migrating birds as rest and feeding stopover places. Within the Reserve such vitally important reservoirs are lakes Ayan, Kutaramakan, Dyupkun, Kharpicha and Sobach’e, rivers Kureika, Yaqtali, Kotuy, Ayan and Irkinda.

The nominated area is a habitat of many endemic, rare and disappearing flora and fauna species. The Reserve is a strategically important area for conservation of 4 rare bird species: Anser erythropus L., Haliaeetus albicilla L., Falco rusticolus L., Numenius minutus Goul.

Criteria under which property is nominated (itemize criteria)
vii, ix,

Name and contact information of official local institution/agency

The “Putoransky” State Nature Reserve.

Address: Krasnoyarsky Krai
663302, Norilsk, ul. Komsomolskaya, 1

Director – Larin Vladimir Vladimirovitch
Tel./fax: +7 (3919) 46-53-26; 46-74-38
E-mail: plato@norcom.ru
http://putorana.boxmail.biz/
Identification of the Property

Double waterfall on the 2-th Gagar’ya River (Reserve’s area). Foto by A. Butorin.
Typical view of the plateau (Reserve’s area). Foto by V. Kirpitchenko.
1.a Country (and State Party if different)
Russian Federation.

1.b State, Province or Region
Krasnoyarsky Krai.

1.c Name of Property
“The Putorana Plateau”. The projected property is located within the borders of the “Putoransky” State Nature Reserve.

1.d Geographical coordinates to the nearest second
The territory of “The Putorana Plateau” is bordered by the following geographical coordinates:
- northern point is 69°53’30” N, 93°28’30” E;
- southern point is 68°20’00” N, 94°46’40” E;
- western point is 69°00’40” N, 91°45’40” E;
- eastern point is 68°42’30” N, 96°38’00” E.
1. Identification of the property complex on the north of Krasnoyarsky Krai.

A2. Topographic map of the Putorana plateau, showing exact boundaries of the Putoransky Reserve and its Buffer zone. Scale 1:500 000
1.f Area of nominated property (ha.) and proposed buffer zone (ha.)

The area of the reserve (the territory, proposed for the inscription on the WH List) is 1,887,251 ha. By Decision of Krasnoyarsky Krai Soviet of the Peoples Deputies Executive Committee № 482, from December 2, 1987, on the lands and water surface surrounding the reserve, a protected (buffer) zone with the limited nature-use regime is created. The territory was enlarged in 1993. The protected (buffer) zone of the reserve is located on the area of 1,773,300 ha. and is managed by the “Putoransky” State reserve.

A3. Scheme of the boundaries of the Putoransky Reserve and its Buffer zone.
2 DESCRIPTION

Kureika river valley (Reserve’s area)

Photo by V. Romanov
Kharpitcha Lake (Reserve’s area). Foto by A. Romanov.
2.a Description of Property

The Putoransky Reserve occupies the central (the highest) part of the Putorana plateau. Since the Reserve occupies the major part of the plateau, the descriptive part relates to the entire area of the plateau, with specifications, if and when necessary, concerning the nominated area.

Geology

The plateau is located on the northern part of the Tungusskaya syneclide, where pre-Cambrian crystalline basement has moved down to 8-10 km. On its surface is accumulated sedimentary sand-clayey strata of Paleozoic rocks with coal-bearing horizon. On the top it is overlapped with thick alternating flat beddings of tuff and basalt with dolerite and diabase dykes and sills. All this magmatic rock mass is a variety of Permian-Triassic traps. In the western part of the Putorana plateau where thickness of trap layers is reduced, on the surface are sometimes shown lower-Permian sandstone, claystone and clay slate. By high scale of tectonic movements and powerful volcanism of the basic mode Putorana is similar to the Deccan upland.
Relief

The Putorana mountains are a basalt plateau located in the north-western part of the Central Siberian plateau, south of the Taimyr peninsula. It stretches from the Northern polar circle to the north almost to 71° N and from 88° E to the east reaching 101° E. It occupies the major part of the rectangle formed by Yenisei river on the west, Kotyí river (in its upper and middle flow) on the east, Kheta river (in its middle and lower flow) on the north and Lower Tunguska on the south. The length of this mountain country is more than 500 km, the width is about 250 km. Average height of mountains is 900-1200 m. Depth of canyons is rather significant - up to 1500 m. The most typical amplitude of relative heights is 800-1000 m. The highest point of the Putorana Plateau is the Kamen’ («Stone») Mountain (1701 meter above sea level) located near the eastern border of the Reserve.

The basalt Putorana plateau is the highest cupola-like elevation within Central Siberian plateau, which has round outlines in the foreground with slight roughness in its north-western part. Area of the plateau is about 250 000 sq.km, similar with Rumania in its outlines.
In the west, north and east the plateau breaks off with sharp ledges with the height of 500-700 m. But even here the plateau border is easy recognised near the North polar circle by southern borders of large, rather typical for the Putorana, lakes.

The typical character of the Putorana is the stepped line of its slopes and thalwegs, distinguished by alternation of hard weathering basalt, diabase, dolerite with easily erosed tuff and sandstone tuff. Perhaps no where else the word “trappa” (which in Swedish means “stairs”) is so much suitable to its meaning, like in the Putorana. In the deeply crossed western part of the plateau one can count up to 20-30 steps, each separate basalt outpour. Besides, every basalt cover has three-part formation. The lower part consists of small-crystal basalt, which is very stable against weathering. The middle part of the cover consists of larger crystals, and distinguishes by large-pillar separate parts, which form sheer rock ledges near the edge of the cover. The upper porous part of the basalt experiences rather fast weathering and forms steppes.

In southern and western foothills is spread large morainic water-glacial clayey sedimentation with lots of pebbles and boulders. Is is classified as a form of Zyryan and Sartan periods of powerful glaciation, where the Putorana was one of its centres.

The modern glaciation of the Putorana, despite of good pre-condition for its development, is insignificant. In the north-eastern and northern part of the mountains there have been noted only 22 small glaciers with the total area of only 2,5 sq.km. The mountains seem to touch the lower border of the snow point and are about to be glaciated.
The Putorana is one of the few unique mountain provinces of Earth where for the short time of the last geological period took place repeated movements of the deepest lakes. Here, together with intensive denudation, and hence, sedimentation, conditioned by mountain relief, deep frozen soils and cold humid climate, valleys retained powerful accumulation of lake sedimentation, which had been brought to surface with an intensive plateau elevation.

The elevation of basalt plateau was accompanied not only with formation of the deep lakes-cracks, but also with an intensive and repeated re-formation of the river-net, lake draining and appearing of lakes in new places. According to the general rule, within the territory rich with lakes, river erosion goes slightly, the destructive power of floods is lower.

And vice versa, in places with intensive river erosion there are few lakes. Appearing and increasing of a number of lakes is typical for regions with abundant humidity and descending relief energy, or for even territories with highly located subsoil waters.

The Putorana mountains are an exception of this rule. Here the dense net of active rivers with highspeed flows are com-
bined with great number of lakes, i.e. reservoirs with slow water exchange. Besides, together with the high number of small lakes, which is typical for the Sub-Arctic in general, a significant number of the deepest and longest lakes of Siberia is concentrated here (we do not mention Baikal and Teletskoye lake). On the Putorana plateau are originally combined the contradictory processes of erosion and accumulation, harsh entrenching of rivers and formation of large lake depressions. Side-by-side go contradictory processes of transformation of mineral substance: on one hand, the intensive destruction of crystalline rocks and transportation of destruction product, on the other hand - no less intensive accumulation and primary diagenesis. There is no other so highly elevated province on Earth than the Putorana with such big number of deep lakes. Here are:

- 8 lakes with the water surface area from 135 to 560 sq.m.
- 10 lakes - from 51 to 100 sq.km.
- 12 lakes - from 21 to 50 sq.km.
- 16 lakes - from 6.1 to 20 sq.km.
- 56 lakes - from 1.1 to 6 sq.km.
- 9415 lakes - from 0.2 to 1 sq.km
- over 9000 lakes - less than 0.2 sq.km.

Lakes are one of the most outstanding component of landscape of the Putorana mountain country. They occupy about 10 % of the plateau area. No where in the world one can see so much long (50-150 km) and deep (50-420 m) lakes, as in the Putorana, especially in its western part. Although on the surrounding plains lakes occupy 30 % - 60 % of territory, their water capacity is very much less.
There are more than 25 000 lakes on the plateau. The longest of them (up to 150 km) and the deepest (up to 420 m) has appeared in big basalt rifts. They are especially numerous in the western and southern parts of the Plateau. These lakes are the biggest in Siberia after Baikal and Teletskoye lake, and have very much in common with Norwegian fjords, only on surface. The depth of most of the lakes in the western part of the Putorana is 50-300 m lower than the sea level. Altogether they make second big surficial water reservoir in Russia after Baikal. Many of the lakes of the Putorana are located wholly or by their most significant part within the Reserve’s area (Kutaramakan, Ayan, Djupkun, Kharpicha, Sobach’e) and its buffer zone.

Second deepest lakes are located in the former channels of big rivers, which have left their beds in the time of re-struction of hydro-net. Great amount of lakes lay in old river channels, thermokarst depressions and basalt hollows.

Lakes form a semicircle, which contour the highest part of mountain dome from the west, south and south-east. In the western part of the Putorana, lakes form an inlet in mountain massif, dividing its strait slopes. The biggest lakes in the western slope of the Putorana are: Lama, Glubokoye, Keta, and Khantaiskoye (all in the Reserve’s buffer zone).

In the north, where the Putorana breaks off sharply into the Eniseisko-Khantaiskaya lowland there are no lakes and no divided heights.

The lakes of Putorana have mutual substrate of basic crystalline rocks. This simplifies revealing of climatic, chemical and biological influence on the landscape. All lakes of the plateau are well-drained, i.e. have rather small rotation period. This is one of the reasons for slight mineralisation of waters: from 13 to 42 mg/L. This is rain water, as by its pureness, as by its taste. Even the water of the famous Baikal is higher minera-
The colour of water of the Putorana lakes, unlike Baikal water, is greyish-yellow because of soil ferric-aluminium-titanic compounds. The gas regime of lakes is also favourable. The waters are constantly cold and, as in Baikal, are saturated with oxygen, so mass deaths of fish through low oxygen level are not common here. Even in winter the amount of oxygen does not go lower than 8 g/l, and the maximum is 13 g/l. But because of scanty water flora and slow soil genesis, the contents of biogenous elements is insignificant, which holds up the development of living organisms in the lakes. For instance, there are almost no phosphate phosphorous, and the amount of nitrate nitrogen is only 0.03-0.4 mg/l. The tempestuous rivers bring much silicon, but in winter, with lowering of drainage, its amount decreases. In spring when solar radiation increases, silicon is abundantly swallowed by diatoms.

The numerous waterfalls bring the territory an outstanding significance. They differ in their forms and in power of waterflow. Their scale and quantity (this is the highest concentration of waterfalls in Russia and, probably, on Earth) are impressive.

Perhaps no other province of the former USSR has such contradictory hydrographic net as the Putorana. Here typical mountain waterflows abundant with rapids and waterfalls are combined with deep hollows with drained lakes with powerful alluvial and limnic sedimentations. In some parts of the plateau rivers have silt covered beds, typical for plain rivers, as their waterflows haven’t yet ragged through rapidly elevated surface.

No other province on Earth has such amount of large lenses of lake sedimentations (fossil lakes). They are concentrated in the modern and partly in abandoned ancient valleys and have been conserved despite the intensive process of denudation and erosion.

The longest river with the most quaint curves is Kureika. The history of this river is tightly connected with the other ancient river, which had existed on the Putorana before the surface elevation, crossing almost all middle, now the highest, part of the plateau. It begun to the north of Ayan lake and flowed to the south-east over the modern middle flow of Kureika and Yadun and Ebenchime rivers to the lower Tunguska basin.

Tectonic movements which have redistributed the flow of the ancient river, took place supposingly about 10 000 years ago. They also caused appearance of the two crack lakes: Ayan, situated in the heart of the Reserve (length - 55 km, maximum depth - 256 m) and Anama (length - 50 km, maximum depth - 120 m). In the older river-bed near present watershed have remained the so-called residual lakes – Monomakli, Omutachi, Yadoun (Reserve).
Along the south-western part of the plateau is revealed another ancient and, subsequently, also reformed Vivi-Agatskaya river valley. Its terraces, unlike sandy Enbenchime-Ayan valley, is clay sedimentation. Here also appeared crack lakes - Vivi, Nyakshingda, Agata, Severnoye. Because of the followed tectonic movements all these lakes have deepened. Almost perpendicular to their former directions have appeared new deep tectonic fissures - this is why lakes of this ancient valley have angular outlines. At the bottom of the lake one can see standing larches – witnesses of the modern deepening of the lake.

Climate

The modern climate of the Putorana is close to the upper Quaternary Period. Noticeable is the difference between more cool and humid summer of the western Putorana and more dry and warm summer of the eastern Putorana.

The Putorana lays to the north of the polar circle within the extreme western part of the East Siberian subarctic climate region. Asian anticyclone influences the climate of the Putorana. The climate of the Putorana is sharply continental. Amplitude of temperatures on the east reaches 100 degrees, on the north - 86 degrees. The precipitation amount is also much decreasing to the east. The major part of precipitation is snow because of significant duration of cold period. The monthly precipitation maximum may be observed in August (57 mm - the average value for the last decade), and minimum - in February (24 mm). The highest daily precipitation values are usually noted in the warm period (June – August). In the cold period daily values usually do not exceed 8-12 mm. The average annual precipitation amount is 453 mm.

On the far north of the Putorana (70° 20’ N) the polar day lasts from 16th of May till 29th of July (74 days), the polar night lasts from 25th of November till 13th of January (56 days). In the central part of the plateau (68° 20’ N) the duration of polar day is 53 days - from 27th of May till 13th of July, and the polar night lasts 31 days - since 5th of December till 5th of January.

In the western part of the Putorana - the line of great lakes - the cyclone activity is especially high in the warm period. To the east its activity is decreasing. In winter the anticyclone is settling over the region, and cyclones penetrate here very rarely, and most predominantly to the western part of the plateau. We must admit that climatic factors change more from west to east than from south to north.

The Putorana winter is long and severe. The stable transition to negative temperatures takes place in the late September - early October. At the same period forms the snow
cover. The average January temperature for the last 25 years is minus 27.5°C.

The snow cover lays about 8 months. It melts by the end of the second decade of June. In the regions surrounding the plateau snow cover stays 20-30 days longer.

Spring begins in April with frequent thaws, but ice on lakes does not melt till June. The transition of temperatures over 0°C (to positive values) happens in late May – early June.

Summer is short but warm. The average July temperature for the last 25 years is 14.2°C. Absolute maximum is 31.9°C in July, 1978 and 31.8°C - in July, 1991. In the warm period temperature normally decreases by 0.5°C with elevation by 100 m.

Autumn comes in late August with morning frosts.

The average annual air temperature for the last 25 years is minus 9.7°C.

Laws of geographical zoning are evidently shown here as in no else sub-arctic region of Russia. Landscapes which have been formed in different parts of the plateau are sufficiently different despite the homogeneity of the geological and geomorphological structure of the territory.

The plateau is located on the cross of longitude and latitude nature zones. In its southern part lays the line between sub-arctic and temperate geographical zones, i.e. the main border of two landscape types of the highest taxonomic range. The two thirds of southern parts of the Putorana is covered with thin forest, and northern part - with tundra forest. Along the
river valleys thin forest penetrates to the north, where it covers no less than 25% of territory. Over the height of 400 m lays mountain tundra, which is replaced by bald peaks — cold mountain deserts — on the height of 1200 m.

Mountain relief of the Putorana makes longitude zonality more visible than latitude zonality. Landscapes, together with lakes of eastern and western parts of the plateau are different in many components.

Atlantic air masses, moving from west to east in the Sub-Arctic, carry the major reserve of humidity on the height of 300-600 m. Unimpeded movement of air masses over the West Siberian plain sharply brakes by the kilometre-high barrier of the Putorana plateau. In the fast elevating air masses the humid of water steams is condensing, precipitating; wind velocity increases. Air mass which has tipped almost all humid onto the western part of the plateau, moves further to the east with lower speed and sharply decreased cloudiness, especially to the east of 93-94° E.

The difference between climatic values of eastern and western parts of the Putorana is significant. The average wind velocity in the west is 6.4 m/sec, in the central part is equal to 2.2 m/sec, and in the east - 1.1 m/sec. In the western part the annual precipitation amount can reach 750-1000 mm, and in the eastern part in no more than 300 mm. If in the west of the plateau winter temperatures never fall lower than minus 60°C, in the east the temperature often goes down to minus 67°C. In the river Tebenchi valley (south-eastern border) in February, the period of maximum of the Siberian anti-cyclone, was fixed the temperature of minus 70°C.
The snow cover of the plateau appears before the harsh frosts. Strong autumn and winter winds constantly redistribute the snow cover. In valleys and leeward slopes appear snowdrifts up to 10 m high, sometimes even to 15 m high. Such snowdrifts are perfect thermoisolators: they not only prevent rivers from freezing, leaving glades for the whole winter, but also decrease the thickness of soil permafrost. As a result, in friable soils of the adjacent plane on the west, thermokarst process is very intensive. Here the small lakes have digged the melted soils of the vast area between the plateau and Yenisei river. This is favourable for the groundwater feed of the rivers and for water height. Groundwater feeding of some rivers reaches 35-43 % of annual, which is not typical for the Sub-Arctic.

Permafrost covers the major part of the plateau. But there are separate talik spots located in river valleys and hollows. Permafrost thickness increases from valley beds (80-150 m) to watershed heights (300-400 m). In spring time the upper permafrost is melting, forming active layer up to 2 m.

The snow cover defines permafrost soil conditions of east and west. In the west permafrost is corroded by taliks in many places, and in the east permafrost is monolith, with its thickness reaching 400 m; here taliks are possible to exist under the bottom of large lakes. The majority of lakes are frozen to their bottom, and waterfalls turn into ice walls.

Thickness of ice on lakes to the east of 93°E reaches 1.8-2 m. Ice melting ends in the middle of July, in forest tundra subzone - in August, and in early September small lakes are again covered with ice. Groundwater feed of rivers here is trivial, rivers are recharged mostly from snow waters (55-70% of annual). The water table fluctuation even of large lakes of the eastern part of the Putorana reaches 4-5 m.
Soils

Because of the severe climate only primary soil formation process is shown on the heights of 1000-1200 m and higher. Here physical weathering predominates over chemical. Significant areas of bald peaks are covered with clumpy and stony placers. These heights have no soils and even no silt accumulations. With reducing of absolute height appear mountain tundra skeletal soils.

Mountain meadow frozen soils are forming in conditions of continued stay of snow cover, higher accumulation of fine soils, low melting of permafrost. Ochric sub-fallow soils are typical for the forest zone.

Flora and Vegetation

Flora of the Putorana plateau has 569 species of vascular plants, which are related to 209 genuses and 57 families. They make 3 altitude complexes: forest - 224 species (39 %), mountain - 183 species (32 %), high-mountain - 162 species (29 %). Circumpolar species predominate - 44 %, on the second place are Asian (Siberian) - 31 %, much less are of Eurasian – 15 % and Asian-American species - 10 %.

The preceding list of the reserve’s higher plants has 398 species (61 % of the plateau flora). Rare species are noted on the
A description of property

The Putorana Plateau Nature Complex reserve’s territory: rose-root stonecrop Rhodiola rosea, lady’s slipper Cypripedium guttatum, poppy Papaver variegatum, Siberian globeflower Trollius asiaticus; and the Putorana endemics: whitlow grass Draba sambukii, marigold Caltha serotina, poppy Papaver variegatum, oxytropis Oxytropis putoranica; the Putorana and Byrranga mountains endemics: fescue Festuca atiriculat; endemics of northern Siberia: rush Juncus longirostris, oxytropis Oxytropis karga, dandelion Taraxacum longicorne.

The major climatic borders divide the Putorana plateau in two directions. One of them defines the line between northern taiga and forest tundra; it goes in latitude direction over the plateau dome. The other line divides the plateau onto western and eastern parts, laying between 90 and 94 oE, and defines the eastern border of spreading of the west taiga vegetation: Siberian spruce Picea obovata, birch Betula tortuosa, Siberian larch Larix sibirica and a complex of attendant plants. To the east of this border totally prevails Dahurian larch Larix gmelini which reflects the increasing of climate continentality to the east.
The significant heights of upwarping within the plateau defines clear vertical vegetation zonality: the following zones are separated – forest sub-bald peaks, bald peaks and cold bald peaks deserts. Forest vegetation occupies valleys; its vertical spreading depends on the latitude (increasing to the south), precipitation amount (the upper border is lower on the west) and on local conditions (exposition, wind safety, etc.). On the plateau’s edges the valley vegetation is evenly changing into zonal vegetation. The prevailing tree type is Dahurian larch *Larix gmelini*. The sub-bald peaks zone is represented by sparse vegetated areas and bushes, but it is not shown everywhere. As a whole, on the plateau prevail mountain tundra with its area increasing to the centre and to the north of the plateau. On the far north (Bokovoye lake) and in the highest areas of the plateau (Nerangda lake) forest vegetation is absent. On the heights of 1350-1400 m above the sea level forms bald peaks desert, and in the highest area of the plateau it creates continuous zone.

The forest complex of vegetation is richly represented. It includes 224 species (39%), as total mountain complex includes 183 species (32%) and high-mountain complex has 162 species (29%). Thus, the flora of the Putorana is forest-high-mountain with the high contents of total mountain plants.

In the Putorana flora is noted the prevalence of circum-polar species (250 species, 44% of total flora). On the second place are Asian (Siberian) plants (178 species, 31% of flora). Much less are Eurasian (86 species, 15%) and Asian-American plant species (55, 10%). The Asian group includes 3 central Siberian species, 2 endemic of the lower Yenisei and 5 endemic of the Putorana plateau.
On the Putorana lay southern and northern borders of areals of many species. Especially high is the number of plants with northern areal border (184 species, 32% of flora), which is connected with the location of the plateau on the border between taiga and forest tundra. The major boreal (61%) and mountain (64%) species, and many alpine species are on their edge of spreading on the Putorana.

Few South Siberian species have spread to the Putorana from the south along the right bank of the Yenisei. Some migrants formed into separate arctic species and subspecies, which later spread in the latitude direction. Such are *Silene pauciflora* (parent specie - *S. chamarensis* Turcz.), *Carex ensifolia ssp. arctisibirica*, which had separated from the previous South Siberian *C. encifolia s.l.*, *Astragalus subpolaris* (close to *A. alpinus* L.), *Claytonia arctica* Adams, tied to *C. joanneana*, *Oxytropis arctica* (close to *O. kusnetzovii* Kryl. et Steimb and *O. alpiola* Turcz.).

**Relictness**

On the territory of the Reserve is noted focused spreading of some plant species, separated from the main areal. These species are supposingly relicts of early Holocene and separate Pleistocene periods. One cannot deny the possibility of conservation of relicts of the earlier, Pliocene period.

The relict of the dark conifer forest is possible to be *Rhododendron aureum*. It is found on the south-west of the plateau (lake Nyakshingda).

The unforested space of early Pleistocene was favourable for the unification of high-mountain flora. In this period on the plateau have appeared mountain species of *Phegopteris connectilis* and *Lomatogonium carinthiacum*, connected to with the areal of South Siberian mountains. Both species are found near Khantaiskoye lake in the western part of the plateau. Relicts of this period can also be *Triselum altaicum*, *Pedicularis compacta*, *Gentiana algida*, *Swertia obtusa*. All these species are found dissociated on the western and south-western edge of the plateau.

In the second part of Pleistocene period Dahurian larch forests moved far to the west. As a part of the larch forest complex, Middendorff’s birch (*Betula divaricata*) had spread on the Putorana. It survived in few isolated places: near lakes Nyakashingda, Ende, Bokovoye and Khaya-Kiuel’.

The wide spreading of the so-called “forest-steppe Pleistocene complex” on the territory of Siberia and Urals is connected to
separate phases of Pleistocene and early Holocene period. The echo of this period are forest-steppe elements of flora which can be found on the plateau in isolated habitats.

In the warm but more humid period of late Pleistocene forests of Siberian larch with spruce and birch had significantly moved to the east. The indicators are single isolated locations of rare specimens of birch *Betula tortuosa*, *Cyperedium guttatum*, *Batrachium aquatile* on the north-east of the plateau, on limestone based soils. Near Khantaiskoye lake is found mainly European boreal specie *Carex dioica L*. On the west (lake Nizhneye Tebenchi) and separately on the far north-east (lake Khaya-Kiuel’) is found *Betula humilis*.

**Endemism**

On the Putorana plateau are found the following endemic plant species:

*A. Romanov*

*Draba sambukii*, described by A.I. Tolmachev (on the base of F.V. Sambuka herbarium) found in the river Kotuy basin. High number of its locations is known on the plateau.

*Caltha serotina* is found disperse on the plateau, most commonly in mochezhinas and on flooded banks of rivers and lakes in the forest zone (see map 7).

*Oxytropis putoranica*. Its population is found on chippings of bald peak near lake Baselak.

*Euphrasia putoranica* grows on limonites near lake Khaya-Kiuel’. **Larch forest (Reserve’s area).**
**Festuca auriculata var. pilosa** abundantly grows dry sandy gravel river terraces near lake Bokovoye.

New specie *Papaver variegatum* is widely spread in the western and central part of the plateau: on the east it is found only in places of contact of basalt cover with limonite (lakes Darima and Sirkiuarvit).

In flora of the Putorana is separated a group of species with areal limited with relatively small territory. Spreading of *Juncus longirostris, Draba parvisiliquosa, Oxytropis middendorffii, Deschampsia anadyrensis* is limited within the north of Central Siberia. Within the Putorana they are found on lakes Khantaiskoye, Bokovoye and in Talnakh village locality.

Isolated seems to be a small group of the Putorana flora species which has nothing in common with Arctic or South Siberian mountains. These are Siberian or South Siberian endemics: *Euphrasia subpolaris, Trollius boreosibiricus, Ertrichium sericeum, Mertensia jenisseensis*.

Relative low endemism of the Putorana is explained by youth of the flora which is connected with lately (late Cenozoic) elevation of the plateau to the height which does not allow growing of forest vegetation and with devastating (or impoverishing) influence of middle Pleistocene mountain glaciation on the high-mountain flora.

Within the plateau are singled 3 geobotanical districts, close in their general outlines to physic-geographical zoning: the sub-arctic and two north taiga districts - eastern and western.

Vegetation of all three geobotanical districts is found on the reserve’s territory. Richer then others are represented complexes of the sub-arctic district, which occupy the major part of the territory. Western taiga is spottily spread near lake Kutaramakan, in Ikinda and Kutaramakan river valleys. Vegetation of eastern north taiga district is found in Yaktali river valley.

The territory of the **sub-arctic district** is spread from the watershed between the upper-flows of Kheta and Kotuy rivers till the northern mountain ledge. This is an upland with its major part occupied by bald peak zone. The valley vegetation, repeating the outlines of the taiga zone, it represented by rare lands and sparse forests of Dahurian larch *Larix gmelini* alternating with intrazonal or even tundra groups. Forest vegetation occupies lower flat terraces; trees height here is up to 8 m, crown closure from 0.3 to 0.1 or less. On dry crushed rock terraces form, as a rule, bush-lichens sparse forest groups. Soils here are poorly developed, with spots of bare blown off soil. About 70 % of cover in such sparse forests are formed by lichens with domination of *Cetraria cucullata* and *Cladina silvestris*. Small shrubs (*cowberry Vaccinium vitis idaea, crowberry Empetrum*...
sp., bog whortleberry *Vaccinium uliginosum* and *Arctous sp.*) make 15-20 % of cover, over 10 % grasses (*Arctagrostis latifolia*, Alpine sweet grass *Hierochloe alpina*, fescue *Festuca sp.*, etc.), also are found single specimen of mixed grass.

Eastern north taiga district occupies the territory from lakes Dupkun (Kureiskiy) and Upper Tebenchi till the eastern borders of the mountains.

**Forest vegetation of sub-arctic** and eastern north taiga districts have much in common. The only forest-forming specie is Dahurian larch *Larix gmelini*. To the south crown closure is slightly increasing, but forest is still sparse. The upper spreading limit of larch increases up to 750-800 m, the share of taiga species enlarges.

The underwood is not noted everywhere, but is typical for wet lands and is represented by alder *Duschekia fruticosa*, willows *Salix sp*, dwarf birch *Betula nana*; also are found juniper *Juniperus sp.*, currant *Ribes sp.*, rose *Rosa sp*. As a rule, in bushgrass stratum dominate bushes: in dry places – crowberry *Empetrum sp* and cowberry *Vaccinium vitis-ideae*, on more wet places – bog whortleberry *Vaccinium uliginosum* and marsh tea *Ledum sp*. As in the sub-arctic district, soil cover of dry drained places is formed by lichens, mostly by *Cladina sp*. Lichen cover is widely spread. In wet places grow mosses. Mosaic lichen-moss cover is most typical. Equally are noted both taiga and mountain grasses (*Alpine sweet grass Hierochloe alpina*, Alpine meadow-grass *Poa alpina*, daisy-flowered bittercress *Cardamine bellidifolia*).

In the bold peak zone increase the share of lichen tundra.

**Western north taiga district** occupies western and southwestern part of the plateau. The reserve’s territory catches small eastern part of the district. Typical here are spruce-larch
and larch-birch forests. In the hollow of lake Kutaramakan are distinguished three vegetation belts. At the mountain foot with running water moistening grow larch-spruce forests, higher on the slope grow larch-birch forests with birch *Betula tortuosa*, Dahurian larch *Larix Gmelini* and bilberry in the bush-moss-lichen cover. The upper border of forest is formed by Siberian larch *Larix sibirica* Led. with its hybrids with Dahurian larch. The bottom of the lake hollow is covered by wilted Dahurian larch forests with bush-lichen (*Cladina stellaris*) undercover. Lake Kutaramakan is the eastern border of birch spreading on the reserve’s territory. Further to the east along Irkinda and Kutaramakan river valleys moves Siberian spruce *Picea obovata*. Mixed spruce-larch forests are noted 40-50 km away from the lake Kutaramakan. In the river valley are noted small spruce forest spots with moss soil cover. Sub-bald peak belt lays on the height of 500-700 m. Abundance of alder and developed moss-lichen cover is typical for this belt.

In the bald peak belt dominate dryas tundra: crushed rock in the lower part, stony – in the upper part. Lichen tundra is poorly presented. On the joint with sub-bald peak belt are found middle-grass meadows.
Fauna

Concerning fauna, the Putorana mountain system is less sharply separated from the surrounding planes, than by floristic indications. The only endemic of this mountain country is the Putorana bighorn sheep *Ovis canadensis nivicola/ borealis* (see map. A4).

Some taiga species (Russian flying squirrel *Pteromys volans*, Siberian capercaillie *Tetrao parvirostris*, sable *Martes zibellina*) have their northern spreading border concurring with the northern border of the plateau. For some of tundra species (perennial flax *Lemmus sibiricus* and others) tundra bald peaks are the southern habitats on the Yenisei North.

As a whole, for the fauna of terrestrial vertebrates is typical the combination of tundra, taiga and widely spread mountain species.

ulula, Ural owl Strix nebulosa, owl Strix uralensis, woodpeckers, lots of species of Charadriiformes and Passeriformes. Putorana is the main region for nesting of jer-falcon Falco rusticolus and white-tailed eagle Haliaeetus albicilla on the north of Central Siberia. In the south-eastern part nests slender-billed curlew Numenius minutus, in the central part dwells the major part of the Putorana bighorn sheep Ovis canadensis nivicola population.

Numerous are wolf Canis lupus, bear Ursus arctos, glutton Gulo gulo, which play an important role in local biocoenosis.

Class Amphibia is represented on the Putorana plateau only by Hynobius keyserlingii. This specie is typical for the whole Siberian taiga, to the north is spread almost to the northern borders of forested tundra, which is about 70oN (Dudinka). On the north of Krasnoyarsky Krai is very rare, common only in pine forests of the upper flow of Podkamennaya Tunguska river.

It was found only once in the central Putorana near lake Kharpicha in July, 1982. The fact of discovering 4 specimen of Hynobius keyserlingii in the centre of the Putorana mountains on the height of 481 m is of definite zoogeographical interest.

On the Putorana plateau are noted 38 species of Mammals, related to 5 orders:

- Insectivora (mole Talpa altaica, shrews – Neomys, Sorex arcticus, S. Roboratus, S. Caecutiens, S. Isodon, S.minutissimus, S. Minutus);

- Carnivora (wolf Canis lupus, fox Vulpes vulpes, Arctic fox Alopex lagopus, brown bear Ursus arctos, ermine Mustela erminea, weasel Mustela nivalis, Siberian weasel Mustela sibirica, sable Martes zibellina, glutton Gulo gulo, otter Lutra lutra, lynx Felis lynx);

- Arktiodactyla (elk Alces alces, reindeer Rangifer tarandus, bighorn sheep Ovis canadensis nivicola);

- Duplicedentata (blue hare Lepus timidus, northern pika Ochotona hyperborea);

- Muridae (Russian flying squirrel Pteromys volans, red squirrel Sciurus vulgaris, Siberian chipmunk Tamias sibiricus, wood lemming Myopus schisticolor, Arctic lemming Dicrostonyx torquatus, muskrat Ondatra zibethica, water vole Arvicola terrestris, northern red-backed vole Clethrionomys rutilus, large-toothed red-backed vole Clethrionomys rufocanus, North-Siberian vole Microtus hyperboreus, Midden-dorff’s vole Microtus middendorffi, field vole Microtus agrestis, root vole Microtus oeconomus).
Except for reindeer and Arctic fox, all the species are permanent inhabitants of the plateau.

Within the territory of the reserve dwell 34 species of mammals, 140 species of birds, 25 species of fish. The reserve protects 28% of the Putorana bighorn sheep Ovis canadensis nivicola areal. The reserve’s territory includes areas of nesting of jer-falcon Falco rusticolus and white-tailed eagle Haliaeetus albicilla. Of a special significance for the reserve is a trans-Putorana meridian fault (deep) – peculiar corridor for penetration of different taiga fauna representatives onto the Putorana. Here goes the massive (compared with other parts of the plateau) birds flight.

One of the striking, unique phenomenons in the animal life of the reserve is seasonal massive wild reindeer migrations.

The Taimyr population of wild reindeers Rangifer tarandus has over 500,000 specimen. The significant part of its areal is the Putorana plateau, no less than 350-400 thousands of wild reindeers migrate annually across the Reserve’s area. Reindeers stay on the Putorana during 5-6 months a year.

Elk Alces alces is a common but comparatively small specie in the Putorana mountains. It is especially rare in the central and northern part of the plateau. Its size and location in the mountains depends on spreading of flood-land vegetation. The density of animals varies in different parts of the plateau: from 0.5 to 1.25 elks per 10 sq. km. The total number of elks is about 800 specimen. The central part of the plateau is the most poorly inhabited – no more than 100 elks. But even in the central Putorana elks presently inhabited all suitable places.
The main habitats of elk are located between 400 and 550 m above the sea level. Elks feed mostly in river flood-lands and are rarely noted higher.

The highest density of wolf *Canis lupus* family pairs is noted in areas of intensive seasonal reindeer migrations – in basin of upper flow of Kotuy, Ayan, Yaktali rivers. In the surroundings of lake Kharpicha on the area of 6 600 sq.km permanently dwell 5 wolf families. In the central part of the plateau (40 000 sq. km) are noted 32 family plots. Here lives about 180 wolfs, which makes a density of 4.5 animals per 1000 sq. km.

In autumn the majority of family pairs with the Youngers follows the migrating reindeer herds. As a rule, they return to the plateau 1-1.5 months before the reindeers.

Glutton *Gulo gulo* is spread everywhere on the Yenisei North. In the Putorana mountains the density of this animal is especially high – average 10 traces per 100 km of route. In spring and autumn in places of reindeer passing appear many gluttons. The average amount is 1.7 predators per 1000 reindeers. After reindeer migrations the glutton density notably decreases, the majority of predators follows the reindeer migrations.

Brown bear *Ursus arctos* is common in the Putorana. During last years was noted significant increase of its population size. By approximate evaluation, on the area of 110 000 sq. km dwell about 770 bears. The main bear habitats are located in the forest, sub-bald peak belts and partly in the bald peak belt.

Traces of lynx *Felis lynx* are constantly noted in the habitats of bighorn sheep. The main factor holding up the growth of lynx population is presumably the high number of wolves.

Blue hare *Lupus timidus* is typical in the Putorana, at some years even abundant. In some places (lakes Kharpicha, Ayan basins) its density reaches 9-10 specimen per 100 ha.

Northern pika *Ochotona hyperborea* is spread on the Yenisei North till the northern edge of the Putorana mountains. As a whole it is a common specie with the high population size in the centre of the Putorana. It prefers stony placers of the sub-bald peak belt. Separate less numerous colonies are noted in forest and bald beak belts.

**Fish fauna**

The composition of fish fauna of the Putorana reserve is in significant part defined by the peculiarity of the hydrographical net: here unite river basins of Yenisei, Pyasina and Khatanga. As a whole, within the reserve and its protected zone were noted 36 species of fish related to 12 families (see Annex C4). During Pleistocene – Holocene water reservoirs had
moved, sea had experienced regression and transgression. The changing of contact and isolation periods on the background of historically poor water fauna had created the unique polygon for the fish evolutionary process. As a result, in waters of the reserve is noted a line of endemic species and forms of loach of Salvelinus genus, Coregonidae family and of Arctic grayling. Many of these forms are not enough studied yet and their taxonomical status is not defined. The presence of the inner-species form significantly increases the diversity of fish of the reserve. Conservation of the formation centres, among which is, undoubtedly, the Putoransky reserve’s territory, seems to be of exceptional interest.

List of endemic species and forms of the Putoransky reserve:
- Salvelinus boganidae Berg, 1926
- Salvelinus tolmaczoffi Berg, 1926
- Salvelinus drjagini Logaschev, 1940
- Salvelinus taimyricus Michin, 1949
- “Putoranchik” loach
- Abyssal loach “Pucheglazka”
- “Gornyi golets” – mountain loach
- Coregonus lavaretus pidschian (Gmelin, 1788)
- Coregonus muksun (Pallas, 1814)
- Prosopium cylindraceum (Pallas et Pennant, 1784)
- Thymallus arcticus (Pallas, 1776)

Avifauna

Birds nesting on the Putorana are noted on almost all continents, visiting tens of countries of the world during migrations and wintering. Thus, the problem of studying and conservation of the Putorana birds and their habitats has an international range. Russia is responsible for it according to the ratified biodiversity convention. The next step to consolidate the international status of this problem should be the inscription of the Putoransky reserve onto the UNESCO World Cultural and Natural Heritage List. From the point of view of features of the local avifauna, there are weighty reasons for it.

The avifauna of the Putoransky reserve, equal to the whole Putorana plateau, is unique.

In the reserve and the surrounding areas of the Putorana are noted 12 species of birds included into the Red book of IUCN, former USSR and Russian Federation:
- diver Gavia adamsii Gray
- red-breasted goose Rufibrenta ruficollis Pall.
- lesser white-fronted goose Anser erythropus L.
- bar-headed goose Eulabeia indica Lath.
- Bewick’s swan Cygnus bewickii Yarr.
- golden eagle Aquilla chrysaetos L.
- osprey Pandion haliaetus L.
9 of these species for certain nest in the Putorana, 3 are endemics of Asian part of Russia.

The nesting density of white-tailed eagle and jer-falcon in the Putoransky reserve is uniquely high. It is proved by the facts of nesting of 6 pairs of eagles on only 70-km line of river Ayan middle-flow, or by simultaneous discovering of few territorial pairs of jer-falcon in one lake hollow. Comparing the size of these two species of birds of prey on the reserve’s territories and beyond its borders allows to affirm that the major part of their Putorana populations is concentrated within the reserve. In the coming years this fact will be playing a general role in maintaining their relative population size on the north of Central Siberia. Number of regions with similar nesting concentration of both rare species is decreasing, and now they are presumably to be isolated. This is why the outstanding value of the Putoransky reserve for the conservation of white-tailed eagle and jer-falcon is obvious and is of international importance.

Conservation of lesser white-fronted goose Anser erythropus L. in Russia is also of international significance. It is Russia who has the major responsibility for the conservation of this specie, as almost all nesting areal of the goose is concentrated within its borders. Taking into consideration the catastrophic decrease of population of the goose areal as a whole, the necessity of conservation of relatively small populations, like the Putorana, sharply increases. The Putorana population of lesser white-fronted goose which dwell in the reserve, is located on the southern edge of the specie’s nesting areal. The special value of this population and the necessity of its thorough conservation is caused by the fact that every
specie is mostly vulnerable at the edge of its areal, from which the population decrease usually begins. The perspectives and optimism in conservation of lesser white-fronted goose in the Putorana reserve are resulted by stableness of the local population. Its size (unlike other regions of Europe and Asia) has been stable during last decade.

Unique are findings of crane Grus monacha Temm. and curlew (Numenius minutus Gould.) nestlings of the Putorana plateau. These rare species are endemics of the Beyond-Yenisei Siberia, have rather small and mosaic areal, and their spreading as a whole is poorly studied.

Taking into account severe conditions of mountains of the polar region, the avifauna of the Putoransky reserve is unusually diverse. List of species has 171 names, of which 109 (65%) are nesting.

The qualitative composition of the Putorana avifauna allows to characterise it as typical for the Palaeartic northern taiga. Besides, mountain relief gives avifauna of the Putorana higher diversity and specifics comparing to the fauna of surrounding plains and highlands. Birds fauna of the plateau has rather complicated structure which is explained by the distinct vertical zonality. In conditions of mountain landscape had formed avifauna of forest, sub-bald peak and bald beak belts. Each of them is an integrated, isolated and peculiar complex, which has no absolute analogues in other mountain systems of Eurasia and North America, and thus presenting an independent object of conservation in the reserve.

Directly in forest biotopes of the Putorana nesting is proved or can be rather possible for 66 bird species. Within north taiga subzone of the Central Siberian region, the plateau is a region of maximal diversity of bird fauna of forest landscapes. This can be explained by high diversity of forest biotopes in mountainous conditions of the plateau, attracting much more bird species than monotonous plain landscapes of northern taiga.

In the water or near-water landscapes of the Putorana plateau surely or supposing nest 49 bird species. Fauna of similar habitats of other regions of northern taiga belt of Russia is considerably poorer. Only in Yakutia biodiversity reaches same values as in the Putorana. Water and near-water birds fauna is richer than its analogues as in mountain regions (Sub-polar Urals, Kolymskoye highland), as on vast plains (Western Siberia, Yakutia) which are located on same latitude, and richer than south taiga landscapes of Central Siberia, which are located farther to the south. The reason of this is the unique vast, ramified and dense hydro-net which, together with highly rugged relief contributes to the high development of diverse water and near-water landscapes, which attract birds of various ecological orientations: from marsh to mountain river species.
Zoo-geographical features of the Putorana plateau are unique. The reason is that the plateau lies within Yenisei zoogeographical border, which is one of Eurasian large-scale meridian bio-geographical borders. On the latitude of the Putorana avicomplexes of spruce-taiga of Western Siberia are changed with avicomplexes of larch-taiga of Central and Eastern Siberia. This explains the high biodiversity and transitional character of the Putorana avifauna. The transitional character is denoted in the simultaneous inclusion of species and subspecies, which are typical representatives of various avicomplexes found to the west and east from the Yenisei zoogeographical border and not spreading farther.

Conclusion: the Putoransky reserve is the only protected nature territory on the vast territory of the Central Palaearctic region where typical avifauna of northern taiga is unusually diverse, enriched by typical mountain species, peculiarly combines western and eastern elements, and includes many rare and disappearing bird species included into the Red book of IUCN and Russia.

Rare and disappearing bird species found on the Putorana plateau:

- Gavia adamsii Gray
- Rufibrenta ruficollis Pall.
- Anser erythrophus L.
- Eulabeia indica Lath.
- Cugnus cugnus L.
- Cugnus bewickii Yarr.
- Anas formosa Georgi
- Pandion haliaetus L.
- Aquila chrysaetos L.
- Haliaeetus albicilla L.
- Falco rusticolus L.
- Falco peregrinus Tunst.
- Grus monacha Temm.
- Numenius minutus Gould.

*Heteroscelus brevipes.*
Rare species of mammals and birds

Putorana bighorn sheep *Ovis nivicola borealis* (see scheme A4)

Putorana bighorn sheep is endemic of the Putorana plateau included into the Red book of USSR and Russian Federation. It is singled into a separate subspecies *Ovis nivicola borealis*, and its areal occupies central part of the Putorana mountains and is hundreds kilometres away from regions of spreading of other subspecies of bighorn sheep.

By the early 1960-s bighorn sheep remained only in the most unreachable and less appropriate for reindeer herding parts of the plateau. In the middle 70-s with significant decrease of human pressure its areal gradually enlarged to 40 000 sq. km. Here remained the main population of the subspecies – about 1 400 animals. In the middle 80-s the main areal of the subspecies reached 60 000 sq. km and continued widening in north-western and southern directions. From 1977 till 1986 the population size has increased almost 2.5 times.

In 1989-1994 was noted the appearance of numerous sheep groups even in formerly harshly damaged northern and south-western borders of the areal (Koltama, Mikchanda rivers, Lama, Sobach’e, Keta, Kutaramakan, Khantaiskoye and other lakes). At present time the main areal reaches 70 000 sq. km and the area of restored areal is 140 000 sq. km.
Now the bighorn sheep population density in the main habitat centres varies from 3.0 to 4.8 specimen per 10 000 sq. km. Areas with high, average and low animal density have been defined and calculation of total population size has been carried out, which makes, within the plateau, a total of 6000 specimens. Large part of the Putorana bighorn sheep population dwells within the Reserve (50% of the population, i.e. about 2800-3000 specimens).

The observed increase of the subspecies population size does not guarantee its prospering in the future. Transition to new forms of managing, fading of traditional ways of reindeer herding has temporary “uninhabited” the central part of the Putorana, and as a result, has created natural reservation for bighorn sheep, giving pre-conditions for the growth of its population size. Creation of the “Putoransky” state reserve in 1989 has promoted conservation of bighorn sheep highest density centres and their natural settling in former dwelling regions. However, human pressure on borders of areal has not decreased, and this means that this settlement can be temporary. For stableness of the subspecies population effective preservation is required. Only in this case the modern relatively successful state of the bighorn sheep population will provide following growth of their number in former habitats.

**White-tailed eagle Haliaeetus albicilla.** White tailed eagle is included into the Red book of IUCN, Russia, and also into Annex I of CITES.
During last decades in connection with increased human activity the population size of the white-tailed eagle has lowered in some regions. In locality of Khantaiskoye lake in 1960-s nested 8-10 pairs, and in 1993 – only 6 pairs. In Norilsk lakes area pairs of white-tailed eagle were nesting regularly every 10-20 km, and in 1994 on the 60 km route along Lama lake were noted only 2 pairs. Nesting sites on rivers Rybnaya and Glubokaya have lost their significance. Just the same with the southern edge of the plateau. In the middle flow of river Vivi, most easy accessible for motorboats, eagles do not nest anymore. On the 300-km route along Kotuy river in 1984 were noted only 4 nests, which presumably can be connected with prolonged stay of hunters, fishermen and geologists.

Relatively high and permanent population size of white-tailed eagle remains only in the centre of the plateau and on bordering areas of forested tundra, the least experiencing human pressure (Reserve’s area). Centre of the areal in the Putorana is equal to 21 800 sq. km; total population size most likely exceeds 220. At foothills of the Putorana plateau and in forest tundra dwell about 90-100 eagles. General state of the population is estimated to be satisfactory.

**Jer-falcon Falco rusticolus L.** Is included into the Red book of Russia and into Annex I of CITES.

The Putorana plateau is an optimum of the nesting areal of jer-falcon on the north of Central Siberia. Population account is carried out since 1983, tendency to the population size decrease is revealed. The total population size in 80-s was estimated in 160-200 pairs, and for the last 15 years it has decreased some 2 times and at present, apparently, is about 100 pairs.

The main reason for decreasing of jer-falcon population is getting caught by fox-traps. Besides this – poaching and catching. Influence of some other inter-population mechanisms are also possible.

On the north of Central Siberia jer-falcon nests almost exclusively in the Putorana. The jer-falcon population on the north of Central Siberia can be estimated as critical.
2.b History and Development

History of relief evolution

In the second part of upper Permian period on the territory of the modern Putorana dominated lagoon-continental conditions accompanied by accumulation of sedimentation. At the end of Permian period began general elevation of the territory. At this time were developing the anticline structures of lakes Glubokoye and Keta. In connection with the general elevation of the territory, deep splits were activated, associated with lava outpour and explosive bursts. However, they were quickly changed by conditions of lagoon-continental regime.

In the early Trias general elevation of the territory accompanied by opening of numerous splits, led to powerful outpour of basalt lava. Layer by layer it covered Paleozoic sedimentation. Basalt filled the deepest northern downwarping of the Tunguss sineclise and remained there for 180 million years. But about 30 000 years ago, in early tertiary period began significant elevation of the north-western part of the Central Siberian plateau. The northern edge of the sineclise was raising faster than the whole Siberian platform. In Neogene-Quaternary period the amplitude reached 1000 metres. And today its elevation speed is 11 mm per year. As a result, the basalt dome about 2 km thick, with length of 500 km and width of 400 km rises 1.5-1.7 km high above the sea level. By the surrounding planes – to the north, east and west of the plateau – basalt breaks off with almost cliffed shelves 300-800 m high.

Abundant density of unbalanced elevation in different parts of the plateau caused cracking of basalt. Cracks spread in all directions from the centre of the plateau. Ancient rivers had fallen almost a kilometre deeper. Before rivers flew mainly to the south, and afterwards, rivers abandoned their valleys developed in Paleogene, and turned to the east, west and even to the north. Traces of this tremendous remoulding of hydrographic net have been conserved as wide ancient valleys with numerous terraces composed of river and lake sedimentation. Sometimes these ancient valleys cross modern watersheds.
In Neogene-Quarterly period formed the main shapes of the modern period. Rivers, creeks and ground water occupied faults and relaxed zones. Large valleys and lake hollows were formed. As a result of repeated mountainous and mountain-valley glaciation was formed peculiar valley profile. About present elevation witness intensive denudation process.

**History of land-use**

In the past the whole Putorana mountain system and especially its northern, eastern and southern parts were intensively used by the local inhabitants for fenced reindeer herding, hunting and fishing. These traditional forms of nature-use of the Far North influenced flora and fauna of the plateau. Mostly human pressure was reflected on the state of populations of vulnerable species, first of all on the Putorana bighorn sheep. Apparently, reindeer herders’ hunt had definite pressure also on the population size dynamics of wild reindeer, and on predator mammals - brown bear, wolf, blue fox, glutton, sable, stoat. By a line of indirect evidence one can suppose some territorial competition between wild and domestic forms of reindeer.

Since 1950-s the number of domestic reindeers on the plateau started decreasing, which in the end led to total discontinuation of ecosystem influence of this nature-use form.

Reindeer herding on the central and northern part of the modern reserve was carried out by “Volochansky” sovkhoz (collective farm). From 14 500 reindeers of its creation period (1966) 4 100 animals were herded major part of the year on the territory of modern reserve. The number of sovkhoz’ reindeers was catastrophically decreasing, and by middle 70-s reindeer herding hadn’t the slightest pressure on the ecosystems of the reserve. The same was noted in the southern regions where the activity of Evenk reindeer herders had ceased by the same time - in the middle 70-s.

Now the consequences of previous domestic reindeer herding are seen in some changing of vegetation structure on the single tracts with the area of 0.5-1.5 ha. These are places of former concentration and keeping of reindeers. The total area of such tracts of the reserve’s territory does not exceed 50 ha.
During last decades before organisation of the reserve the central parts of the plateau were used as hunter lands. But the use was quite limited because they were too remote and too hard to reach. On lake Ayan annually were shoot up to 600 wild reindeers and about 50-150 blue foxes. Near lake Kharpicha reindeers were also episodically shoot - seasonal quarry had not exceed 100-150 heads.

Fish resources were also poorly used. In limited scale fish was being caught on lakes Kutaramakan and Ayan. Volume of annual catch of valuable fish species (powan, broad whitefish, pelyad, Siberian cisco, loach and others) made between 0.5 and 12.1 tons. Fish catch on lake Kharpicha did not exceed 0.15 tons per year. Prime cost of fish was extremely high, craft was not paying. Main land users had to take these lands as nature reservats, serving as reproduction areas. In fact, these territories became reserved.
3 Justification for inscription

Waterfall on a tributary of the Kureika River (Reserve’s area). Foto by A. Romanov.
3.a Criteria under which inscription is proposed (and justification for inscription under these criteria)

“The Putorana plateau” nature complex is nominated under the following criteria:

(vii) Contains superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

The territory of the Putoransky Reserve contains quite a few natural phenomena, which especially beautify the area. Numerous waterfalls, which differ by their shape, height and power of torrent, give the territory an outstanding aesthetic significance. Scales and number of waterfalls are impressive (the highest density of waterfalls in Russia and possibly in the world). Narrow north-western portion of the lake Dupkun is situated in a narrow hollow between table rocks. This stretch from the mouth of the 1 Gagarya River to the mouth of Tesnaya River is, perhaps, one of the most spectacular places in the Putorans. Its main attraction is a mountain Trapezium (1208 m.) on the left bank of the lake. The mountain slope drops to the thin ribbon of the lake. In June or - in rainy years – all summer

Lake Keta – one of the most extensive at the plateau (Buffer zone).
long a multi-stepped waterfall with total height of 500 meters – one of the highest in Russia - descends from the northern slope of the mountain. Waterfalls on rivers Irkinda, Yaktali, Neral, Dulismar, Gagarya, Moya-Achin, Kholokit, Duluk, Kotyi are also very picturesque (for the description of waterfalls and canyons see Annex C5). Irkinda river is especially picturesque because of a group of waterfalls in its lower part, which includes one of the most beautiful cascades in Russia – 27-meter high Khitabo-Oron.

The landscape of intercontinental lake fjords is very picturesque. More than 25 000 lakes bring this austere polar mountain country special attractiveness. Several large fiord lakes (Depkun, Sobach’ye and others) are located near the western border of the Reserve and one of the lakes – Lake Ayan (55 km long and up to 256 meters in depth) – is situated in the very heart of the Reserve, in a narrow and deep gorge. Aesthetic value of all the abovementioned natural monuments is very high.

Unusual and very beautiful are trappean relief forms, ragged by deep canyons. By their size some canyons can be compared to the Colorado Grand Canyon.

(ix) Is outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.

At the Putorana plateau clearly reveals the rule of geographical zonality. Landscapes which have been formed in different edges of the plateau, are totally different despite the homogeneity of geological and geo-morphological structure of the territory. The plateau is situated at the intersection of latitude and longitude nature zones, which causes higher level of biodiversity for this latitude. In its southern part passes the border between sub-arctic and temperate zones, i.e. the general border of two landscape types of the highest taxonomic range.

General climate frontiers divide the Putorana plateau in two directions. One of them defines the border between northern taiga and forest tundra, crossing the plateau dome in latitude direction. The other divides the plateau onto eastern and western parts, crossing the plateau between 90-94° and defines the eastern bound of spreading of western taiga vegetation: Siberian spruce *Picea obovata*, *Betula tortuosa*, *Dahurian larch* *Larix gmelini* and a complex of attendant plants.
The mountain and hollow relief type of the plateau stipulated for hypertrophied discrete (i.e. focal, spot) spreading of many animal and plant species. The modern high level of isolation of many species’ populations is the main reason for active generation of new living (ecological and morphological) forms. The Putorana plateau is remarkable for “higher speed” of evolution processes developed in the intensive morphogenesis (up to subspecies level). In the world scale, within regions of inland location these processes are not revealed with such evidence as at the Putorana - they are more typical for ecosystems of marine and oceanic islands.

The Putorana Plateau is the zone of interpenetration of northern (tundra) and southern (taiga) Western and Eastern Siberian elements. This fact gives grounds to regard the Plateau as a unique natural region. This is, figuratively speaking, a huge domelike «laboratory bench» made by the nature itself, where one can observe a large variety of important natural regularities and natural phenomena and watch the course of natural processes in three-dimensional measurement: in latitudinal and longitudinal directions and within various altitudinal zones from the bottom of canyons up to the basaltic cupola of the Plateau.
Situated on the natural border between taiga and tundra, Putorana Plateau is marked by rich diversity of well-preserved subarctic tundra and forest tundra ecosystems, which are currently underrepresented in the World Heritage list. The nominated property is located in the Eastern Palaeartctic where the minimal density of natural WH sites is observed in comparison with other biogeographical regions of the planet, and in the north of Siberia - one of the most extensive gaps on the global WNH sites distribution map. And the last but not the least, the nominated property amply represents the subarctic tundra – an important member of the Polar Deserts/Tundra Biome, which is currently underrepresented in the World Heritage List. The inscription of the Putorana Plateau in the World Heritage List would fully commensurate with the policy of the World Heritage Center and serve the interests of the Global Strategy launched in 1994 for a more Balanced, Representative and Credible World Heritage List.

The Putorana plateau, the major part of which is occupied by the Putoransky Reserve, is a giant (with area of over 2.5 million ha) basalt trappean highland, which is not disturbed by the human activity and presents an outstanding universal value from the point of view of science and conservation.
The nominated property is distinguished by an outstanding peculiarity of relief which has an exceptional value both from scientific and aesthetic points of view. Numerous waterfalls, which differ by their shape, height and power of torrent, give the territory an outstanding aesthetic significance. Scales and number of waterfalls are impressive (the highest density of waterfalls in Russia and possibly in the world).

The landscape of intercontinental lake fjords is very picturesque. Unusual and very beautiful are trappean relief forms, ragged by deep canyons. By their size some canyons can be compared to the Colorado Grand Canyon.

The number of plateau lakes is over 25,000. These lakes are the largest in Siberia after Baikal and Teletskoye lake, the depth of most of them reaches 180-420 m. Altogether lakes make the second largest sweet water reservoir in Russia after Baikal. Many of the lakes of the Putorana are located wholly or by their most significant part within the Reserve’s area (Kutaramakan, Ayan, Djupkun, Kharpicha, Sobach’e) and its buffer zone. The plateau has a cupola shape and, as the Reserve’s area occupies the large central part of the cupola, all lakes are filled mostly from the Reserve’s area.

The Putoransky Reserve is a territory, where one can observe a large variety of important natural regularities and natural phenomena and watch the course of natural processes in three-dimensional measurement: in latitudinal and longitudinal directions and within various altitudinal zones from the bottom of canyons up to the basaltic cupola of the Plateau.

The plateau is the only habitat for one of the world’s largest poorly studied mammals – the Putorana bighorn sheep, which 15,000 years ago was separated from the main population and formed the subspecies. Large part of the Putorana bighorn sheep population dwells within the Reserve (50% of the population, i.e. about 2800-3000 specimens).

The Putorana plateau is located within the global transcontinental birds’ migration route (Central Asian migration route). Numerous water reservoirs of Putorana are of vital importance for thousands of migrating birds as rest and feeding stopover places. Within the Reserve such vitally important reservoirs are lakes Ayan, Kutaramakan, Dyupkun, Kharpicha and Sobach’e, rivers Kureika, Yagtali, Kotuy, Ayan and Irkinda.

The nominated area is a habitat of many endemic, rare and disappearing flora and fauna species. The Reserve is a strategically important area for conservation of 4 rare bird species: Anser erythropus L., Haliaeetus albicilla L., Falco rusticolus L., Numenius minutus Goul.
3.c Comparative analysis (including state of conservation of similar properties)

In 1994 the World Heritage Committee launched an important program called Global Strategy for a more Balanced, Representative and Credible World Heritage List (the List has been maintained since 1978). In the perfect option, the UNESCO WH List should include all most outstanding historical and cultural monuments and natural phenomena throughout the world, i.e. the sites of «outstanding universal value» (for a site to be granted the World Heritage status it is required to be of outstanding universal value and meet at least one out of ten selection criteria).

In the case of natural properties, the location of a potential World Heritage site should also be examined to satisfy the principle of natural representativeness; such evaluation is usually made on the basis of the 1982 Udvardy scheme (so-called «gap analysis»). Gap analysis shows whether the nominating property «closes up» some important geographical gap on the World Heritage map. Integrity of ecosystems is another important assessing condition for natural properties nominated for inscription on to the World Heritage List.

**Summary:** a natural property nominated for the World Heritage status shall be a superlative natural phenomenon, well-preserved and authentic and, besides, laying in a geographical range, which yet hasn’t been represented by another natural WH site.

1. GEOGRAPHICAL ANALYSIS

1.1. Global Biogeographic Context - Realms

Global distribution analysis of the World Natural Heritage Sites shows that of all biogeographic realms allotted upon the prominent Udvardy natural demarcation scheme (1975) the most poorly represented is Eastern Palaearctic, i.e. the vast area which includes the whole Siberia and Far East of Russian Federation, China, Mongolia, other states of Central Asia and Arabia. Here, as estimated by J. Thorsell (2003), the density of natural World Heritage Sites is 0.47 per million sq.km., while this index for Western Palaearctic (European Russia, Western Europe, the Mediterranean and Northern Arctic) makes 1.6, which is 3 times higher. Indo-Malay area bears maximal value – 2.26, which is 4.5 times higher than for Eastern Palaearctic. The evident lack of natural World Heritage Sites is present at this vast and the richest in terms of its natural value region of the World (the disproportion has been only slightly evened out since the time when the above mentioned analysis was performed (2003)).

The conclusion from the stated above: the inscription on the WH List of the Putorana Plateau, which is located in the north of the Eastern Palaearctic and precisely in the north of continental Siberia, where there are no World Heritage sites, seems to be very reasonable, as it would bring more balance to the global scheme of distribution of natural WH sites.
1.2. Global Biogeographic Context – Biomes

Existing World Heritage sites represent almost all types of wildlife habitats (biomes) on the Earth, however, with nonuniform global distribution. Such biomes as wetlands, mountain sites, humid and dry tropical forests, coastal areas and islands are well-represented, while lake systems, steppes and temperate grasslands, polar deserts and tundra are currently underrepresented in the World Heritage List. (J. Thorsell, 2003).

The Polar Deserts/Tundra biome is best represented in the Northern hemisphere: in Eurasia, North America and also in Greenland, where this biome is located within two climate zones –Arctic zone (polar deserts/arctic tundra) and the Subarctic zone (subarctic tundra and forest tundra). However, by now, there are only few natural WH sites containing sufficiently large and representative tundra and polar desert areas in the vast expanses of the Arctic and the Subarctic (Table 1).

Thus, in the New World the northernmost natural WH sites are situated on the northern edge of the forest belt of the Temperate zone. Those sites are Alaska’s Kluane / Wrangell-St Elias / Glacier Bay / Tatshenshini-Alsek (Canada/USA) and Canadian National Parks Wood Buffalo and Nahanni. The influence of Subarctic zone is quite perceptible here, but the Tundra biome is represented poorly and only by a subarctic tundra, i.e. more southern tundra type, and also by mountain tundra. The sites are much more representative in terms of forest tundra and conifer forest ecosystems.

However, the situation looks brighter if one takes into account potential WH sites located in the north of Canada and even further to the north (see Tentative List). The first of the sites - Ivavik, Vuntut and Herschel Island parks – is located on the northern coast of Yukon. The site includes a coastal mountain ridge, a lake in the Beaufort Sea and a swampy area on its coast and represents a variety of subarctic tundra sub-types. Another site is Quttinirpaaq National Park located in the northern part of the Ellesmere Island, Canada (720 km far from the North Pole), where arctic tundra and polar deserts have wide distribution. Therefore, in the future the Polar Deserts/Tundra biome has a chance to be sufficiently represented in the North America.

The situation is more complicated for Northern Eurasia where various tundra types and polar deserts occupy vast areas stretched from west to east like a 6-7 thousand kilometer wide belt. Thus, for the Eurasian Continent, apart from the necessity to represent the biome as such, there is a task to provide the World Heritage coverage for every longitudinal sector of this huge belt: Scandinavia, Ciscaucasian Russia, Siberia and Russian Far East.

Today there is only one World heritage site in the Eurasian Arctic and Subarctic – the Wrangel Island (Russian Federation) -, which provides sufficient representation of northern (arctic) tundra. Also, there are two WH sites on the northern border of temperate boreal forests – Laponian Area (Sweden) and Virgin Komi Forests (Russian Federation). But both sites are dominated by northern taiga forests, marshes and poorly wooded areas, while the tundra is represented only by different mountain tundra types.

Further on, according to the Tentative List, world heritage status can be given to the Svalbard Archipelago (Norway), which is covered with arctic tundra, polar deserts and glaciers. The inscription of this site will obviously improve the representativeness of the UNESCO WH List.

However, the southern (subarctic) tundra type still stay underrepresented in the World Heritage List and an extensive area of Eurasian Subarctic – from northern Scandinavia to the Bering Sea shoreline – still looks like a huge gap on the World Heritage map.
**Table 1. World Heritage sites (existing and potential), representing arctic and subarctic tundra and polar deserts**

<table>
<thead>
<tr>
<th>Property</th>
<th>Geographic position</th>
<th>Geographical zone</th>
<th>Landscape</th>
<th>Major ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EURASIA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Putorana Plateau (Eastern Siberia, Russian Federation)</td>
<td>68-70° N 92-96° E</td>
<td>Border between the Subarctic zone and the Temperate zone.</td>
<td>Tableland with well-defined trappean landscape</td>
<td>Taiga, forest tundra, mountain tundra, mountain rocky desert</td>
</tr>
<tr>
<td>Laponian Area (Sweden)</td>
<td>66-68° N 16-20° E</td>
<td>Northern Temperate zone</td>
<td>Medium-altitude mountains, foothills, flatlands</td>
<td>Marshes, taiga, light forest, mountain tundra</td>
</tr>
<tr>
<td>Virgin Komi Forests (Ural Mountains, Russian Federation)</td>
<td>61-66° N 57-61° E</td>
<td>Northern Temperate zone</td>
<td>Medium-altitude mountains, foothills, plains</td>
<td>Marshes, taiga, light forest, mountain tundra</td>
</tr>
<tr>
<td>Wrangel Island (Russian Far East)</td>
<td>71-72° N 180° E</td>
<td>Arctic zone</td>
<td>Upland landscape</td>
<td>Arctic tundra</td>
</tr>
<tr>
<td>Svalbard Archipelago (Norway)</td>
<td>76-80° N 11-27° E</td>
<td>Arctic zone</td>
<td>Upland landscape</td>
<td>Arctic tundra, polar deserts, glaciers</td>
</tr>
<tr>
<td><strong>NORTH AMERICA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaska’s Parks and Reserves (Canada/USA)</td>
<td>58-63° N 136-146°W</td>
<td>Northern Temperate zone</td>
<td>High-mountain landscape</td>
<td>Taiga, light forests, mountain tundra, glaciers</td>
</tr>
<tr>
<td>Nahanni (Canada)</td>
<td>61-62° N 123-127°W</td>
<td>Northern Temperate zone</td>
<td>Upland landscape</td>
<td>Taiga, light forests, mountain tundra</td>
</tr>
<tr>
<td>Wood Buffalo (Canada)</td>
<td>58-61° N 111-115°W</td>
<td>Northern Temperate zone</td>
<td>Flat and hilly landscape</td>
<td>Taiga, marshes, forest tundra, flat tundra</td>
</tr>
<tr>
<td>Ivvavik/Vuntut/Herschel Island (Yukon, Canada)</td>
<td>68° N 139°W</td>
<td>Subarctic zone</td>
<td>Upland and flat landscape</td>
<td>Marshes, light forests, mountain tundra</td>
</tr>
<tr>
<td>Quttinirpaaq (Ellesmere Island, Canada)</td>
<td>82° N 70°W</td>
<td>Arctic zone</td>
<td>High-mountain and upland landscape</td>
<td>Mountain tundra, polar deserts, glaciers</td>
</tr>
</tbody>
</table>

*Note: the Subarctic zone includes two more World Heritage sites – small volcanic Surtsey Island (south of Iceland) and Ilulissat icefiord (south west coast of Greenland). However, they are not the objects of this analysis as they contribute negligibly to the conservation of the Tundra/Polar deserts biome.*

**Conclusion:** Situated on the natural border between taiga and tundra, Putorana Plateau is marked by rich diversity of well-preserved subarctic tundra and forest tundra ecosystems, which are currently underrepresented in the World Heritage list. What is more, the highest part of the plateau is covered throughout with cold rocky barrens looking very much like zonal polar deserts located far to the north of the Putorana plateau. It is also important that the plateau lies in the Siberian sector of the Tundra/Polar desert biome, i.e. within that huge area, which yet contains no World Heritage sites.
1.3. Russia’s Context

As is well known, almost all eight Russian natural World Heritage sites are located in coastal or mountain regions in the periphery of the country. The sites form a kind of “natural necklace” encircling the territory of Russia around the periphery. However, the extensive inland area (i.e. continental Russia) contains no World Heritage sites. The single exception is the Virgin Komi Forests located in the Northern and Subpolar Ural Mountains. Thus, the situation is such that currently there are only 3 WH sites - Lake Baikal, Altai Golden Mountains and Uvs Nuur Basin – in a vast and rich in natural treasures area of Siberia. The three WH properties are concentrated in the south of Siberia, and none of natural WH sites is found in the middle and northern parts of Siberia. Thus, the giant region, compared in terms of size to the whole Western Europe, seems to be out of the coverage by the World Heritage Convention despite the presence of a few very valuable natural sites, which are worthy of the WH status. One of them is the Putorana plateau. Judging by the key characteristics (geological, geomorphological, hydrological, biotic and aesthetic) of the site, it is one of the most notable natural areas in the north of Siberia, with well-defined natural borders (canyons, rivers, fiord lakes, watersheds).

As far as the potential World Heritage sites is concerned, according to the Tentative list such sites have not yet been identified in this part of Siberia. The nearest site where one can find tundra and forest tundra ecosystems is the Magadansky Reserve, which is located on the Russian Far East about 3,000 km east of the plateau and lies in the zone of ocean influence. This area differs fundamentally from the Putorana plateau in terms of climate conditions, geological features, landforms and biota. Other potential WH sites in Siberia are the Great Vasyugan Mire, Lena Pillars, Krasnoyarsk Pillars, Daurian Steppes. However, they lie well south from the Putorana plateau, in the taiga zone and even farther to the south, where landscape and natural conditions are in marked contrast to those of the Putorana plateau.

Conclusion: Russian Siberia and especially its northern regions is one of the largest gaps on the WNH sites distribution maps of world and Russia. Today the Putorana Plateau seems to be the most promising potential WH site in this region. Besides, excepting the Virgin Komi Forest (1995) none of the Russian natural sites has been inscribed on the World Heritage List under criteria (VII + IX) as is recommended for the Putorana plateau. Moreover, up to now such landscape as a basaltic trappean tableland has not been nominated for the inscription by the Russian Federation.
2. COMPARISON WITH OTHER SIMILAR PROPERTIES

CRITERION VII

The territory of the Putoransky Reserve contains quite a few natural phenomena, which especially beautify the area and therefore worthy of special mention. Narrow north-western portion of the lake Dupkun is situated in a narrow hollow between table rocks. This stretch from the mouth of the 1 Gagarya River to the mouth of Tesnaya River is, perhaps, one of the most spectacular places in the Putorans. Its main attraction is a mountain Trapezium (1208 m.) on the left bank of the lake. The mountain slope drops to the thin ribbon of the lake. In June or - in rainy years – all summer long a multi-stepped waterfall with total height of 500 meters – one of the highest in Russia - descends from the northern slope of the mountain. Waterfalls on rivers Irkinda, Yaktali, Neral, Dulismar, Gagarya, Moya-Achin, Kholokit, Duluk, Kotyi are also very picturesqu (for the description of waterfalls and canyons see Annex C5). Irkinda river is especially picturesque because of a group of waterfalls in its lower part, which includes one of the most beautiful cascades in Russia – 27-meter high Khitabo-Oron.

Several large fiord lakes (Depkun, Sobacho’ye and others) are located near the western border of the Reserve and one of the lakes – Lake Ayan (55 km long and up to 256 meters in depth) – is situated in the very heart of the Reserve, in a narrow and deep gorge. Aesthetic value of all the abovementioned natural monuments is very high.

However, not only some of its parts but the entire plateau is a very picturesque area. Its scenic beauty can be compared to the beauty of those beautiful mountain areas with fiord lakes (or true fiords), plenty of waterfalls or well-defined trappean landforms, which already have the World Heritage status. At the same time it should be noted that parallels can be drawn only with regard to one of the landforms (for example, the compared properties have fiord lakes or waterfalls but have no trappean landforms, etc.), and the similarity of the properties doesn’t extend further. Thus, according to our data, none of existing World heritage sites has a landscape absolutely similar to the landscape of the Putorana Plateau (see Table 2).

Moreover, it is often found that outwardly similar landscapes significantly differ in natural properties, and that the similarity of appearance is merely a result of long evolution. This is the case for the Putorana plateau. Those sites that look like this Siberian plateau are in marked contrast to it in terms of the origin and on-going geological processes

Some examples of outwardly similar landscapes:

1) Sites containing mountain fiords/fiord lakes.

This group includes two WH sites: Laponian Area (Sweden) located on the eastern slopes of Scandinavian Mountains, where one can find fiord-like mountain lakes, and West Norwegian Fjords lying on the western slopes of the same mountain system, where one can see true fiords Geirangerfjord and Neroyfjord.
These areas have an obvious visual resemblance to the Putorana Plateau because deep and narrow lakes of the plateau look very similar to fiords. Besides, all three sites are situated in a subpolar mountain environment; they all are covered with northern taiga forests, light forests and tundra with plenty of small lakes and picturesque waterfalls.

But both Laponian Area and West Norwegian Fjords are surrounded by typical Alpine landscape with dissected topography and specific glacier landforms, where there is nothing even vaguely resembling flat-topped mountains, extensive canyons and well-defined trappean «stair-step» landforms of the Putorana plateau.

Besides, the main factors that triggered the formation of these beautiful landscapes are widely different. Indeed, fjord-lakes of the Putorana plateau have their origin not only in mountain glaciers, but to a greater extent – in tectonic elevations which led to formation of numerous cracks in basalt mass where later flew rivers forming narrow and deep lakes.

As for Scandinavian lakes and fjords of the Norwegian Sea, they have been originated first of all under the influence of mountain glaciers, which wrecked rocks forming lake valleys and working out fjords’ beds.

2) Sites containing flat-topped mountains and waterfalls.

The Putorana waterfalls in their major parameters (height, width and power) are much inferior to such famous World Heritage cascades as Angel Falls (about 1000 meters high), Yosemite Falls (about 730 meters), Sutherland Falls (about 580 m.), Gavarnie Falls (about 420 m. high), Iguaçu Falls and Victoria Falls (3 and 2 kilometers wide, respectively).

Nevertheless, the most valuable thing about the Putorana plateau is an extremely high concentration of small waterfalls. That’s what the Putorana plateau (where the stair-step landscape facilitates the formation of waterfalls) is recognized for as a natural phenomenon of global significance. By this feature the Siberian plateau stands alongside with other WH properties distinguished for their numerous waterfalls: Atlantic Forests South-East Reserves, Plitvice Lakes (Croatia), Canaima (Venezuela), Noel-Kempff-Mercado (Bolivia), Blue Mountains (Australia) and South-West New Zealand.

However, the resemblance of the Putorana plateau to the abovementioned World Heritage sites is limited to the presence of waterfalls, precisely, to their abundance. As for other characteristics, the sites diverge considerably from each other. Thus, the Brazilian WH site is an Atlantic Coastal ridge with humid and warm climate and with very specific South American flora and fauna. There are no trappean mountains, fiords or large mountain lakes in this WH area. Instead, numerous rivers flow over huge «steps» (of tectonic origin, while the Putorana stair-step landscape is a result of aeolation) forming picturesque waterfalls. Plitvice Lakes is a special case because in fact this is a cascade of about 20 small and large lakes divided by waterfalls. Canaima National Park (Venezuela) and Noel-Kempff-Mercado National Park (Bolivia) as well as the Blue Mountains (Australia) are more like the Putorana Plateau. They all are high and strongly dissected plateaus having plenty of rivers and waterfalls. But they have no fiords or fiord lakes or trappean mountains (though canyons with stepped slopes are encountered). Besides, there can be no comparison between tropical environment of the abovementioned places and harsh subpolar landscapes of the Putorana plateau. The New
Zealand WH site bears two important similarities to the Putorana plateau: high concentration of waterfalls and the presence of fiords. At the same time the South Island’s landscape is not a plateau-like but an alpine one (the highest peak is Mount Cook, 3764 meters high). There no trappean mountains here, but there are massive mountain glaciers; vegetation consists of wet conifer forests and mountain beech woods.

3) Sites containing trappean landscape.

Trappean landscape widely and amply represented on the Putorana plateau is both of scientific interest and aesthetic value. Indeed, flat plateau-like areas and extensive stepped-slope basaltic canyons intermitting each other make the plateau an exotically looking place. Trappean landscape fittingly complements the strong aesthetic impression produced by other key elements of the landscape.

The other largest trap areas on the planet are: Deccan highland in India, Columbian plateau on the west of the USA, the Parana lava plateau in Brazil and Ethiopian plateau in Eastern Africa.

The major feature distinguishing the Putorana plateau from the above mentioned areas is its location within the subarctic natural zone while the other large trap areas have been developed in the temperate, subtropical, tropical or subequatorial zones, i.e. in the essentially different natural conditions. This factor determined fundamental difference between landscape formation and biota development processes of the Putorana plateau and the above listed largest trap areas of the Earth. The Putorana plateau is a unique subarctic trap area.

Only two of the four forgoing world’s largest trap areas have WH sites, which, though not so clearly as the Putorana plateau, represent this particular type of landscape.

The Simien National Park is located in the highest, most dissected and hard-to-reach part of the Ethiopian plateau. As in the case of the Putorana plateau, the landscape of the Ethiopian plateau has been developed as a result of ancient tectonic activity (huge basaltic lava outflow), intensive tectonic elevations and after that – erosion and aeolation. That’s why the park, just like the Putorana plateau, has deep canyons, plateau-like flat-topped mountains called ambas, and pronounced stepped relief. The thickness of the Ethiopian Basalts (up to 1500-2000 meters) corresponds to the one of the Putorana lava beds.

But there is a number of fundamental distinctions between the two sites related to the appreciation of the landscapes and to their aesthetic value. The Ethiopian plateau is much higher (average heights are from 2000 to 3000 meters and the highest peak is 4620 meter high Ras-Dashen, the fifth highest mountain in Africa). In terms of vegetation, which contributes greatly to the landscape, the sites are also principally differ one from another. And one more thing: the Simien National Park has neither large mountain lakes similar to pseudo-fiords of the Putorana, nor plenty of waterfalls.

Famous natural monument of Argentina and Brazil the Iguazu waterfall is an ancient lava plateau in the Parana River basin, where basalt thickness reaches 1000 meters and where in some places a trappean landscape may be traced.

However the Parana plateau is less dissected and lower then the Putorana plateau – its average heights are 500-600 meters. The most part of the Parana plateau is a flat or hilly country without any abrupt changes of elevation excepting the waterfall itself (70-80 meters). The
Parana plateau contains no such inherent elements of the Putorana landscapes as elongated fiord lakes or extensive canyons (instead, Parana plateau has narrow basaltic gorges). Local gross subtropical vegetation reminds not even a bit of Putorana’s tundra and light forests. Lastly, instead of hundreds of little waterfalls scattered about all over the Putoranian reaches, in the Parana plateau we can see a compact terraced cascade composed of 275 individual waterfalls. The whole set looks like a giant horseshoe; the front of falling water is about 3 kilometers long.

Table 2. Aesthetic value of the Putorana Plateau vs. some other World Heritage sites

<table>
<thead>
<tr>
<th>WH sites/Key landscape elements</th>
<th>Fiord lakes/fiords</th>
<th>High concentration of waterfalls</th>
<th>Trappean landscape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Putorana Plateau (Russia)</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Laponian Area (Sweden)</td>
<td>+</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>West Norwegian Fjords</td>
<td>+</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Atlantic Forests South-East Reserves (Brazil)</td>
<td>–</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Plitvice Lakes (Croatia)</td>
<td>–</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Canaima (Venezuela)</td>
<td>–</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Noel-Kempff-Mercado (Bolivia)</td>
<td>–</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Blue Mountains (Australia)</td>
<td>–</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>South-West New Zealand</td>
<td>+</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Simien National Park (Ethiopia)</td>
<td>–</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td>Iguazu waterfall (Argentina/ Brazil)</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

**Conclusion:** It is true that every of the above described natural phenomena included in to the World Heritage List is beauty and unique in its own way. However, image-making elements though have some assonance are nevertheless different for each of the sites. The Putorana plateau has its own specific beauty features: in spite of its visual resemblance in terms of certain parameters to some other regions of the Earth, the plateau has a unique combination of a few key landscape elements (large fiord-like lakes, numerous waterfalls and trappean «steps») and thus has no analogues among existing WH sites.
CRITERION IX

Let’s compare the Putorana Plateau with three other World Heritage sites also located in Northern Eurasia, and let’s make it the aim of this comparative analysis to answer the following questions: how rich the sites are in terms of natural diversity? How the natural diversity of the sites manifests itself? What are the main factors influencing the natural diversity of the sites?

Russian WH site Virgin Komi Forests (total area 3.3 million ha) situated on the western slopes of the Ural Mountains demonstrates, on the one hand, well-marked altitudinal belts. As one goes up to the mountains, piedmont low-mountain conifer forests replace marshy lowlands, next are light forests, mountain tundra, stony lands and glaciers. High-mountain areas in Northern, and especially in Subpolar Urals with maximum height of 1,895 meters are decorated by amazing residual outcrops, high peaks and sharpened ridges. This is a typical alpine landscape (on the Putorana Plateau altitudinal belts are less defined, and the landscape is not so much dissected as in the Komi Forests. Well-defined glacier landforms are not present on the plateau). On the other hand, the Komi Forests’ 400-kilometer length from north to south allows one to observe how the temperate taiga forests gradually replace northern taiga. This phenomenon considerably increases the landscape diversity of the Virgin Komi Forests area (on the Putorana plateau, as one goes from south to north, absolutely another landscape succession is observed: tundra - forest tundra - northern taiga).

Natural diversity of another Russian WH site - the Wrangel Island - located in the Arctic zone is the result of a combination of low-mountain, plain, coastal and marine ecosystems (the territory of the site includes an extensive surrounding water area; the total area of the site is 2.2 million ha). The island itself is covered mainly with arctic tundra (in the case of the Putorana plateau it is subarctic tundra). The relic tundra-steppe communities of the island are of special interest. Small lakes and bogs and osieries are common here. Small glaciers and stone lands are frequently found in the mountains. Low coastlines are dissected by lagoons, which are separated from the sea by send spits. For the Wrangel Island, except for the high-latitude location, ocean effect is the key factor of the landscape development (as is well-known, the Putorana plateau is an inland area having severe continental climate with all that it implies). Altitudinal zonation is poor on the Wrangel Island, where the highest point is only 1,096 meters high. Besides, for the Wrangel Island in terms of Criterion ix special attention is given to the local on-going species formation processes, which ran in a long-term isolation and has resulted in a unique biota with a number of endemic plant and animal species.

Laponian Area is situated in northern Sweden, near the Arctic Circle. The total area of this site consisting of 6 parks and reserves is about 940 thousand hectares. Since the territory stretched 180 kilometers from west to east, the main «natural diversity axis» lies just along its horizontal centerline. From west to east, the latitudinal succession of the following zones occurs: Scandinavian alpine zone with typical glacial landscape (cirques, U-valleys, moraines, etc.); submountain zone covered with virgin northern taiga forests; the zone of hilly plains occupied by light forests and extensive swampy areas. Scandinavian Mountains (maximum height is 2089 meters) have a few pronounced altitudinal zones: the zone of intermountain hollows covered with conifer forest, the zone of birch thickets, mountain tundra zone and the zone of stone lands, glaciers and permanent snow. Polygonal tundra areas, deep fiord lakes and a big river delta at the Lake Laitaure complete the landscape biodiversity of the Laponian Area. It is obvious that the Putorana Plateau and the Laponian Area share some landscape types, but at the same time many of Lapland landscapes are not found on the Putorana plateau.
The landscape and biota diversity of the Putorana plateau are greater than those of the neighboring areas located in the same latitude. This is due to the fact that two important natural borders cross the plateau. As already stated, the border between the northern taiga and forest tundra runs in west-east direction along the купол плато. It is also the natural border between two geographical zones – subarctic zone and temperate zone, i.e. this is a border of a higher taxonomic level than, for instance, the border between the middle taiga and northern taiga forests in the territory of the Virgin Komi Forests. Another natural border divides the plateau in two parts - the western part (more humid and less cold) and the eastern part, which has dry and frosty climate. Climate difference determines a significant difference in vegetation cover of the two parts. Indeed, not only the northernmost and southernmost, but also western and eastern natural distribution limits of many plant species run through the Putorana plateau. Longitudinal and latitudinal regularities are supplemented with altitudinal zonation. On the Putorana plateau three altitudinal belts are identifiable, though not so clearly as in true mountains. These belts are, namely: forest belt, goltsy belt (light forests and mountain tundra) and the belt of cold rocky deserts.

Further on, the Putorana Plateau is a place where a variety of natural processes run in undisturbed natural conditions, for example, glacial processes and processes running in mountain rivers and fiord lakes, various biotic processes (bogging, succession, pioneer colonization). The most peculiar natural process that brings uniqueness to the region is the development of trappean (stepped) landscape. This landscape type has its origin in ancient volcanic activity, followed by tectonic elevations and later was under the effect of glaciation during the Ice Age. The landscape development is still not finished and now erosion and aeolation are forming the landscape. Permafrost, thermokarst and other northern phenomena complement the overall picture. Mountain relief makes the local climate even more severe in comparison with what it should be in these latitudes in Eurasia, and this fact brings more specificity to the development of natural complexes of the Putorana plateau.

The high level of preservation of the nominated site (natural processes run in almost «sterile» conditions), its large area (approximately 2 million ha) but a compact form (rounded area 200 x 250 kilometers with well-defined natural borders) – all that significantly increases the model value of the plateau. This vast and undisturbed basaltic plateau running tens kilometers in north-south and west-east directions is a perfect research test site.

**Conclusion:** The Putorana Plateau is the zone of interpenetration of northern (tundra) and southern (taiga) Western and Eastern Siberian elements. This fact gives grounds to regard the Plateau as a unique natural region. In terms of represented ecosystem and the richness of on-going natural processes the Plateau ranks with other natural WH sites of Northern Eurasia. We may describe the plateau as a huge domelike «laboratory bench» made by the nature itself, where one can observe a large variety of important natural regularities and natural phenomena and watch the course of natural processes in three-dimensional measurement: in latitudinal and longitudinal directions and within various altitudinal zones from the bottom of canyons up to the basaltic cupola of the Plateau.
SUMMARY: Despite the fact that there is a vague similarity between the Putorana Plateau and some World Heritage properties located in the Eurasian North and on other Continents, the Putorana Reserve area can be considered to be of outstanding universal value in terms of a number of parameters. It follows from the results of comparative analysis of aesthetic value of WH sites (criterion VII), as well as from the evaluation of locally running natural processes and the diversity of the site’s ecosystems (criterion IX). The plateau perfectly meets both criteria.

Moreover, The Putorana plateau is a justified candidate for inscription on the World Heritage List in the context of the global distribution of natural World Heritage sites: it is located in the Eastern Palaearctic where the minimal density of natural WH sites is observed in comparison with other biogeographical regions of the planet, and in the north of Siberia - one of the most extensive gaps on the global WNH sites distribution map.

And the last but not the least, the Putorana Plateau amply represents the subarctic tundra – an important member of the Polar Deserts/ Tundra Biome, which is currently underrepresented in the World Heritage List.

The inscription of the Putorana Plateau in the World Heritage List would fully commensurate with the policy of the World Heritage Center and serve the interests of the Global Strategy launched in 1994 for a more Balanced, Representative and Credible World Heritage List – in order to more fully represent natural and cultural diversity of the world and provide the World Heritage coverage of all main geographical regions of the Earth.
3.d Integrity and/or Authenticity

Integrity

One should take into consideration that already upon establishment of the Putoransky Reserve (which boundary coincides with the nominated property) the integrity principles of the Putorana plateau natural complex have been observed.

Integrity substantiation has been in accordance with the “Convention Implementation Guidelines”:

Paragraph 88:

(a) The Putorana plateau is a whole nature complex with its main components inseparably tied with each other by the common origin, history and the dynamics of natural development, and includes all elements necessary to express its outstanding universal value.

(b) By its size (1,887,251 ha) the nominated property is enough to support the functioning of nature complexes of the Putorana plateau and to ensure the complete representation of the features and processes which convey its significance. The vast buffer zone of the Reserve (1,773,300 ha) gives additional integrity guarantees for the nominated property.

(c) Different forms of human activity (reindeer herding, hunting, fishing, tourism, geological exploration, metallurgical production and others), which existed at the plateau before the Reserve’s establishment exercised minimal influence on the reserved ecosystems, and did not quite disturb them. The Putoransky Reserve is a compact nature conservation area not subjected to management impact. Bearing the status of the state nature reserve – the highest nature conservation status in Russia, the whole and compact Putorana plateau territory provides protection and the following natural development of representative complex of ecosystems. The territory is extremely hard to access (only by helicopter), which gives it supplementary guarantees of integrity and safety.
Paragraph 90:
The biophysical processes and landform features of the nominated area are intact.

Paragraph 92:
The nominated property is of outstanding universal value and includes all areas that are essential for maintaining the beauty of the property, including tremendous number of waterfalls which differ by flow rate, height and form; deep canyons cutting through in all parts of the plateau; mighty trap relief forms; intercontinental fjord-lakes. All landscape components bringing the Putorana plateau an outstanding aesthetic value are in a natural interrelationship stipulated by the common genesis of the nominated property.

Paragraph 94:
The plateau Putorana is situated at the intersection of latitude and longitude nature zones, which causes higher level of biodiversity for this latitude.

Because of its large size, the Reserve’s area represents vegetation of three geobotanical districts. Complexes of the sub-arctic district occupying the major part of the territory are presented most fully: it’s the high-mountain area with distinct altitude zonality with typical biocoenosis at each zone. Major part of the territory is occupied by bald peak zone. The valley vegetation, repeating the outlines of the taiga zone, is represented by rare lands and sparse forests of Dahurian larch Larix gmelini alternating with intrazonal or even tundra groups. Forest vegetation occupies lower flat terraces; on dry crushed rock terraces form bush-lichens sparse forest groups.

Thus, the nominated area contains all necessary elements to demonstrate the key aspects of processes that are essential for the long term conservation of the Putorana Plateau ecosystems and the biological diversity they contain.
4 STATE OF CONSERVATION AND FACTORS AFFECTING THE PROPERTY
Irkinda Waterfall (Reserve's area).

Foto by V. Kirpitchenko.
4.a Present state of conservation

The Reserve’s area

During last decades different forms of human activity (reindeer herding, hunting, fishing, tourism, geological exploration, metallurgical production and others) exercised minimal influence on the reserved ecosystems, and did not quite disturb them. The consequences of earlier human influence can now be related to historical ethnography of the region. Remained traces of their manifestation (rotting wood fences, mouldering houses and cult buildings, fumes and other) now are more the key to understanding the specifics of different forms of former human activity than influencing factors. Taking into consideration the minimal damage brought by negative influence for the last years and also comparative mildness of former means of traditional nature-use, the reserved biocoenosis can be estimated as undamaged. The whole area of the reserve can be characterised as vast model plot of the unique mountain system in the north if Central Siberia.

The buffer zone

To comparatively new forms of human influence on ecosystems of the Putorana plateau outside the Reserve’s boundary relate building of cities and villages, minerals extraction, pollution of atmosphere, water and soil by industrial waste, using of caterpillar transport, recreational pressure, poaching. All the above forms are negative sequences of the development of the biggest polar Norilsky territorial industrial complex. These factors influence only in western part of the plateau (the buffer zone of the reserve) and do not sufficiently damage the reserve’s biocoenosis.

The main enterprise with the negative influence on the plateau’s nature is Norilsky mining metallurgical plant, which is situated 150-200 km away from the western border of the reserve. Plant’s bursts lead to degeneration of vegetation cover in the western part of protection zone of the reserve.
4.b Factors affecting the property

(i) Development Pressures (e.g., encroachment, adaptation, agriculture, mining)

Directly on the reserve’s territory there are no development pressures of any kind.

(ii) Environmental pressures (e.g., pollution, climate change, desertification)

Total severeness of abiotic environmental conditions define duration of recovery processes in biocoenosis of Polar regions, which is shown in higher sensitivity of northern nature to human pressure.

(iii) Natural disasters and risk preparedness (earthquakes, floods, fires, etc.)

The central part of the Putorana plateau was classified as zone of higher avalanche hazard by works of the Krasnoyarsk aimed avalanche group expedition in 1980. Peak of avalanching period falls on April-May. During this period in the reserve fall many hundreds of avalanches, which in some places (centre and south-east of the plateau) by their power and destructive effect can be compared to avalanches of Western Caucasus. This natural disaster creates significant threat to the majority of inhabitants of the plateau, especially for the Putorana bighorn sheep. Annual deaths value of sheep because of avalanches many scales exceeds the volume of poaches’ bags.

The avalanches threat should without fail be taken into account while planning some forms of sport tourism and carrying out scientific research (spring accounting of bighorn sheep in thawing holes, outline snow survey, etc.).

Mudflows and landslides are less typical for the Putorana plateau, as a rule, these disasters are noted in late June and early July. They are preceded with establishment of stable positive temperatures (over + 20°C) in combination with protracted rains. Immediate slide of hundreds of tons of rocks mixed with snow and thawed water by narrow canyons of the plateau is very dangerous but extremely rare. In the history of the reserve was registered only one case of real treat for human life (lake Ayan).

Owing to relief features defining the regularity of water-collection, sharp fluctuations of river levels are noted in many mountain rivers of the reserve. Such rain freshets are short but very dangerous for the majority of the inhabitants of flood plain biotopes (elk, blue hare, etc.), expeditions and tourist groups. Animal deaths caused by freshets are annually registered, extreme situations with visitors of the plateau are common. The strongest freshets are typical for the last decade of July and early August.

In the majority of regions of the reserve are found traces of ancient fires. Apparently this has direct relation to the past intensive development of the plateau by reindeer herders. In the history of the reserve, and also according to data by Scientific Research Institute of agriculture of the Far North, beginning from the 1860-s large-scale fires was not registered.
within the territory of the reserve. At the same time, vast territories of easy-to-burn lichen cover forests and domination of larch pine in the fall allows classifying the territory of the reserve as fire hazardous in dry period.

Break-through of powerful cyclones on the territory of the plateau is followed by snow-falls even in summer. Sharp temperature decrease in combination with fallen snow sometimes over 1 metre high leads to massive deaths of laying and hatches of singing birds, and is dangerous for tourist groups. All necessary safeguards for the described natural disasters are given in the rules of safety engineering, which are to be followed by visitors of the reserve.

(iv) Visitor/tourism pressures

Biocoenosis of western part of the plateau (outside of the reserve) experience excessive spontaneous recreational pressure. In summer weekends over 600 boats move towards lake Lama, Glubokoye and others. This is accompanied with pollution of reservoirs, shore zone, spontaneous forest cuts, also hunters wintering houses are being constructed. The plateau is visited by numerous expeditions; the number of tourist groups is annually increased. Reliable control over these large groups of tourists and expedition participants is problematic because of lack of financing. Evidently, the problems of conservation of the unique mountain landscapes, which have an outstanding environmental significance, require to be solved without delay in the interests of preservation virgin nature of the north.

(v) Number of inhabitants within the property and the buffer zone

Because the territory of the reserve is remote and hard to reach, it has no constant settlements. All stationary scientific establishments (3) and compounds (4) are visited by watches in turn.

In the buffer zone of the property:

Vast protected (buffer) zone of the reserve has few rather large governmental tourist hostels (8), few tribal community and farmers production units (11), numerous legal, semi-legal and unregistered girder type buildings (~680) constructed by hunters and amateur fishermen. Total number of temporary inhabitants of all above buildings has brightly denoted seasonal dynamics. In snow season the number is usually no higher than 200 people, and in July-August it sharply increases up to 1200-1500 people (mushroom and berry collectors, amateur fishermen, holiday-makers, etc.).

The only village located on the Putorana plateau but outside the borders of the reserve and its protected (buffer) zone is Khantaisky village. It is located beside Khantaiskoye lake and has about 500 inhabitants, 400 of which belong to indigenous people (dolgan, evenk). Traditional occupation is reindeer herding, fishing, hunting.

Total: 700 - 2000 persons   Year: 2008
5 PROTECTION AND MANAGEMENT OF THE PROPERTY
Icefall on the Upper Yaktali River (Reserve's area).

Foto by V. Kirpitchenko.
5.a Ownership

The territory of the Putorana plateau is a federal property.

Russian Federation
Moscow, Krasnopresnenskaya nab.
Government House
Premier-Minister

The process of merging 3 constituent entities of the Russian Federation – Krasnoyarsky Krai and Taymyrskiy (Dolgano-Nenetsky) and Evenki Autonomus Districts – finished by the 1st of January, 2007. Finally, the Krasnoyarsky Krai has become the largest constituent territory of the Russian Federation.

The specially protected natural areas of the federal level (including the Putoransky Reserve) are the federal property under the jurisdiction of federal public authorities. The Putoransky Reserve is administered by the “Putoransky State Nature Reserve” Federal State Institution. Thus, consolidation of three autonomous districts into one (Krasnoyarsky Krai) does not influence the management of the nominated property.

5.b Protective designation

State nature reserve.

Legal status is defined by the state legislation acts:


5.c Means of implementing protective measures

The Putoransky reserve is an extremely hard to reach territory, which has no inhabitants except its staff. The protection of the reserve is executed on the basis of “Regulations of state nature reserve “Putoransky” confirmed by the Order of the Ministry of Nature Resources #66 of 17.03.2005. (Annex B5). According to the Order of Rosprirodnadzor (the nature management supervising state institution) of 03.12.2007 № 491 “On improvement of the planning system of general activity of nature reserves and national parks” a draft management plan of the Putoransky Reserve has been prepared during the 2008 (Annex B7). Official approvement of the management plan is scheduled for March 2009, after what the plan will become the major management instrument of the Reserve.

- direct responsibility for protection has the administration of the reserve and its guard service;
- protection is executed during rounds by the forest guards (huntsmen), daily; of the whole territory – by organisation of swoop patrol;
- Fire protection of forest is executed by the reserve’s fire department which has fire-chemical stations provided with techniques and equipment according to established normative.

5.d Existing plans related to municipality and region in which the proposed property is located (e.g., regional or local plan, conservation plan, tourism development plan)

In the project of organisation of the “Putoransky” state nature reserve (1988) collective of authors already stated that the nature property responds to all demands for conferring “Biosphere” status, and the vast protected zone is ideal for creating a biosphere polygon. Nearly at that time specialists understood that territorial closeness of unique landscapes of the north of Central Siberia and the country’s biggest mining complex (Norilsky Nickel) has no analogues and will demand creation of multi-profile system of protected nature territory.

Elaboration of the following projects was the development of chosen direction:

1. In 1989 in Institute of Scientific Research of agriculture of the Far North was prepared and confirmed on the Scientific Council of the Institute (resolution from 02.06.1989) a project of organisation of “Lama” state nature park in a system of Great Norilsk lakes located in the reserve’s buffer zone.
2. In 1997 Tomsk State University prepared and confirmed (02.04.1997) a project of creation of complex ichthyologic reservation in lake Khantayskoe basin, which adjoins the western border of the reserve.

For some social and economic reasons these thoroughly worked out projects had not been realised. All the necessary documentation is kept in the reserve and can be used in any time.

The new management conditions in Taimyr as an independent subject of Russian Federation helped to use in needs of nature protection the possibility of lending land for farmstead. In 1988, with every kind of assistance of the reserve, one of its employees (vice-director for general problems, Krashevsky O.R.) on its own means has organised “Bunisyak” private nature park (later renamed into “Putoransky”) with the area of 132 000 ha.

Organisational form – farmstead with specialisation in eco-tourism and traditional nature-use.

The main directions of work of “Bunisyak” farmstead are:

- working out conception for development of eco-tourism in Norilsk region;
- working out program of ecological and social-ethnographical education of population;
- cleaning up the consequences of “wild recreation”;
- creating ecological trails and organising tourist sites not damaging the environment;
- restoration and conservation of traditional nature-use of indigenous people of the north;
- limitation of pressure on fishing and hunting resources of the east end of lake Lama;
- creation of supplementary working places for indigenous population.

As the park borders the “Putoransky” reserve, the park took a line of its problems:

1. Strengthening protection and study of mountain-taiga and lake-taiga landscapes of the central part of the North of Central Siberia.

2. Organisation of monitoring service and optimisation of general ecological situation of the region.

3. Attracting foreign specialists to work in the region.

4. Organisation of managed recreational zone bordering the reserve for maximal satisfaction of people’s needs.

Even the short period of park’s activity showed that such form of protected territory is quite perspective.
5.e Property management plan or other management system

Management of the Reserve is executed in conformity with:
- Regulations of the Putoransky State Nature Reserve approved on 19.12.1997 (in edition of the Order of the MNR of Russia of 17.03.2005 № 66);
- Order of Rosprirodnadzor (the nature management supervising state institution) of 03.12.2007 № 491 “On improvement of the planning system of general activity of nature reserves and national parks”;
- Recommendations for organization of protection of nature reserves and national parks approved by the Order of Rosprirodnadzor of 14.06.2007 № 165;
- Recommendations for organization and fulfillment of ecological and educative activity in nature reserves and national parks, approved by the Order of Rosprirodnadzor of 18.06.2007 № 170;
- Recommendations for organization of scientific and technical activity in nature reserves and national parks, approved by the Order of Rosprirodnadzor of 18.06.2007 № 169;
- Annual work plan of the Putoransky State Nature Reserve (approved annually by the head of superior department of Rosprirodnadzor).

According to the Order of Rosprirodnadzor of 03.12.2007 № 491 a draft management plan of the Putoransky Reserve has been prepared during the 2008 (Annex B7). Official approvement of the management plan is scheduled for March 2009, after what the plan will become the major management instrument of the Reserve.

Buffer zone of the Reserve is established according to the decision of the Executive Committee of Krasnoyarsky Krai of 02.12.1987 № 482. The buffer zone has been extended by the Decree of the Administration of Taimyr Autonomous District of 13.07.1993 № 111.

According to the Regulations of the Buffer zone of the Putoransky State Nature Reserve (approved on 14.01.1992), the buffer zone is under the jurisdiction of the Putoransky State Nature Reserve. The land occupied by the buffer zone has not been withdrawn from land users. Enterprises, institutions and organizations fulfilling economic activity, and private persons are obliged to observe the stated regime.

Regulations of the buffer zone state that construction of houses and production facilities, amateur hunting and fishing in specified period within the buffer zone are allowed upon permission of the Reserve’s Administration.
5.f Sources and levels of finance

The “Putoransky” state nature reserve is financed by Federal budget of Russian Federation, and does not lead commercial activity.

In 2008 the accounts of the “Putoransky” reserve has received:

I. Budget means from the Federal Budget – 8 166 000 RUR;
II. Gratis as charitable donations from private persons and organizations - 935 800 RUR.

Actual expenses for maintenance of organisation are – 9 101 800 RUR.

5.g Sources of expertise and training in conservation and management techniques

3 of 33 employees of the reserve have the degree “Candidate of sciences”, 10 have higher special education, 8 have secondary professional education and 5 – universal secondary education (training). In 2008 2 employees were training while continuing working.

Over 50% of guard department staff has working experience in different nature-protection structures (fish and hunt inspections, forestry enterprises) or subdivisions of Ministry for Internal Affairs.

5.h Visitor facilities and statistics

In the reserve and its protected (buffer) zone have been created 9 tourist and 5 specially equipped ecological trails. In 2005 the reserve’s employees have built a guest-house complex at Michkanda river for accommodation of the scientific research group and now it can be used for accommodation of tourists. 3 guest-houses have been built at Keta lake have been, area for accommodation of tourist and scientific groups has been equipped. Part of visitors use test trails. Upon the results the decision of passing or not passing the test trail is being made.

Total number of visitors of the reserve reached in 2008 204 people (16 tourist groups).
5.1 Policies and programmes related to the presentation and promotion of the property

In 2002 the «Taimyr» ecological and educative center has been established on basis of the reserve. It has been successfully implementing the informational, propaganda and advertising activity by publication and spreading brochures, booklets and guidebooks. During the year of its existence there have been published:
- ecological booklet «Rare and disappearing birds of the Putorana plateau inscribed into the Russian Red Book»;
- exclusive phone card edition with images of birds and animals saved by the center;
- series of mini-calendars with images of rare and disappearing bird species;
- scientific popular photo-books «The Putorana plateau from a bird’s eye view» and «Fauna of the Putorana plateau» are being prepared for publication;
- scientific popular films are being shown on regional and Russian TV channels. 46 topics about the Reserve and its ecological and educative center activity have already been shown, 7 broadcast talks on the regional radio have been made;
- 21 ecological articles have been published in central and local periodicals.

In 2002-2003 there have been published 4 scientific articles in the RSA anthologies and a monography of A.A. Romanov «Avifauna of lake hollows of the Putorana plateau».

In 2004 the Putoransky Reserve has started an own webpage called «The unique features of the Putoransky Reserve» (http://puterana.boxmail.biz/), in addition to the web-page at the ecological site of «Northern initiatives» party of the Norilsk Nickel Company.

The reserve’s scientists read series of lectures on ecology and fundamental ecological legislation at the Norilsk branch of the Moscow Institute of business and law.

Members of the ecological and educative center have read 90 lectures for schoolchildren and teachers, led 15 excursions (demo enclosures of the ecological center of the Reserve, in summer – acquaintance with the unique tundra coenosis), organized 29 video film showings – which for the most people was the only possibility of getting to know the unique nature of the Reserve.

Demo enclosures with prey birds of Taimyr, “Plants beyond the polar circle” collection, paleontological exposition “Mammoth fauna complex” are permanently open, annual theme expositions are being made by the Reserve’s Day.

For 3 years the reserve together with the leading regional TV company and population fulfils the project of saving traumatized birds and animals. Those of them who have too serious damages and cannot be returned to their natural habitats are kept in special demo enclosures.
The project of saving the lesser white-fronted goose – a specie inscribed into the Red Books of IUCN and Russia is run together with the Norilsk Nickel Company by the reserve’s initiative. The project is bringing the real benefit.

Operative connection with mass media has been established which allows the Reserve to interpret measures taken by the Reserve fully and in time to provide popularity among the population. Co-operation with the “Norilsk” State Broadcasting Company and “Severny Gorod” (“Northern City”) Broadcasting Company makes possible to create quality and informative programs and video-subjects. Permanent co-operation with “Zapolyarnaya Pravda” newspaper has been established.

The reserve keeps close contacts with “Natural Heritage Protection” Fund and Greenpeace Russia. Every year expeditions of Russian geographic society work in the reserve. The reserve takes part in organisation and carrying out of mutual scientific researches together with the Institute of Ecological and Evolutionary Problems of Russian Science Academy (RSA) and with Botanical Institute of RSA.

The reserve has worked out the conception and implemented the program of establishment of the first Russian private protected natural area – the «Bounisyak» natural park of 132 000 ha. The park is located in the buffer zone of the reserve. General activities of the park are different types of tourism: ecological, international educative, extremal (kayak sailing, mountain and ice-climbing).

The reserve keeps close long-term relations with two dolgan family communities, organised in the buffer zone of the reserve with its support. Heads of family communities take part in guarding the reserved territory. From its side the reserve provides radio communication of these communities, gives informational and organisational support of their activity.

For fulfillment of planned measures the Reserve has signed contracts for non-commercial co-operation with municipal institutions of compulsory and additional education and kindergartens, which allowed to broaden the children’s audience and to regulate the work with teachers.

The Reserve has established co-operation and partnership with the Norilsk Nickel Company (press-service, editorship of the “Norilsk Nickel” corporative magazine), Cultural Initiatives Fund (Fund of Mikhail Prokhorov), “Severny Gorod” Broadcasting Company, “Norilsk” State Broadcasting Company, Public Organization “Workgroup for anseriformes of Northern Eurasia (Moscow), Pre-school Education Board of the Norilsk Administration, Education Board of the Norilsk Administration, Culture and Arts Board of the Norilsk Administration, Municipal Library. The above organizations render financial and informational assistance to ecological and educative measures of the Reserve.
5.j Staffing levels (professional, technical, maintenance)

By the state of early 2009 the reserve’s staff has 33 people, including:

I. Executive - 1
   1. Director of the reserve – 1 (1807,00)

II. Accounts and staff department - 4
   1. Head of the department – head accountant – 1 (792,00)
   2. Bookkeeper - 2 (482,00)
   3. Cashier– 1 (251,00)

III. Science department - 6
   1. Vice-director for scientific research – 1 (431,00)
   2. Head research worker – 1 (761,00)
   3. Head research worker – 2 (520,00)
   4. Research worker – 1 (294,00)
   5. Laborant researcher - 1 (294,00)

IV. Department of ecological education (ecological education sector of science department) - 4
   1. Vice-director for ecological education – 1 (419,00)
   2. Ecological education specialist – 2 (377,00)
   3. Ecological education methodologist – 1 (377,00)

V. Preservation department - 8
   1. Vice-director for preservation – 1 (755,00)
   2. District state inspector – 2 (377,00)
   3. State inspector –2 (335,00)
   4. State inspector – 3 (294,00)

VI. Department of Forestry - 5
   1. Head of the department – 1 (587,00)
   2. District state inspector -1 (377,00)
   3. State inspector for forest protection – 3 (335,00)

VII. Department for providing general activity - 5
   1. The Head of the Department - 1 (419,00)
   2. Material and technical supply engineer – 1 (419,00)
   3. Service technician – 1 (402,00)
   4. Personnel officer – 1 (419,00)
   5. Secretary - 1 (252,00)

Monthly salary (in roubles) of employees is shown in brakes (1$ = 31 RuR).
In the reserve has been created constantly working operative guarding group.
In case of inscription of the Reserve onto the World Heritage List, it is planned to increase the number of employees by 50 %.
MONITORING

Reserve’s guest-houses at Keta lake (Buffer zone). Foto by M. Anoshin.
Canyons and Waterfalls on the Upper Yakuti River (Reserve’s area). Foto by V. Kirpitchenko.
6. Key indicators for measuring state of conservation

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Periodicity</th>
<th>Location of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical composition of the Reserve’s lakes water</td>
<td>Once in 2 years</td>
<td>The Putoransky Reserve. Krasnoyarsky Krai, Norilsk, 663302, Komsomolskaya st.,1</td>
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<tr>
<td>State of vegetation communities:</td>
<td>Annually</td>
<td>The Putoransky Reserve. Krasnoyarsky Krai, Norilsk, 663302, Komsomolskaya st.,1</td>
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<tr>
<td>- reindeer moss communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- mature larch communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population size:</td>
<td>Annually</td>
<td>The Putoransky Reserve. Krasnoyarsky Krai, Norilsk, 663302, Komsomolskaya st.,1</td>
</tr>
<tr>
<td>- rare and disappearing species (the Putorana bigjorn sheep, lesser white-fronted goose, white-tailed eagle);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- common species (wild reindeer, brown bear, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meteorological characteristics</td>
<td>Daily</td>
<td>The Putoransky Reserve</td>
</tr>
</tbody>
</table>
6.b Administrative arrangements for monitoring property

On the territory of the reserve are 2 stationary scientific establishments (“Lake Kutaramakan” and “Lake Ayan”) and 3 compounds (“Lake Sobach’e”, “Lake Diupkun” and “Lake Manumakli”).

On the “Lake Kutaramakan” stationary scientific establishment (stationary) is a meteostation with stationary equipment shelter, precipitation gauge, wind vane, anemometer, snow scale. In the equipment shelter are weekly recording thermometer, urgent and minimum thermometers. Weather watches on the stationary are carried out annually during the field season.

Hydrological watches are carried out on the stationary since 1990 during the field season. Lake water level fluctuation measurements are done with gauge fixed in a cove protected from the moving ice by cape. Recordings are taken every day.

Ecological reviews on single bird and mammal species are made. Materials on fauna of birds and mammals are collected.

Watches over rare species (Putorana bighorn sheep *Ovis nivicola borealis*, white-tailed eagle *Haliaeetus albicilla* and Curlew *Numenius minutus* is noted).

Also are made flora estimation and changing research. Berry and mushroom crop is estimated, too. Nature calendar is being written.

On “Lake Ayan” stationary hydrological and meteorological watch have been carried out since 1993.

Watches over rare species of birds and mammals are carried out. Wild reindeer migrations are being watched. Nature calendar is being written.

On “Lake Manumakli” stationary meteorological watch is carried out annually. Temperature is measured with one recording and two control thermometers.

In the protected zone of the reserve in firth of river Mikchangda was constructed the background monitoring station. At Kata lake within the buffer zone of the Reserve a permanent biostation for complex study of the unique biocoenosis of the plateau has been built together with State Scientific Research Institute of the Far North.

Scientific research

- Theme “Study of the way of natural processes and revealing interrelations between separate parts of nature complexes” (Nature Chronicles”). The research is carried out constantly by the reserve’s specialists.
- Theme “Hydrochemical and limnological research”.
- The reserve has signed a contract of scientific co-operation with the Moscow centre of Russian Geographical Society. The final aim of the research - working out a landscape map.
• Project “Comparative ecology of polar deserts”. Botanical and zoological research have been carried out in 1996-97 by complex biocenological expedition of the Institute of problems of ecology and evolution of Russian Science Academy (RSA) (Moscow) and of the Botanical Institute of RSA (St.-Petersburgh).
• Theme: «Ecological research of the Arctic». Program of geographical faculty of the Moscow State University.
• Theme: «Inventory of wild reindeers, elks, gluttons and ptarmigans in Putorana mountains».
• Theme: «Avifauna of western areas of the Reserve and its modern state».
• Theme: «Population state of lesser white-fronted goose at the reserved and contiguous areas».
• Project: «Saving the lesser white-fronted goose – a specie inscribed into the Red Books of Russia and IUCN, fulfilled together with the «Norilsk Nickel» mining and smelting company.

6.c Results of previous reporting exercises

Hydro chemical investigation of lakes Ayan, Kutaramakan and Sobach’e and of few water flows in Kureika and Yagtali river basins carried out in 1995 has showed that during 20 years chemical composition of lake waters within the reserve had changed very slightly. The composition of lake waters is close to the composition of atmosphere precipitation. Accumulation of heavy metals, specifically copper, was not detected in waters of lakes Ayan and Kutaramakan.

On “Lake Sobach’e” compound in 1996 had been working the Complex biocenological expedition of the Institute of problems of ecology and evolution of Russian Science Academy (RSA) (Moscow) and of the Botanical Institute of RSA (St.-Petersburgh).

Botanical research has been carried out on two height levels. Flora of vascular plants was revealed (herbarium of 700 pages), characteristics of vegetation of nival deserts were given, sketches of horizontal structure considering nanorelief were made, biomass of vascular plant was estimated, visual watch of plants’ phenology were carried out, fragments of plants for studying ultra structure of cells (14 species), samples of soils and water were taken for defining composition of algae on different heights.

Separate vascular flora lists were compiled for 5 facies on different heights (600-1000 m).

Preliminary analysis of nival belt communities has showed that their structure is similar to zonal deserts and their composition is closest to nival communities described in northern belt of the sub-zone of typical Taimyr tundra.

Vascular flora of lake Sobach’e locality counts 287 species from 47 families and 131 genuses’.
Also fulfilled standardised quantity soil-zoological research in 12 vegetation communities in different terraces. Data was collected and processed by model groups with the highest coenosis value (microarthropodes - mites and collembola among microfauna, and tiger and ground beetles among mezofauna).

In the region of the research were found: 156 microarthropodes species (83 collembola species, 12 gamasid mite species, 29 loricate mite species, 3 astigmatical mite species, 5 endeostgmatical and no less than 24 prostigmatical mite species).

At least 17 microarthropode species are discovered for the science. Most probably that 10 of them dwell only in the Putorana plateau.

In 1997 in the protected zone of the reserve was working temporary stationary “River Khibarba”. The following work was executed:
- meteorological watch (air temperature, precipitation, cloudiness) - June-August 1997;
- general phenological watch in the form of a calendar;
- investigation of endemic specie of the Putorana plateau and Byrranga mountains - *Oxytropis putoranica*, morphometrical values in 3 different phitocoenosis of 74 specimen were taken, phenology of specie was followed, and seeds for defining germinability were collected;
- herbarium material collected - 132 pages of higher plants and 28 samples of inferior plants;
- material for Nature Chronicles collected (fauna and animal population). During the whole summer observations over bighorn sheep were executed: 9 animals met, 44 noted. For the chapter “Fauna species” were fixed meetings of different animals.

In 2001 field research (theme: «Avifauna of the south-western area of the reserve and its modern state») has been carried out. The research has fully embraced lake Dupkun basin (140 km long), upstream of Kureyka river, undercurrents and deltas of rivers which flow into the Dupkun lake (Utyesnaya, Tesnaya, Tal’nikovaya, Gagarya 1-st, Gagarya 2-nd). Pedestrian and boat trips were made for collecting data on bird spreading through biotopes and definition of their density by the J.S. Ravkin method (1967). Total routes length made 507 km.

The uniqueness of lake Dupkun has been ascertained as the habitat of two rare species – lesser white-fronted goose and whooper swan.

A discovery has been made: the lesser white-fronted goose population found by the expedition at lake Dupkun (of no less then 100 pairs) is the plateau’s largest and, undoubtedly, one of the largest in Taimyr and, probably, in the whole Eurasia. This discovery gives grounds to draw the southern border of the specie spreading in Middle Siberia along the N 67°40’ parallel which is 150 km further to the south than the previously known boundary (Syroechkovsky, 1996; Romanov, 1996).

Nesting conditions for lesser white-fronted goose at lake Dupkun are favourable and stable.
During February-June 2002 field research at the «Lake Ayan» biological field research center have been made. Theme of the research was: «Abiotic and biotic environmental factors determining the dynamics of wild reindeer migrations over the Putorana plateau». As the result:
- hibernation areas of wild reindeers have been revealed;
- quantity and age-sexual structure of herds has been determined;
- materials on wild reindeer migration within the reserve area have been gathered;
- the study of fauna and its role in biocoenosis and ecosystems of the reserve has been systematically carried out;
- human factors affecting the nature of the reserve have been studied;
- daily phenological research has been conducted.

In 2002 ornithological research on the subject «Autumn migration of Passeriformes order over the western part of the Putorana plateau» has been carried out at the «Lake Sobach’e» compound of the reserve. The research has allowed to make fuller overview of autumn migrations of Passeriformes order, of their general migration dynamics and migration features of each specie. The research has also made possible the comparison of data collected in 1991 and 2002.

Bighorn sheep population monitoring


The constant accounting area (600 sq. km) was established near lake Ayan. From 1986 till 1993 the population size of bighorn sheep has increased 2.4 times, in river Kholokit basin – 6.8 times.

In 1993 in Duluk river valley, one of main habitat centres of bighorn sheep in the Putorana, were counted 37 specimen on the area of 90 sq. km.

At present the population of the Putorana bighorn sheep is in well condition. Its population size increases, animals settle in the old habitats. Landscape features of the Putorana mountains define comparatively small size of subspecies areal (140 000 sq. km), its belt-like interrupted (seated) structure. The main part of the population (3 900) are concentrated in centres (seats) with the total area of 10 000 sq. km. On the remaining territory animal groups are separated, their number is about 1 600. The total modern population size is about 5 500 specimen. Age and sexual complement is optimal.

Cardfiles and photo libraries

The cardfile of flora is being replenished – 153 species has been collected and determined.

The base for the reference herbarium of the “Putoransky” reserve has been laid. Plants were collected in August of 1995 in the north-eastern sector of the Putorana plateau and in August of 1996 in the central sector. For replenishing of reference herbarium in June-July of 1997 on the north-western edge of the plateau were collected 132 pages of higher plants and 28 samples of inferior plants.

In 1996 another herbarium was compiled on the area between lakes Manumakli and Dupkun. The list includes 98 species of higher plants.

100 samples of higher plants for enlarging the reference herbarium were collected in June-August 2001.
Spring at the top of the plateau (Reserve’s area). Foto by A. Romanov.
7. a Photographs, slides, image inventory and authorization table and other audiovisual materials

### IMAGE INVENTORY AND PHOTOGRAPH AND AUDIOVISUAL AUTHORIZATION FORM

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<th>Id. No</th>
<th>Format (slide/print/video)</th>
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<th>Date of Photo (mo/yr)</th>
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<td>Video</td>
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<td>2000-2001</td>
<td>Sarana V.</td>
<td>TaimyrRosGeo</td>
<td>663300 Norilsk, Komsomolskaya, 14</td>
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<td>Southern border of the reserve. View of eastern edge of Dupkun lake.</td>
<td>09.2000</td>
<td>Butorin A.</td>
<td>Butorin A.</td>
<td><a href="mailto:butorin@nhpfund.ru">butorin@nhpfund.ru</a></td>
<td>Yes</td>
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<td>3</td>
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<td>Relative heights on the plateau often exceed 1000 metres.</td>
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<td>Butorin A.</td>
<td>Butorin A.</td>
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<td>Print</td>
<td>Rivers cut through the plateau, creating deep canyons with steep and unassailable slopes.</td>
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<td>Kantor V.</td>
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<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
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<td>Western border of the reserve. Lake Sobach’e.</td>
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<td>Panoramic picture of Irkinda waterfall taken from a helicopter.</td>
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<td>Waterfall (32 m) in the middleflow of 2-nd Gagar’ya river.</td>
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<td>Kirpitchenko V.</td>
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<td>View of 1-st Gagar’ya river valley.</td>
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<td>Waterfall (23 m) on 2-nd Gagar’ya river.</td>
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<td>The reindeer’s horns in mountain tundra.</td>
<td>08.1999</td>
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<td>Valley of Khikikal river.</td>
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<td>Romanov A.</td>
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<td>Larch forest at the southern boundary of the reserve</td>
<td>06.2006</td>
<td>Romanov A.</td>
<td>Romanov A.</td>
<td><a href="mailto:putorana05@mail.ru">putorana05@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>Print</td>
<td>Spring at the top of the plateau</td>
<td>06.2006</td>
<td>Romanov A.</td>
<td>Romanov A.</td>
<td><a href="mailto:putorana05@mail.ru">putorana05@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>Print</td>
<td>Relief of the central part of the plateau. Ayan river valley</td>
<td></td>
<td>Romanov A.</td>
<td>Romanov A.</td>
<td><a href="mailto:putorana05@mail.ru">putorana05@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>23</td>
<td>Print</td>
<td>Lake Ayan</td>
<td>Romanov A.</td>
<td>Romanov A.</td>
<td><a href="mailto:putorana05@mail.ru">putorana05@mail.ru</a></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Print</td>
<td>Turdus naumanni</td>
<td>Romanov A.</td>
<td>Romanov A.</td>
<td><a href="mailto:putorana05@mail.ru">putorana05@mail.ru</a></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Print</td>
<td>Anser erythropus L.</td>
<td>Romanov A.</td>
<td>Romanov A.</td>
<td><a href="mailto:putorana05@mail.ru">putorana05@mail.ru</a></td>
<td>Yes</td>
<td></td>
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<tr>
<td>Id. No</td>
<td>Format (slide/print/video)</td>
<td>Caption</td>
<td>Date of Photo (mo/yr)</td>
<td>Photographer/Director of the video</td>
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<td>Contact details of copyright owner (Name, address, tel/fax, and e-mail)</td>
<td>Non exclusive cession of rights</td>
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</tr>
<tr>
<td>26*</td>
<td>Slide</td>
<td>Clear water of the lakes does not distort reflection</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>27*</td>
<td>Slide</td>
<td>Lake Sobach’ie</td>
<td>08.1999</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>28*</td>
<td>Slide</td>
<td>Relative heights within the Plateau often exceed 1000 m. Lake Djupkun</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>29*</td>
<td>Slide</td>
<td>Panoramic picture of the Plateau taken from a helicopter</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>30*</td>
<td>Slide</td>
<td>Stone rivers - kurumniks are the typical components of the landscape. The Plateau is composed by the basalt rocks</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>31*</td>
<td>Slide</td>
<td>Surface of the Plateau is frequently covered with clouds. The slopes are intricately cut by water erosion</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>32*</td>
<td>Slide</td>
<td>Crystal-clear waters of the Khikhikal’ River are inhabited by the graylings</td>
<td>08.1999</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>33*</td>
<td>Slide</td>
<td>The 1-st Gagar’ya Valley</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>34*</td>
<td>Slide</td>
<td>The eroding has exposed the basement folds</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>35*</td>
<td>Slide</td>
<td>Narrow valleys of the numerous rivers and small rivers cut through the surface of the Plateau</td>
<td>08.1999</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>36*</td>
<td>Slide</td>
<td>The reindeer’s horns whitened by the sun</td>
<td>08.1999</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>37*</td>
<td>Slide</td>
<td>Ermine and polar pika are typical inhabitants of the kurumniks (stone rivers)</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>38*</td>
<td>Slide</td>
<td>Ermine and polar pika are typical inhabitants of the kurumniks (stone rivers)</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
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<tr>
<td>39*</td>
<td>Slide</td>
<td>The Plateau abounds in beautiful waterfalls. Double waterfall at the 2-nd Gagar'ya River</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>40*</td>
<td>Slide</td>
<td>Waterfall at the 1-st Gagar'ya River</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>41*</td>
<td>Slide</td>
<td>Nameless brook</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>42*</td>
<td>Slide</td>
<td>The canyons in the Khibarba Valleys can to compete with the famous Grand Canyon</td>
<td>08.1999</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>43*</td>
<td>Slide</td>
<td>Waterfall Vika is the highest (108 m) on the Putorana Plateau</td>
<td>08.1999</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>44*</td>
<td>Slide</td>
<td>Waterfall at the 1-st Gagar'ya River</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
<tr>
<td>45*</td>
<td>Slide</td>
<td>Most full-flowing waterfall of the Putorana Plateau is Kureisky (14 m.)</td>
<td>09.2000</td>
<td>Kantor V.</td>
<td>Kantor V.</td>
<td><a href="mailto:vadimkantor@mail.ru">vadimkantor@mail.ru</a></td>
<td>Yes</td>
</tr>
</tbody>
</table>

*NOTE: 20 slides showing the Putorana plateau (in 3 copies) have been sent to the World Heritage Center on February, 7, 2005.
7.b Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the property

Copies of orders, decrees and management plans relevant to the property are given in Annex B:

B4. Order of State Committee on Environmental protection of RSFSR “On organisation of state reserve “Putoransky” in Krasnoyarsky Krai” from 04.01.1989 № 2
B5. Regulations of state nature reserve “Putoransky” from 17.03.2005
B6. Letter of Governor of Taymyrsky autonomous district on representation of the “Putoransky” reserve for inscription on the UNESCO World Heritage List
B7. Draft management plan of Putoransky Reserve.
7. Form and date of most recent records or inventory of property

6. Informational reports by Director of the “Putoransky” State nature reserve of 2002 and 2003.

7. Address where inventory, records and archives are held

The Ministry of the Natural Resources of the Russian Federation.
Address:
123995, Moscow, GSP-5,
Bolshaya Gruzinskaya str. 4/6, D-242

“Putoransky” State Nature Reserve.
Address:
Krasnoyarsky Krai
663302, Norilsk, ul. Komsomolskaya, 1

7. Bibliography

Annex D contains over 50 names of significant science works devoted to the Putorana plateau.
CONTACT INFORMATION OF RESPONSIBLE AUTHORITIES

Waterfall in the middleflow of 2-nd Gagar’ya river (Reserve’s area). Foto by V. Kantor.
8.a Preparer Name:

1. Alexey Butorin  
Position: Director of Natural Heritage Protection Fund  
Address: Viborgskaya str, 8-3  
Moscow 125212 Russia  
Telephone: 7 (499) 150 92 93  
Fax: 7 (499) 150 92 93  
E-mail: info@nhpfund.ru

2. Vladimir Larin  
Position: Director of the Putoransky Reserve  
Address: Komsomolskaya, 1  
663302 Norilsk, Krasnoyarsky Krai, Russia  
Telephone: +7 3919 46 53 26  
Fax: +7 3919 46 74 38  
E-Mail: plato@norcom.ru

3. Prof. Peter A. Schmidt  
Position: Dresden University of Technology  
Address: Pienner Strasse 8  
D-01737 Tharandt, Germany  
Telephone: +49 35203 383 1288  
Fax: +49 35203 383 1399  
E-Mail: schmidt@forst.tu-dresden.de

4. Dr. Nikolay Maksakovsky  
Position: Leading Researcher of the Russian Institute for Cultural and Natural Heritage  
Address: Kosmonavtov st., 2  
129366 Moscow Russia  
Telephone: +7 495 686 13 24  
Fax: +7 495 686 13 24  
E-mail: maxakovsky@mtu-net.ru

5. Nikita Vronsky  
Position: Russian Association of Indigenous People of the North  
Address: Vernadskogo prosp., 37, korp.2, app. 527  
Moscow, Russia  
Telephone: +7 495 780 87 27  
Fax: +7 495 780 87 27  
E-mail: nvronski@mail.ru

6. Ekaterina Petrovskaya  
Position: Designer of the “Natural Heritage Protection Fund”  
Address: Grodnenskaya st., 10-137  
Moscow, Russia  
Tel: +7 495 444 00 12  
Fax: +7 499 150 92 93  
E-mail: petrovskayaekaterina@yandex.ru
8.b Official Local Institution/Agency

The “Putoransky” State Nature Reserve is locally responsible for the management of the property.
Address: Krasnoyarsky Krai
663302, Norilsk, ul. Komsomolskaya, 1
Director – Larin Vladimir Vladimirovitch
Tel./fax: +7 (3919) 46-53-26, 46-74-38
E-mail plato@norcom.ru

Main functions of management of the reserve are entrusted to the Department for specially protected nature territories and licensing activity of the Federal Service for Nature Management Supervision (Rosprirodnadzor).
Address: 123995, Moscow, GSP-5,
Bolshaya Gruzinskaya str. 4/6, D-242
Head of the Department – Fedotkin Dmitry Viktorovitch
Phone: +7 (095) 2547938,
Fax: +7 (095) 2544310

8.c Other Local Institutions

2. Authority of the Taymyrsky (Dolgano-Nenetsky) municipal area.
3. Authority of the Norilsky municipal area.
4. Authority of the Evenki municipal area.
5. Cultural Initiatives Fund (Fund of Mikhail Prokhorov)

8.d Official Web address
http://
Contact name:
E-mail:

http://putorana.boxmail.biz/
Contact person: Strekalovskaya V.g., tel.: +7 (391-9) 48 53 17
E-mail: plato@norcom.ru
9. SIGNATURE ON BEHALF OF THE STATE PARTY

Director of the International Department of the Ministry of Natural Resources and Ecology of the Russian Federation

Maydanov I.I.
Deep canyon of Kanda River (Buffer Zone).

Photo by V. Sarana.
A1. Location of “The Putorana Plateau” nature complex on the north of Krasnoyarsky Krai;
A2. Topographic map of the Putorana plateau, showing exact boundaries of the Putoransky Reserve and its Buffer zone. Scale 1:500 000
A3. Scheme of the boundaries of the Putoransky Reserve and its Buffer zone
A4. Scheme of the high conservation value areas in the Putoransky Reserve and adjacent areas (Ovis nivicola borealis)
A5. Floristic regions of Middle Siberia
A6. Spreading of Juncus longirostris, endemic specie of the Putorana plateau
A7. Spreading of Caltha serotina, endemic specie of the Putorana plateau
B4. Order of State Committee on Environmental protection of RSFSR “On organisation of state reserve “Putoransky” in Krasnoyarsky Krai” of 04.01.1989 № 2
B5. Regulations of state nature reserve “Putoransky” of 17.03.2005
B6. Letter of Governor of Taymyrsky autonomous district on representation of the “Putoransky” reserve for inscription on the UNESCO World Heritage List
B7. Draft management plan of Putoransky Reserve
ON SPECIALLY PROTECTED NATURAL AREAS


Specially protected natural areas are defined as terrestrial and aquatic areas including atmospheric spaces above them, hosting natural complexes and objects presenting outstanding value for the environmental protection, science, culture, as well as for recreation and human health rehabilitation and thus are entirely or partially exempt for economic activity by virtue of the decision made by governmental bodies and are subject to regimen of special protection.

Specially protected natural areas are considered to be objects of national heritage.

1. State Natural Reserves (Putoransky State Natural Reserve):

Article 6.

1. Specially protected natural complexes and objects (natural sites, aquatories, subsurface, flora and fauna) possessing an outstanding environmental and educational, scientific and nature protection values being samples of natural environments, typical or rare landscapes, sites of genetic resource conservation for wildlife flora and fauna are to be completely withdrawn from economic activities within the areas of the State National Reserves.

The State Natural Reserves are institutions of nature protection, scientific research and environmental education, aimed at preservation and research of the natural mechanism of the processes and phenomena, genetic resource of the flora and fauna, individual wildlife species and plant and animal communities, as well as typical and unique environmental systems.

Article 9.

1. An activity, contradictory to the objectives of the State Natural Reserve, the regime of special protection set forth by the provision on the above mentioned Reserve is prohibited within it’s grounds.

Introduction of any alive species into the grounds of the State Natural Reserve aimed at the acclimatization of the aforementioned species is prohibited.

2. The grounds of the State Natural Reserves allow for the following undertakings and activities intended to:

a) reserve the natural condition of the wildlife complexes, including rehabilitation and prevention of changes to occur in the natural complexes and their components resulting from human impacts;

b) maintain the conditions securing sanitary and fire safety;

c) prevent the conditions capable of causing natural disasters dangerous for human life and settlements;

d) implement environmental monitoring;

e) carry out research and investigation tasks;

f) promote environmental education and awareness;

g) implement overseeing and controlling functions.
**Article 10. State Natural Biosphere Reserves**

1. The State Natural Reserves, which are included in an international system of biosphere reserves, realising global ecological monitoring have status of the State Natural Biosphere Reserves.

2. Biosphere polygon territories, including those with differentiated condition of the special guards and functioning can be joined to territories of state natural biosphere reserves with the purposes of realisation of scientific researches, ecological monitoring, and also for approbation and introduction of rational nature management methods, not destroying environment and not exhausting biological resources.

**Article 11.**

2. State Nature Reserves use the following financial assets at their discretion and according to the existing procedure:

- income of scientific and nature protection activities, advertising and publishing, as well as other activities non-contradictory to the purposes of the State Natural Reserves;
- payments in compensation of damage caused to natural complexes and objects, located within the grounds of the State Natural Reserves;
- revenue from the sale of legitimately expropriated poaching implements and the products resulting from illegal use if the natural resources;
- free donations and charity contributions.
The Krasnoyarsky Krai Soviet of the Peoples Deputies  
Executive Committee  
DECISION  

02.12.1987 Krasnoyarsk № 482

Concerning the establishment of state reserve “Putoransky”

With a view to study and preserve natural environments of the Putorana Plateau, its rare and endangered animals and plants in particular, to develop scientific grounds for nature conservation and rational resource use, and governed by item 9 of the Law “On Natural Protection in the Russian Federation”, items 34 and 13 of the RF Land Code, the Executive Committee of the Krasnoyarsky Krai Soviet of the Peoples Deputies HAS DECIDED:

1. To apply to the Council of Ministers of the Russian Federation for:
   Establishing state nature reserve “Putoransky” of the RF Glavokhota (Ministry of Hunting) within the territory of the Taymyrsky and Evenkiisky Autonomous Areas of the total area 1,887,251 ha in accordance with the project developed by the Western-Siberian development expedition of the RF Glavokhota, within the boundaries according to Appendix 1; its central office being located in Dudinka.
   A permission to allocate 1,363,321 ha of land from the state forest lands of the Turukhansk Forestry, and 1,523,930 ha of land from the Evenkiisky Forestry and pass it over to the Main Department of hunting and natural reserves in the RF Council of Ministers in order to organize state natural reserve “Putoransky”;
   With a view to restore a historical habitat area of the snow sheep and sable, to organize research-production biosphere experimental sites for the studies in the buffer zone of the reserve, where traditional landuse forms of the indigenous peoples are preserved, as well as to regulate the recreation of residents of the Norilsk industrial center in the natural environments, to establish the protected buffer zone along the reserve’s borders according to Appendix 2;
   To oblige the RF Glavokhota to establish management authorities and security services in reserve “Putoransky”, to mark the borders of the reserve and its buffer zone in the landscape.

2. In connection with the establishment of reserve “Putoransky” to apply to the Academy of Sciences of the USSR for decision of giving it the status of the biosphere reserve and of organizing monitoring stations within its area.

3. To ask the Executive Committee of the Taymyrsky Soviet of the Peoples Deputies to provide the required support in the organization the reserve and creation of its material and technical basis.

Head of the Executive Committee  
V.V. Plisov

Secretary of the Executive Committee  
K.M. Gutorov
Council of Ministers
RESOLUTION
№ 524

December 15, 1988
Moscow

On the establishment of state reserve “Putoransky”
of the RF Goskompriroda in the Krasnoyarsky Krai

Council of Ministers decides:

1. To establish state reserve “Putoransky” of the RF Goskompriroda within the territory of the
   Taymyrsky and Evenkiysky Autonomous Areas (Krasnoyarsky Krai) of the total area 1,887,251 ha
   within the borders defined by the decision of the Executive Committee of Krasnoyarsky Krai of
   December 2, 1987, № 482.

2. To allocate land area of 1,363,321 ha from the state forest lands of the Turukhansk Forestry,
   and land area of 1,523,930 ha from the Evenkiysky Forestry and pass them over to state reserve
   “Putoransky”. The Executive Committee of Krasnoyarsky Krai together with the RF Goskompriroda
   should define the borders of the reserve.

3. To the Ministry of Forestry of the Russian Federation: ensure the assignation of buildings and
   facilities, located on the state forest lands that are to be allocated for the reserve, to reserve
   “Putoransky” according to the existing regulations, as well as the corresponding number of
   employees, wages fund and material-technical basis adopted for the 12th five-year plan.

4. To the State Planning Committee, Ministry of Finances of the RF: to assign to the RF Goskompriroda
   additional wages fund for the reserve, including the wages for researchers and scientific research
   in accordance with the project of the state reserve “Putoransky” development and taking into
   account the rates that are passed by the Ministry of Forestry of the Russian Federation.

5. To Gosagroprom (State Committee on Agriculture) of the Russian Federation: taking into
   account correction of the material balance plan, to pass by to Goskompriroda RF a passenger car
   UAZ-3151-01 – 1 item, lorry GAZ-66 – 1 item, ZIL-157 KD – 1 item, tractor DT-75 – 1 item, hostel
   carriages VD-2M – 5 items.

Head of the RF Council of ministers
Business-manager of the RF Council of Ministers
State Committee on Environmental protection of the Russian Federation
ORDER
Moscow

04.01.1989 № 2

On the establishment of
State reserve “Putoransky”
In the Krasnoyarsky Krai

Council of Ministers of the Russian Federation by Resolution № 524 of December 15, 1988 issued the following decision:

1. To establish state reserve “Putoransky” of the RF Goskompriroda in Krasnoyarsky Krai of the total area 1,887,251 ha.

To allocate land area of 1,363,321 ha from the state forest lands of the Turukhansk Forestry, and land area of 1,523,930 ha from the Evenkiisky Forestry and pass them over to the reserve.

The Executive Committee of Krasnoyarsky Krai together with the RF Goskompriroda should define the borders of the reserve.

2. To the Ministry of Forestry of the Russian Federation: ensure the assignation of buildings and facilities, located on the state forest lands that are to be allocated for the reserve, to reserve “Putoransky” according to the existing regulations.

In pursuance of the mentioned resolution of the RF Council of Ministers
I DIRECT:

1. To establish state reserve “Putoransky” in the Krasnoyarsk Krai of the total area 1,887,251 ha.

2. To the Personnel Department (to Sherstobitov N.Ye.) and to the Department of protection and regulation of plants and animals use, and protected areas (to Shalybkov A.M.): select the candidate for designation as the Director.

3. To the Director of reserve “Putoransky”:
   3.1. To include in a two-months period into reserve “Putoransky” the land area of 1,363,321 ha from the state forest lands of the Turukhansk Forestry, and land area of 1,523,930 ha from the Evenkiisky Forestry, as well as buildings and facilities located on lands allocated for the reserve.

3.2. Together with the Executive Committee of the Krasnoyarsk Krai to define the reserve’s borders established by the decision of the Krasnoyarsk Krai Executive Committee of 12.01.1988, № 48-24. To mark the reserve’s borders by boundary-marks.

3.3. Acceptance document of the reserve’s land areas identified in p.3.1 of this order, sketchy maps with marked borders, forms 1 and 2 of forest resources survey send to Goskompriroda RF.

4. To the Budget Department (to Gasilov S.M.) and to the Department of protection and regulation of plants and animals use, and protected areas (to Shalybkov A.M.): to submit list of members of staff, budget and action plan of state reserve “Putoransky” for approval.
5. To the Department of Capital Construction and Material and technical supply (to Syrtsov A.G.): to provide state reserve “Putoransky” with the necessary investments and material and technical resources.

6. To the Department of protected areas (to Smirnyakov Yu.I.) and to the Krasnoyarsky Krai Committee on environmental protection (to Idimechev V.F.): to render support to state reserve “Putoransky” in its activity.

7. Control over realization of this order is entrusted to the Department of protection and regulation of plants and animals use, and protected areas (to Shalybkov A.M.).

First Vice-Chairman

M.M. Shvetsov
REGULATIONS ON STATE NATURAL RESERVE “PUTORANSKY”
(In redaction of the Order of the Ministry of Natural Resources of the Russian Federation №66 from 17.03.2005)

General provisions

1. State Natural Reserve “Putoransky” (hereafter - reserve) is a nature-preserving, scientific-research and environmental-instructive organization of Federal importance, which is aimed on preserving and studying the normal course of natural processes and phenomena, genetic pool of flora and fauna, some species and communities of plants and animals, typical and unique environmental systems of the Putorana Plateau.

2. The Reserve is non-commercial organization, that is financed at the expense of Federal budget, has an independent balance, accounts (including the ones in foreign currency) with the banks of Russian Federation and also official stamp of Russian Federation with its own name.

3. The Reserve is situated within the area of Dudinka and Khatanga administrative Rayons of Taymyr (Dolgan-Nenetskiy) Autonomous Area and within Ilim Rayon of Evenki Autonomous Area (Appendix 1).

4. Land and its interior part, waters, flora and fauna covering an area of the Reserve are passed into the Reserve’s possession according to the Federal Laws. Their allocation, or assigning the right of possession is prohibited.

5. Property of the Reserve is a Federal ownership.

6. Buildings, constructions, historical and cultural facilities and other capital facilities are assigned to the Reserve with the right to manage realty operatively.

7. Natural resources and realty of the Reserve are completely excluded from circulation (they could not be alienated and passed from one legal entity to another by other ways).

Objectives of the Reserve

8. The following objectives are committed to the Reserve:
   a) protection of the natural areas with the goal of preserving biodiversity and maintaining normal state of the protected natural complexes and objects;
   b) carrying out the scientific researches, including the Natural Records;
   c) performing the environmental monitoring;
   d) environmental education;
   e) participation in state environmental expertise of the projects related with the allocation of economic and other facilitates;
   f) rendering assistance in training scientific personnel and specialists in environmental protection.

Reserve management

11. The Federal Service for Nature Management Supervision (Rosprirodnadzor) manages the Reserve. The Reserve is headed by a director, who is appointed by the Rosprirodnadzor. Director bears a full responsibility for the Reserve’s activities.
Regime established in the Reserve

12. Any activity, contradicting the Reserve’s objectives and regime of special protection of its territory is prohibited, including:
   - activity disturbing a hydrological regime of the territory;
   - geological prospecting and exploitation of mineral resources, disturbance of soil cover and outcrops of minerals and rocks;
   - final felling, harvesting the oleoreising, tree syrup, medicine plants and raw-wood and also other ways of forest exploitation except when it is provided by the present Statute;
   - haymaking, cattle grazing, location of bee-hives and apiaries, harvesting the wild fruits, berries, mushrooms, nuts, seeds and flowers and other ways of flora exploitation except when it is provided by the present Statute;
   - construction of industrial and agricultural enterprises and their facilities, building of constructions and of engineering structures, construction of the roads and other communication lines except those, which are required for the Reserve; a permits for building the units, which are designed by a master plan, are issued in accordance with the Article 61 of the law of Russian Federation “On local self-governing in Russian Federation”;
   - commercial, sport and amateur hunting and other ways of fauna use except when it is provided by the present Statute;
   - introduction of animals with the aim to their acclimatization;
   - applying mineral fertilizers and herbicides and pesticides;
   - timber floating;
   - cattle transit;
   - travel of unauthorized persons by road, or by foot outside the roads and water routes of general use;
   - collecting zoological, botanic and mineral specimens except when it is required for scientific researches in the Reserve;
   - flying of helicopters and airplanes bellow 2000 m vie the Reserve area without co-ordination with the Reserve’s administration, or the Rosprirodnadzor and also flying of supersonic airplane above the Reserve’s area;
   - other activities disturbing normal course of natural processes and endangering natural complexes, and also activity, which is not aimed at solving the put tasks.

13. The following measures and activities are permitted within the Reserve area:
   a) conservation of the natural complexes, their restoration and also prevention of the man-induced changes of natural complexes and their components;
   b) maintenance of the conditions providing sanitary and fire safety of population, animals natural complexes and objects;
   c) prevention of dangerous natural phenomenon (snow and stone slides, mud flows etc.) threatening settlements and people’s life;
   d) scientific researches, including environmental monitoring;
   e) environmental education;
   f) controlling function.

14. The following activities providing the Reserve’s functioning and survival systems of the persons inhabiting the considered area could be permitted within a radius of 4 km from the control posts and scientific stations of the Reserve according to the procedure, that is established by the present Statute:
   - agriculture providing the Reserve’s employees and their families with food;
   - harvesting of firewood and industrial wood to provide the Reserve’s needs and/or the needs of the persons dwelling its territory should be carried out in accordance with the current legislation according to the established procedure. Decision on utilization of the wood, which is produced in course of non-commercial felling, should be made by the Reserve’s administration;
- harvesting mushrooms, berries, and nuts by the Reserve’s employees when fulfilling the duties and also by the Reserve’s residents for personnel use without the right to sell;
- non-commercial fishing by the Reserve’s employees, when fulfilling the duties, and also by the Reserve’s residents for personal use (without the right to sell), according to the procedure provided by the rules on non-commercial and sport fishing, which are in force in the Taymyr A.A. and Evenki A.A.;
- organization of the educational and excursion environmental tours. Projects of excursion tours, which are recommended by the Academic Council, are presented by a Director of the Reserve for approval in the Rosprirodnadzor;
- location of the museums of the protected nature, including those with the exposition in the open air.

Hunting the animals for scientific and regulation purposes is permitted only with permission of the Rosprirodnadzor.

15. Persons, which are not the Reserve’s employees, or the officials, which are not in the stuff of the Rosprirodnadzor could stay within the Reserve’s area only in the presence of permissions of the Rosprirodnadzor, or the Reserve’s administration.

16. The following activities are permitted on a contractual basis, according to the procedure established by a Reserve’s Director after discussion with the Academic Council:
- shooting an environmental films by foreign TV- and cinema companies and also by private persons in accordance with a Statute on procedure of shooting a film and video film and taking a picture in the state natural reserves.

Protection of natural complexes and objects within the Reserve’s area

17. Special state environmental inspection, which employees are in the Reserve’s stuff, protects natural complexes and objects within the Reserve’s area.

18. A director and deputy director of the Reserve, including a head of security, are respectively a main state inspector and deputy inspectors on protection of the State Natural Reserve.

The Reserve’s employees, which are not state inspectors according to their posts, are permitted to perform duties of state inspectors on reserve’s protection. The pointed rights are granted with the consent of an employee and by his written statement and are legalized by an order of a Reserve’s Director.

Rights of the state inspectors on protection of the State Natural Reserve

19. In accordance with the Legislation of Russian Federation the Reserve’s employees, which are the state inspectors on protection the territory, have the rights:
   a) to examine the documents permitting the visiting of the Reserve and licenses for bearing the fire-arms of the persons staying within the Reserve’s area;
   b) to examine the licenses for nature use and other kinds of activities within the buffer zone adjacent to the Reserve’s area;
   c) to arrest the persons, which broke the legislation of Russian Federation on Specially Protected Areas within the Reserve’s area and its buffer zone; to draw up the reports on the infringements of the lows and to convey the low-breakers to low-enforcement agencies;
   d) to examine travel facilities and baggage, to perform personal examination, to examine the arms and other fishing and hunting gears and the harvested objects of flora and fauna both during transportation and in the course of processing;
   e) to use force and special means such as handcuffs, batons, tear gas and facilities for forced stopping the travel facilities, war-dogs and fire-arms;
   f) to commit the reports on administrative responsibility of the persons broken the established regime of the Reserve;
g) to confiscate the objects of flora and fauna, which were harvested illegally, the hunting and fishing gears illegally used, travel vehicles and also corresponding documents from the breakers of the Low of Russian Federation on Specially Protected Areas; confiscation should be drawn up according to the established procedure;

h) to visit freely any objects placed within the Reserve’s area and its buffer zone in order to control the compliance with the Legislation of Russian Federation on Specially Protected Areas;

i) to stop economic, or other activities, which are not in compliance with the regime of specially protected area of the Reserve and its buffer zone.

20. A chief state inspector and his deputies are granted a complete list of rights of the state inspectors, that is provided by the present Statute. Besides, the pointed persons are entitled:

a) to abandon economic, or other activities, which are not in compliance with the established regime in the State Natural Reserve and its buffer zone;

b) to inflict a penalty for the infringements of the Legislation of Russian Federation on Specially Protected Areas;

c) to advance the claims to natural and juridical persons on imposing a penalty in favour of the State Natural Reserve on account of reparation of damages, which were caused to natural complexes and objects of the Reserve, its buffer zone and other territories, which are under the Reserve’s control, in result of breaking the established regime;

d) to commit the reports on the cases related to breaking the Legislation of Russian federation on Specially Protected Areas into the law-enforcement agencies.

21. State inspectors on protection of the territory of the State Natural Reserve are granted the all rights of the officials of state forest protection and other specially authorized state environmental bodies of Russian Federation.

22. State inspectors on protection of the Reserve’s area are permitted to bear the fire-arms when fulfilling the duties.

A procedure of purchasing, storing and applying the fire-arms is regulated by a current Legislation.

23. State inspectors on protection of the Reserve’s area are provided with body armours and other facilities for personal safety.

24. State inspectors on protection of the Reserve’s area are subjected to compulsory state insurance according to the Legislation of Russian Federation.

25. Damage to an inspector’s property, which was caused, when fulfilling the duties, should be compensated on the account of the Rosprirodnadzor. The Reserve’s Administration is within its right to take an action of recourse against an organization, or against a person, who is responsible for the caused damage.

26. In case of loss of life of a state inspector when fulfilling the duties his family is supported by the state during the 5 years since the inspector’s death, when this time expires pension because of loss of a bread-winner is paid according to the procedure established by a current legislation.

Scientific-research activity in the Reserve

27. Scientific-research activity in the Reserve is focused on studying the natural complexes and the long-term monitoring of the natural processes in order to forecast environmental situation, to develop scientific basis for environmental protection, to conserve biodiversity, to reproduce and to manage natural resources.
28. Scientific-research activity in the Reserve is performed:
   - by the employees according to the plans of scientific-research works;
   - by the scientific-research organizations and higher educational institutions of appropriate profile on a contractual basis using the unified programs coordinated with the Rosprirodnadzor.

29. Deputy director on scientific work, who is appointed by the Rosprirodnadzor, organizes and directs the scientific researches in the Reserve.

30. Academic Council should be established in the Reserve. Members of the Academic Council should be approved by the Rosprirodnadzor. Activity of the Academic Council is regulated by a Statute on the Academic Councils in state natural reserves ratified by the Rosprirodnadzor.

31. Scientific funds are formed and stored in the reserve.

32. The Reserve is granted the right to publish the scientific works.

Financial-economic activity of the Reserve

33. The reserve realizes the activity that is not in conflict with its objectives and the established protection regime.

34. Action plans aimed at realization of the proclaimed objectives, and the budget financing is confirmed by the Rosprirodnadzor.

35. The reserve independently commands its own finance obtained from:
   - Researches, nature protection, advertising-publishing and other activities that are not in conflict with the objectives of the state natural reserve;
   - Reparation of damages caused by juridical or natural persons to the natural ecosystems and natural bodies located within the state natural reserve area;
   - Sale of the forfeit instruments of hunting and fishing, and the products of illegal use of natural resources;
   - Grants and charitable contributions.

Administrative penalties imposed for environmental offences, exacted according to resolutions of officers of the state natural reserve, income to independent command of the reserve.

36. The reserve has the right to have its own symbolics (flag, pendant, emblem, etc.) approved by the Ministry of Natural Recources of the Russian Federation.

37. Production of souvenirs, consumer goods, printed output with the use of natural and historical-cultural sites and areas located within the reserve area, as well as use of its name and symbols, is carried out by authority of the reserve directorate.

38. The reserve has preferential tax treatment scheduled for state natural reserves by the Russian Federation Law and legislation of the Taymyr Autonomous Area.

Remuneration of labor in the reserve

39. Structure and regular authorized establishment of the reserve is defined by the director of the reserve within the wage fund, basing on the objectives and specifics of the reserve.

40. The form, system and size of the remuneration of labor is defined by the reserve independently in compliance with the current labor remuneration regulations and within the actual wage fund. Extra charge, rise in wages, bonuses and other additional payments are defined by the reserve administration in compliance with the current legislation.
41. Housing resources of the state natural reserve may be included into the category of outbuildings in accordance with the established procedure.

42. When a specialist takes a temporary job in the reserve, his and his family members’ permanent accommodation is reserved for the whole time of the labor contract.

43. Reserve officers are provided with free special clothes, footwear and personal protection facilities according to the norms approved by the Rosprirodnadzor, as well as the standard breastplate. Besides, state inspectors are provided with free uniform with insignia and body armors.

44. Reserve officers that have personal motor cars, motor sledges, motor-launches, and boat motors, and use them for official needs, may be provided with oils and petroleum, as well as free minor repairs of these techniques.

45. Reserve officers are provided with firewood to heat their accommodations at reduced prices scheduled for officers and workers employed in forestry.

46. An exception from the rule limiting joint employment of relatives provided by Article 20 of the Labor Code of the Russian Federation, is permissible towards the officers of the reserve.

Control over the reserve activity

47. State control over the reserve organizing and activity is realized by specially authorized state bodies of the Russian Federation in the sphere of environmental protection.
GOVERNOR
of the Taimyrsky (Dolgano-Nenetsky) Autonomous District
66320, Dudinka, Sovetskaya St., 35
Tel.: (39111) 2-11-60, Fax: 2-39-79
28.01.2001 # 98

To the Chair of
the Russian Federation Commission
for UNESCO
Academician V.E.Fortov

Dear Vladimir Evgenievich,

The administration of the Taimyr (Dolgano-Nenetsky) autonomous district (TAD) defined the environmental work as one of its priorities. More than 12% of the total area of TAD is specially protected territories, which is a maximum rate in Russia.

In the framework of the Convention on the Protection of the World Cultural and Natural Heritage in autumn 2000 a Russian-German expedition worked in the territory of Putoransky State Nature Reserve. As a result the nomination “Plateau Putorana” was prepared.

I ask you to assist the inclusion of Putoransky State Nature Reserve located within the territory under my jurisdiction in UNESCO World Natural Heritage List.

District Governor

A.G. Khloponin
Dear Boris Alexandrovich,

Preparation of the Putorana nomination for inscription into the World Heritage List of UNESCO carried out by representatives of Putoransky state natural reserve, the Arctic Ring foundation, WWF and The Natural Heritage Protection foundation is presently being finalized.

Realizing the importance of inscription the Putoransky reserve into the World Heritage List of UNESCO, Administration of the region supports the nomination and turns to you with request to approve the documents enclosed.

District Governor

Nedelin G.P.
DRAFT MANAGEMENT PLAN OF PUTORANSKY RESERVE

1. General information
1.1. Description of the Reserve
1.2. History of the establishment
1.3. Goals of the Reserve
1.4. Main features

2. Values and remarkable features of the reserve
2.1. Natural values
2.2. Analysis of the state of conservation

3. Man & Nature
3.1. History of development
3.2. Attendance of the site
3.3. Anthropogenic effect, illegal nature use activities
3.4. Threats to natural values of the Reserve

4. Reserve’s infrastructure and activities
4.1. Administrative arrangement
4.2. Protection of the territory
4.3. Scientific research projects
4.4. Environmental education
4.5. Tourism activities
4.6. Financial and economic activities
4.7. Integration into the regional social and economic structure

Analytic summary

5. Territorial management plan

6. Action plan

6.1. Goals and priority tasks

In the upcoming period, the main development objective of the Reserve is to create objective prerequisites for implementing the Reserve’s duties taking into account the specifics of social and economic development of the region and the existing federal concept of SPAs, i.e.:

- Enhancement of the Reserve’s infrastructure and improvement of the protection of natural complexes and natural sites;
- Scientific and information support of management tasks of the Reserve;
- Provision for the sustainable functioning and development of the Reserve.
For the Reserve, which primary and fundamental purpose is biodiversity and landscape diversity conservation, the most important short-term development trends are as follows:

- Development of research projects as a basis for nature conservation activities;
- Establishing on the basis of the Reserve and progressive development of an environmental education center *Taimyr*;
- Development of domestic and international tourism activities including extreme travels;
- Integration of the Reserve into the regional social network.

Successful implementation of the above mentioned programs would allow the Reserve and the local authority to combine efforts in order to improve the effectiveness of the Reserve and to achieve the leading position in the region in the field of nature conservation.

Taking into consideration the factors of industrial development of the region, the above stated priority lines of the Reserve’s development are determined by local socio-economic conditions.

The full achievement of the objectives stated above will only be possible if the decisions are scientifically supported, the scientifically grounded approaches and methods are used and the complete database is produced as soon as possible.

The ultimate goal of the Reserve’s establishment and development achievable by step-by-step fulfillment of individual tasks can be the harmonization of the «society-nature» interaction, providing that the sustainable biodiversity and ecological structure of the area being maintained.

### 6.2. Action plan

The 2009-2013 Action Plan has been built on the principle of target programs, which major goals and tasks are in conformity with the main activity lines of the Reserve. The goals and tasks are to be performed through the implementation of a series of specialized management tasks, which can be corrected as the work moves forward. In turn, the management tasks are followed by a series of appropriate actions.

The long-term Action Plan can serve as the basis for the development of annual action plans specifying objectives, responsible officers and necessary non-human resources. Financial changes can cause changes in the timing of events and in the list of planned activities.

Many of the Plan’s objectives require good coordination between nature conservation and economic activities of the Reserve and between the Reserve and its superior bodies, governing bodies and local authorities.

#### 6.2.1. PROGRAMME «Protection of natural territorial complexes of different levels and biological and landscape diversity conservation»

The programme includes:

Subprogrammes:

1.1. Description and state cadastral survey of the Reserve’s area.

1.2. Improvement of the effectiveness and sustainability of nature conservation measures through the application and development of innovative technologies
1.1. Subprogramme «Description and state cadastral survey of the Reserve’s area»

**Goal:** The receiving of a cadastral (land use) map and the Certificate of State Registration of Title to Land for the Reserve’s area;

**Management task:**
1.1.1. Registration of the Reserve’s boundaries in accordance with the Regulations for cadastral registration of land GZK-1-T.0-04-01-01, and the registration of title.

**Activities:**
- Land surveying, obtaining of a cadastral map of the Reserve’s area, registration of title to land, boundary demarcation, building of an up-to-date database for the SPA boundaries, location of cordons, scientific research stations, etc.

**Expected outcomes:**
- Amendment of the Reserve’s boundaries following the Decree No ОМ-04-33/6152 dated 11.11.2005.
- Recognition of a specific character of boundary protection and area patrolling for each part of the Reserve, since the parts differ greatly in their location, spatial parameters and accessibility.

1.2. Subprogramme «Improvement of the effectiveness and sustainability of nature conservation measures through the application and development of innovative technologies»

**Goal:** To improve the work of staff inspectors of the Reserve - first of all concerning preventive measures and then environmental control functions.

*The main goal is to develop an integral sustainable mechanism for the protection of the reserve, which would provide integrated and effective solutions of nature conservation problems in changing social and economic conditions.*

- To achieve regular and effective patrolling as well as an effective prevention of any attempts to penetrate into the Reserve’s area by means of equipping the reserve’s patrollers with modern transport, communication and monitoring facilities;

*To create a modern communication system between all elements of the Security Guard and Patrol Service of the reserve; provide robust communication between officers during the patrolling and establish ongoing communication with the management of the Reserve in Norilsk; provide field officers with modern communication means (walkie-talkie sets, mobile phones, chargers, electric power storage devices).*

*To improve the mobility of the Security Guard and Patrol Service, for which purpose modern transport means (boats, engines) and facilities for their upgrade and field repair (tool kits, tents, portable stoves for field repair in the Far North conditions) are needed.*

- To rebuild and equip those cordons, which are crucial for the protection of the reserve’s area; to apply new security and control systems and to provide their autonomous remote control ability (power storage and charging devices, wireless watching cameras with “record” function);

- To rebuild the totally ruined for the last 20 years line of information panels along the Reserve’s borders. That will deny to potential law-breakers, in the case of their illegal access to the area of the reserve, appeal to the absence of identification signs;

- Take measures to prevent the violation of environmental laws;
To provide, by joint efforts of the Security Guard and Patrol Service and the Science and Environmental Education departments, the preparation, publication and circulation of information and reading materials on environmental issues; to distribute environmental information via electronic and print mass media and the webpage of the Reserve; to use the resources of the local authority for the distribution of environmental information.

- To develop and implement (jointly with the Science Department) most adequate, targeted protection measures aimed to maintain sustainability of populations of rare and endangered species, taking into account the present state of conservation of the populations and the expected population dynamics;

To apply new approaches to nature conservation taking as a basis the population integrity preservation principle. According to this principle, the boundaries of the SPA are nominal, not natural, and the area contains only a part of the population. Therefore, the task is to combine the direct protection of animals within the protected area with preventive environmental measures in the adjacent areas!

Activities:

- Purchasing and use of modern transport means and their supply-and-maintenance-support equipment (boats, engines, repair tools and equipment, consumables in assortment);

- Purchasing and use of modern communication means (walkie-talkie sets complete with charging devices, cell phones c/w accumulator batteries);

- Purchasing, delivery to the cordons, installation and use of modern remote video surveillance systems (wireless cameras, batteries, signal reception systems);

- Ordering, delivery and installation of information panels along the Reserve’s boundary. The delivery of the panels to the northern, eastern and southern borders of the Reserve is possible only by helicopter. To pay the helicopter delivery, it is planned to attract additional funding from sponsors and some scientific projects currently implementing in the Reserve.;

- Purchasing and delivery of building materials (construction materials and implements) within the minimum scope necessary for the reconstruction of the key cordons; obtaining of additional financing for the reconstruction from sponsors and local administration; the reconstruction is to be carried out by the Reserve’s staff;

- In cooperation with the Environmental Education and Science departments: preparation, publication and free distribution of color booklets calling for the conservation of rare and endangered species (and reminding about the law prohibiting men from hunting them); color posters promoting environmental friendliness to the nature of the Putorana plateau – a gem of the Taymir polar region; dissemination of printed materials concerning nature conservation issues among hunters, fishermen, tourists, the population of the Taymir Peninsular and the north of the Central Siberia and in governmental and public organizations. The Reserve has considerable experience of publishing and target distributing of printed materials; for this purpose some additional financing can be obtain from the funds of a few on-going research projects;

- To continue fruitful cooperation with the mass-media: to provide, jointly with the Science and Environmental Education departments, nature conservation coverage on the regional radio and TV; to continue publishing the environment-oriented materials in the regional press (a considerable experience has already been obtained in this field);

- Placing of environmental information on the webpage of the Reserve;
Implementation (in cooperation with the Science Department) of special (targeted) measures in the regions inhabited by the most endangered animal species (in particular, the Bighorn Sheep and the Lesser White-fronted Goose) and where there is a specific threat to those species. Thus, rapidly vanishing lesser white-fronted goose nests near the southwest boundary of the Reserve. The species’ habitat is located partly in the territory of the Reserve and partly in the adjacent area. The major threat to the local population of the white-fronted goose is the disturbance factor, for the minimization of which preventive measures should be taken both in the reserve and in the neighboring areas. The major threat in the eastern part of the Reserve is the potential hunting of the endemic species of the Putorana plateau – the bighorn sheep. To prevent this, special attention should be paid to the boundary demarcation in the eastern sectors of the Reserve.

**Expected outcomes:**
- Optimization of the work of the Security Guard and Patrol Service; obtaining the opportunity to control in full measure the extensive area of the Reserve (slightly less than 2 million hectares);
- Creation of a basis for continued and sustainable growth in the effectiveness of nature conservation measures assumed in the protected territory and in the adjacent areas;
- Raising of public awareness and concern about environmental issues; strengthening and development of cooperation with public organizations and authorities in the sphere of environmental education;
- Rise in the effectiveness of preventive measures against the violation of environmental laws achieved through the distribution of environmental information via mass media and the Internet on a permanent basis;
- Maintenance of stable populations of rare and endangered species within the territory of the Reserve and in the adjacent areas;
- Prevention of illegal infiltration into the Reserve’s area and the reduction of poaching in the neighboring areas;
- Provision of video patrolling of the Reserve’s area.

**Indicators:**
- Increase in the quality of work (growing success in preventing illegal infiltration)
- Sustainability of the achievements of the project, which provides a basis for the effective work of the Security Guard and Patrol Service in the future;
- Opportunity to realize the project on the basis of close cooperation between different departments of the Reserve;
- Application of high-end technologies;
- Application of advanced nature conservation methods to preserve rare and endangered species;
- Opportunity to apply the experience gained in the implementation of the present project to other Russian SPAs.
### 6.2.1 PROGRAMME «Protection of natural territorial complexes of different levels and biological and landscape diversity conservation»

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<td>1.1.1. Registration of the Reserve’s boundaries in accordance with the Regulations for cadastral registration of land GZK-1-T.0-04-01-01, and the registration of title.</td>
<td>Land surveying, obtaining of a cadastral map of the Reserve’s area, registration of title to land, boundary demarcation, building of an up-to-date database for the SPA boundaries, location of cordons, scientific research stations, etc.</td>
<td>Amendment of the Reserve’s boundaries following the Decree No OM-04-33/6152 dated 11.11.2005. - Recognition of a specific character of boundary protection and area patrolling for each part of the Reserve, since the parts differ greatly in their location, spatial parameters and accessibility.</td>
<td>2009 - 2013</td>
<td>The Reserve; The Federal Service for Oversight in the Sphere of Nature Use for the Krasnoyarsky Krai</td>
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<td><strong>1.2. Subprogramme «Conservation of natural complexes and sites. Nature use management»</strong></td>
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<td>1.2.1. Improvement of the effectiveness of environmental control and preventive measures against the violation of environmental laws</td>
<td>- Purchasing and use of modern transport means and their supply-and-maintenance-support equipment (boats, engines, repair tools and equipment, consumables in assortment); - Purchasing and use of modern communication means (walkie-talkie sets complete with charging devices, cell phones c/w accumulator batteries); - Purchasing, delivery to the cordons, installation and use of modern remote video surveillance systems (wireless cameras, batteries, signal reception systems); - Ordering, delivery and installation of information panels along the Reserve’s boundary. The delivery of the panels to the northern, eastern and southern borders of the Reserve is possible only by helicopter. To pay the helicopter delivery, it is planned to attract additional funding from sponsors and some scientific projects currently implementing in the Reserve.;</td>
<td>- Optimization of the work of the Security Guard and Patrol Service; obtaining the opportunity to control in full measure the extensive area of the Reserve (slightly less than 2 million hectares); - Creation of a basis for continued and sustainable growth in the effectiveness of nature conservation measures assumed in the protected territory and in the adjacent areas; - Raising of public awareness and concern about environmental issues; strengthening and development of cooperation with public organizations and authorities in the sphere of environmental education;</td>
<td>2009</td>
<td>The Reserve Security Guard and Patrol Service of the Reserve</td>
<td>Extrabudgetary funds</td>
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<td>Management tasks</td>
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</table>
| The development of an integral sustainable mechanism for the protection of the reserve, which would provide integrated and effective solutions of nature conservation problems in changing social and economic conditions. | - Purchasing and delivery of building materials (construction materials and implements) within the minimum scope necessary for the reconstruction of the key cordons; obtaining of additional financing for the reconstruction from sponsors and local administration; the reconstruction is to be carried out by the Reserve’s staff;  
- In cooperation with the Environmental Education and Science departments: preparation, publication and free distribution of color booklets calling for the conservation of rare and endangered species (and reminding about the law prohibiting men from hunting them); color posters promoting environmental friendliness to the nature of the Putorana plateau – a gem of the Taymir polar region; dissemination of printed materials concerning nature conservation issues among hunters, fishermen, tourists, the population of the Taymir Peninsula and the north of the Central Siberia and in governmental and public organizations. The Reserve has considerable experience of publishing and target distributing of printed materials; for this purpose some additional financing can be obtain from the funds of a few on-going research projects;  
- To continue fruitful cooperation with the mass-media: to provide, jointly with the Science and Environmental Education departments, nature conservation coverage on the regional radio and TV; to continue publishing the environment-oriented materials in the regional press (a considerable experience has already been obtained in this field);  
- Placing of environmental information on the webpage of the Reserve;  
- Implementation (in cooperation with the Science Department) of special (targeted) measures in the regions inhabited by the most endangered animal species (in particular, the Bighorn Sheep and the Lesser White-fronted Goose) and where there is a specific threat to those species. Thus, rapidly vanishing lesser white-fronted goose nests near the southwest boundary of the Reserve. The species’ habitat is located partly in the territory of the Reserve and partly in the adjacent area. The major threat to the local population of the white-fronted goose is the disturbance factor, for the minimization of which preventive measures should be taken both in the reserve and in the neighboring areas. The major threat in the eastern part of the Reserve is the potential hunting of the endemic species of the Putorana plateau – the bighorn sheep. To prevent this, special attention should be paid to the boundary demarcation in the eastern sectors of the Reserve. | - Rise in the effectiveness of preventive measures against the violation of environmental laws achieved through the distribution of environmental information via mass media and the Internet on a permanent basis;  
- Maintenance of stable populations of rare and endangered species within the territory of the Reserve and in the adjacent areas;  
- Prevention of illegal infiltration into the Reserve’s area and the reduction of poaching in the neighboring areas;  
- Provision of video patrolling of the Reserve’s area. | | | |
6.2.2. PROGRAMME «Environmental education and tourism; the building of public support for the Reserve»

Goal: «environmental acculturation» of local people, i.e. the development of the intention and skills to profitably apply environmental knowledge in practice. The increased environmental culture standard of local people is the main component of harmonious development of the area, which enjoys unique natural, industrial and social values.

Major tasks:
- Public awareness on environmental issues;
- Public involvement in the nature conservation activities;
- Contribution to the building of an «integrated information space» in order to support the environmental education and public relations information and experience exchange between all interested persons at the SPA-system, national and international levels;
- Ongoing development and approval of methodological procedures for effective and up-to-date work in the field of environmental education, including the accumulation of appropriate domestic and international experience and the development of new methodological procedures.

The programme includes the following subprogrammes:

2.1. Media coverage
2.2. Promotion and publishing activities
2.3. Environmental actions and events
2.4. Public relations
2.5. Work with children

2.1. Subprogramme «Media coverage»

Management tasks:
The priority should be given to the scientific credibility of information and to the communication of the information in a way that makes it easy to understand for the general audience.

Activities:
- Publication of articles related to the nature conservation and environmental education issues in the local and regional press.
- Cooperation with local and regional TV and radio companies in the preparation of TV and radio programs on environmental issues.

2.2. Subprogramme «Promotion and publishing activities»

Management tasks:
Dissemination of environmental information and promotion of environmental friendliness.

Activities:
- Publication of educational booklets and brochures on environmental issues.
- Publication and distribution of illustrated materials to inform the population about the unique character of natural complexes, anthropogenic effects upon them and the work of SPAs
- Publication and dissemination of teacher’s editions.
2.3. Subprogramme «Environmental actions and events»

Management tasks:
Drawing of people’s attention to the nature conservation problems.

Activities:
• Public involvement through the participation of public agencies, educational and cultural institutions, local authority and public authorities in the management of environmental events.

2.4. Subprogramme «Public relations»

Management tasks:
• Popularization of scientific and, in particular, environmental knowledge among the general public.

Activities:
• Facilitation of public participation in local environmental events.
• Development of ecotourism and sightseeing services in the site.

2.5. Subprogramme «Work with children»

Management tasks:
• Continuity of environmental education, integration of environmental events into educational programs for preschool, formal, higher and extended education.

Activities:
To lay the groundwork for the development in children of environmental consciousness, the fundamental concept of which is a holistic worldview.

• Development in children an ability to solve «small-scale» environmental problems with concrete and tangible result.

• To imbue the minds of youth with patriotism based on the sense of pride in the unique natural values of their country. Well-thought-out and well-organized demonstration of natural values of the site to children and youth is a powerful instrument for the development of patriotic feelings.

• Contribution to the work of the Norilsk Preschool and Formal Education Administration in the field of occupational guidance of senior pupils.

• Scheduled work with teachers - counseling assistance, organization of workshops, information and methodological support, elaboration of games and lessons on the subject for children and youth - in order to compensate for the lack of knowledge on the natural features of the site and the significant lack of teacher’s editions.

Expected outcomes:
Rise in the environment education level, what can be measured by the number of visitors of the environmental education center, the number and quality of lectures, excursions, events for children, the number of appearances in the mass-media, the quantity of printed materials.
### 6.2.2. PROGRAMME «Environmental education and tourism; the building of public support for the Reserve»

<table>
<thead>
<tr>
<th>Management tasks</th>
<th>List of activities</th>
<th>Results/Indicators</th>
<th>Timing</th>
<th>Executors</th>
<th>Source of financing</th>
<th>Cost, thousands RUB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.1. Subprogramme «Media coverage»</strong></td>
<td></td>
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<tr>
<td>Scientific credibility of information and communication of the information in a way that makes it easy to understand for the general audience.</td>
<td>✪ Publication of articles related to the nature conservation and environmental education issues in the local and regional press. ✪ Cooperation with local and regional TV and radio companies in the preparation of TV and radio programs on environmental issues.</td>
<td>Rise in the environment education level, what can be measured by the number of visitors of the environmental education center, the number and quality of lectures, excursions, events for children, the number of appearances in the mass-media, the quantity of printed materials.</td>
<td>2009-2013</td>
<td>Putoransky Nature Reserve</td>
<td>Federal Budget</td>
<td>200/1000</td>
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</tbody>
</table>

| **2.2. Subprogramme «Promotion and publishing activities»** | | | | | | |
| Dissemination of environmental information and promotion of environmental friendliness. | ✪ Publication of educational booklets and brochures on environmental issues. ✪ Publication and distribution of illustrated materials to inform the population about the unique character of natural complexes, anthropogenic effects upon them and the work of SPAs ✪ Publication and dissemination of teacher’s editions. | Rise in the environment education level, what can be measured by the number of visitors of the environmental education center, the number and quality of lectures, excursions, events for children, the number of appearances in the mass-media, the quantity of printed materials. | 2009-2013 | Putoransky Nature Reserve | Federal Budget | 200/1000 |
### 2.3. Subprogramme «Environmental actions and events»

<table>
<thead>
<tr>
<th>List of activities</th>
<th>Results/Indicators</th>
<th>Timing</th>
<th>Executors</th>
<th>Source of financing</th>
<th>Cost, thousands RUB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing of people’s attention to the nature conservation problems.</td>
<td>Rise in the environment education level, what can be measured by the number of visitors of the environmental education center, the number and quality of lectures, excursions, events for children, the number of appearances in the mass-media, the quantity of printed materials.</td>
<td>2009-2013</td>
<td>Putoransky Nature Reserve</td>
<td>Federal Budget</td>
<td>200/1000</td>
</tr>
<tr>
<td>- Public involvement through the participation of public agencies, educational and cultural institutions, local authority and public authorities in the management of environmental events.</td>
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</tbody>
</table>

### 2.4. Subprogramme «Public relations»

<table>
<thead>
<tr>
<th>List of activities</th>
<th>Results/Indicators</th>
<th>Timing</th>
<th>Executors</th>
<th>Source of financing</th>
<th>Cost, thousands RUB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Popularization of scientific and, in particular, environmental knowledge among the general public.</td>
<td>Rise in the environment education level, what can be measured by the number of visitors of the environmental education center, the number and quality of lectures, excursions, events for children, the number of appearances in the mass-media, the quantity of printed materials.</td>
<td>2009-2013</td>
<td>Putoransky Nature Reserve</td>
<td>Federal Budget</td>
<td>200/1000</td>
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<tr>
<td>- Facilitation of public participation in local environmental events.</td>
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<tr>
<td>- Development of ecotourism and sightseeing services in the site.</td>
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</table>

### 2.5. Subprogramme «Work with children»

<table>
<thead>
<tr>
<th>List of activities</th>
<th>Results/Indicators</th>
<th>Timing</th>
<th>Executors</th>
<th>Source of financing</th>
<th>Cost, thousands RUB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity of environmental education, integration of environmental events into educational programs for preschool, formal, higher and extended education.</td>
<td>Rise in the environment education level, what can be measured by the number of visitors of the environmental education center, the number and quality of lectures, excursions, events for children, the number of appearances in the mass-media, the quantity of printed materials.</td>
<td>2009-2013</td>
<td>Putoransky Nature Reserve</td>
<td>Federal Budget</td>
<td>200/1000</td>
</tr>
<tr>
<td>- Development in children an ability to конкретному solve «small-scale» environmental problems with concrete and tangible result.</td>
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<tr>
<td>- To imbue the minds of youth with patriotism based on the sense of pride in the unique natural values of their country. Well-thought-out and well-organized demonstration of natural values of the site to children and youth is a powerful instrument for the development of patriotic feelings.</td>
<td></td>
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<tr>
<td>- Contribution to the work of the Norilsk Preschool and Formal Education Administration in the field of occupational guidance of senior pupils.</td>
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<tr>
<td>- Scheduled work with teachers - counseling assistance, organization of workshops, information and methodological support, elaboration of games and lessons on the subject for children and youth - in order to compensate for the lack of knowledge on the natural features of the site and the significant lack of teacher’s editions.</td>
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</tbody>
</table>
6.2.3. PROGRAMME «Scientific research and monitoring activities»

Goal: Information and scientific support of management and planning of the Putorana Reserve activities

Major tasks:

• Development of information and analytical support for nature conservation and nature use management activities of the Reserve.
• Integrated monitoring of natural ecosystems.
• Target research projects on the dynamics of the key components of natural territorial complexes.

Subprogrammes:

3.1. Inventory and surveying
3.2. Development of scientific research projects
3.3. Development of environmental monitoring system

3.1. Subprogramme «Inventory and surveying»

Management tasks:

• Inventory of natural objects and phenomena found in the territory of the Reserve, including the assessment of their state and dynamics.
• Inventory of natural objects in different parts of the territory of the Reserve, taking into account the extensiveness of the Reserve’s area and, thereof, its landscape heterogeneity.
• For the key natural complexes: extension of the list of objects to be monitored and subjects to be studied.

Activities:

• Research, description and development of integrated database on the flora and fauna of the Reserve.
• Collection of reliable scientific data on a few specific sites of the Reserve.
• Listing of unstudied groups of living organisms.

3.2. Subprogramme «Development of scientific research projects»

Management tasks:

• Organization and carrying out of scientific researches within the framework of a long-term plan.
• Coordination of research projects developed by the Reserve with a research plan developed by the Ministry of Natural Resources and with research activities in the framework of joint projects of the Reserve.
• Development of material and technical infrastructure for the implementation of research projects.
• Extension of the existing database and bibliography of key research projects carried out in the Reserve and in the adjacent areas.
• Integration of research officers of the Reserve into the SPA research activities information exchange system.
Activities:

- Analysis of actuality and resolution of priority of research projects; development of a detailed long-term research plan, including particular activities.
- Connection/information exchange with project partners.
- Purchasing of equipment to facilitate the implementation of scientific work by the Reserve’s own forces.
- Compilation of a complete bibliography for the research projects on the key components of the Reserve’s fauna. Publication of monographs and articles.
- Participation of research officers of the Reserve in domestic and international conferences and symposiums; missions to the leading research centers for the work with collections, experience exchange, professional advancement and the development of partnership in monitoring.

3.3. Subprogramme «Development of environmental monitoring system»

Management tasks:

- Establishment of ecosystem monitoring in different parts of the Reserve, taking into account spatial and qualitative heterogeneity of the landscapes.
- Optimization of data collection process within the framework of the Nature Records programme.
- Input of data concerning the state of the Reserve’ ecosystems into information systems of global target scientific research projects on the conservation of rare species and of integrated monitoring programs.

Activities:

- Development of monitoring programs and data collection systems for the different parts of the Reserve (basing on specific features of each part); determination of information supply and processing methods.
- Systematic data collection in the framework of a program «Nature Records»; periodic data assessment.
- Input of the data collected in the Reserve into the information system of the Circumpolar Biodiversity Monitoring Program (CBMP).

Expected outcomes:

- Database of the current state of biodiversity and its dynamics and of unique natural phenomena found in the Reserve and in the adjacent areas;
- Systematic professional training for research officers;
- Integrated monitoring program for the Reserve’s area;
- Progressive development of cooperation with environmental organizations (the Working group on Anseriformes of Northern Eurasia), the Circumpolar Biodiversity Monitoring Program (CBMP) and with environmental programs of the largest industrial companies of the region.
- Regional analytic reports on the state of conservation of the RF Red Data Book species – habitants of the Reserve;
- Submission of the Lesser White-fronted Goose National Conservation Strategy for approval to the Ministry of Natural Resources;
- Publication of monographs, collected articles and presentations prepared for symposiums and conferences;
- Broad involvement of the Reserve’s specialists in the participation in scientific conferences and in regional, federal and international environmental projects.
### 3.1. Subprogramme «Inventory and surveying»

<table>
<thead>
<tr>
<th>Management tasks</th>
<th>Activities</th>
<th>Result/Indicator</th>
<th>Timeline</th>
<th>Executors</th>
<th>Sources of financing</th>
<th>Costs Thousand RUB. Year/period</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1. Inventory of natural objects and phenomena found in the territory of the Reserve, including the assessment of their state and dynamics.</td>
<td>Research, description and development of integrated database on the flora and fauna of the Reserve.</td>
<td>Integrated database on the flora and fauna of the Reserve and the adjacent areas</td>
<td>2009-2011</td>
<td>Putorana State Nature Reserve</td>
<td>Federal budget</td>
<td>150/450</td>
</tr>
<tr>
<td>3.1.2. Inventory of natural objects in different parts of the territory of the Reserve, taking into account the extensiveness of the Reserve's area and, thereof, its landscape heterogeneity</td>
<td>Collection of reliable scientific data on a few specific sites of the Reserve.</td>
<td>Information database on the key natural territorial complexes of different parts of the Reserve and the adjacent areas</td>
<td>2009-2011</td>
<td>Putorana State Nature Reserve</td>
<td>Federal budget</td>
<td>150/450</td>
</tr>
<tr>
<td>3.1.3. For the key unique natural complexes: extension of the list of objects to be monitored and subjects to be studied</td>
<td>Case studies for the development of the most detailed and complete list</td>
<td>Information database of unstudied groups of living organisms and their inclusion into the program of systematic integrated monitoring of flora and fauna of the Reserve and the adjacent areas</td>
<td>2009-2011</td>
<td>Putorana State Nature Reserve</td>
<td>Federal budget</td>
<td>40/120</td>
</tr>
</tbody>
</table>
### 3.2. Subprogramme «Development of scientific research projects»

<table>
<thead>
<tr>
<th>Management tasks</th>
<th>Activities</th>
<th>Result/Indicator</th>
<th>Timeline</th>
<th>Executors</th>
<th>Sources of financing</th>
<th>Costs Thousand RUB. Year/period</th>
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<tbody>
<tr>
<td>3.2.1. Organization and carrying out of scientific researches within the framework of a long-term plan.</td>
<td>Analysis of actuality and resolution of priority of research projects; development of a detailed long-term research plan, including particular activities</td>
<td>Long-term research plan approved by the Ministry of Natural Resources</td>
<td>2009</td>
<td>Putorana State Nature Reserve</td>
<td>Federal budget</td>
<td>100</td>
</tr>
<tr>
<td>3.2.2. Coordination of research projects developed by the Reserve with a research plan developed by the Ministry of Natural Resources and with research activities in the framework of joint projects of the Reserve.</td>
<td>Maintenance of contacts and information exchange with projects partners</td>
<td>Implementation of joint research projects and programs</td>
<td>2009-2011</td>
<td>Putorana State Nature Reserve</td>
<td>Federal budget</td>
<td>50/150</td>
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</tbody>
</table>
### Management tasks

<table>
<thead>
<tr>
<th>Activities</th>
<th>Costs</th>
<th>Year/period</th>
<th>Executors</th>
<th>Sources of financing</th>
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</thead>
<tbody>
<tr>
<td>3.2.3. Development of material and technical infrastructure for the implementation of scientific work by the Reserve’s own forces:</td>
<td></td>
<td>2009-2011</td>
<td>Putorana State Nature Reserve</td>
<td>Federal budget</td>
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<tr>
<td>- Purchasing of equipment to facilitate the safe and effective implementation of scientific work:</td>
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<td></td>
<td>RUB.</td>
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<td>RAFT (Tango) motor boat – 35 000</td>
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<td>RUB; 1</td>
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<td>outboard 2-horsepower engine – 25 000</td>
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<td>RAFT: 4 “EXTREME” tents – 44 000</td>
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<td>RUB (11 000 RUB per tent); 8</td>
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<td>field work clothing ensembles (tarpaulins and</td>
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<td>other extreme condition clothing, anoraks,</td>
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<td>mackintoshes, water boots, stone boots,</td>
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<td>mittens, hats, sunglasses – 108 000</td>
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<td>RUB; 8 backpacks (60-80 litres)– 24 000</td>
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<td>RUB (3000 RUB per each); 10</td>
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<td>sealed bags – 8000 RUB (800 RUB per bag); 2</td>
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<td>satellite phones, charging devices,</td>
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<td>monthly fees – 140 000 RUB (70 000 RUB per set); 2</td>
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<td>burner devices – 2000 RUB (100 RUB per unit);</td>
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<td>2 binoculars – 8000 RUB (2000 RUB per unit);</td>
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<td>1 telescope – 7500 RUB; 2 laptops – 80 000</td>
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<td>RUB (40 000 RUB per unit) and 1 portable computer</td>
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<td>– 35 000 RUB; 1 printer – 5000 RUB; 2</td>
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<td>professional reflex cameras (+ 2 flash cards and 2 accumulators per each camera and 1 tripod) – 80 000</td>
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<tr>
<td>RUB (40 000 RUB per unit); 4 GPS devices – 6000 (2000 RUB per each); 4 sleeping bags – 20 000 RUB (5000 RUB per unit); 20-hour helicopter flight to deliver people, equipment and technical devices to the territory inaccessible by any other transport means – 2,600,000 RUB (130 000 RUB per hour; prices are valid for January, 2009).</td>
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</table>

### Result/indicator

Successful realization of both stationary and field research activities and office work based on up-to-date techniques and methods.
<table>
<thead>
<tr>
<th>Management tasks</th>
<th>Activities</th>
<th>Result/Indicator</th>
<th>Timeline</th>
<th>Executors</th>
<th>Sources of financing</th>
<th>Costs Thousand RUB. Year/period</th>
</tr>
</thead>
</table>
| 3.2.4. Extension of the existing database and bibliography of key research projects carried out in the Reserve and in the adjacent areas. | - Writing of monographs and articles.  
- Work with written sources and in the archives in order to compile a complete bibliography of research studies on key components of the Reserve’s fauna | - Publishing of monographs and articles.  
- Publication of a complete bibliography of research studies on key components of the Reserve’s fauna in monographs, bibliographic reports and in the Internet | 2009-2011 | Putorana State Nature Reserve | Federal budget | 90/180 |

| 3.2.5. Involvement of research officers of the Reserve into the SPA research activities information exchange system. | Participation of research officers of the Reserve in domestic and international conferences and symposiums; missions to the leading research centers for the work with collections, experience exchange, professional advancement and the development of partnership in monitoring. | Professional advancement of research officers, facilitation of the implementation of scientific work by the Reserve’s own forces. The rise in the number of publications. The defense of thesis. | 2009-2011 | Putorana State Nature Reserve | Federal budget | 150/450 |

### 3.3. Subprogramme «Development of environmental monitoring system»

#### 3.3.1. Establishment of ecosystem monitoring in different parts of the Reserve, taking into account spatial and qualitative heterogeneity of the landscapes.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Result/Indicator</th>
<th>Timeline</th>
<th>Executors</th>
<th>Sources of financing</th>
<th>Costs Thousand RUB. Year/period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of monitoring programs and data collection systems for the different parts of the Reserve (basing on specific features of each part); determination of information supply and processing methods. Monitoring of rare and common fauna species.</td>
<td>Continuation and development of successfully implementing monitoring studies of rare and common species. Implementation of monitoring programs to identify quantitative and qualitative characteristics for different parts of the Reserve’s area (as well as for different target groups of organisms).</td>
<td>2009-2010</td>
<td>Putorana State Nature Reserve</td>
<td>Federal budget</td>
<td>200/400</td>
</tr>
<tr>
<td>Management tasks</td>
<td>Activities</td>
<td>Result/Indicator</td>
<td>Timeline</td>
<td>Executors</td>
<td>Sources of financing</td>
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<tr>
<td>3.3.3. Input of data concerning the state of the Reserve' ecosystems into information systems of global target scientific research projects on the conservation of rare species and of integrated monitoring programs.</td>
<td>- Input of the data collected in the Reserve into the information system of the Circumpolar Biodiversity Monitoring Program (CBMP) - Data collection for the preparation of the Lesser White-fronted Goose National Conservation Strategy.</td>
<td>- Informing of the CBMP coordinators about the results of ecosystem monitoring in the Putoransky Reserve - Submission of the Lesser White-fronted Goose National Conservation Strategy for approval to the Ministry of Natural Resources</td>
<td>2009-2010</td>
<td>Working group on Anseriformes of Northern Eurasia, Putorana State Nature Reserve</td>
<td>Attracted funds</td>
</tr>
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</tbody>
</table>
6.2.4. PROGRAMME «International Activities»

The Putoransky Reserve was established in 1988. Since then scientific researches carried out in
the Reserve have resulted in many monographs and collected works, reports and presentations
at in total 12 international conferences. Scientific works of the Reserve are published in Russian
and English and regularly disseminated in more than 20 countries (not counting CIS countries)
on all continents.

The published monographs are the first detailed and reliable reports on the fauna of the Putorana
plateau. These works have compensated for a lack of a complex description of fauna of one of the
world’s most extensive and hard-to-reach regions. Due to the fact that the publications contain
extensive chapters in English, they are available for and have already become very popular among
the international science community. Presentations of the works at international symposiums in
London, Buenos Aires and Helsinki have aroused significant interest and, the books themselves
were praised by biologists and ecologists. Scientists from many countries took an interest in
the monographs. By now the books are in possession of many experts and are available in the
libraries of leading scientific research centers, universities, nature reserves and national parks in
Russia, CIS countries, USA, Canada, Japan, China, Great Britain, Holland, German, Sweden, Finland,
Norway, Poland etc. In particular, the books are contained in the libraries of Oxford, Krakow and
Tokyo Universities and in the Yellowstone National Park.

Active and wide dissemination of information collected during fundamental research projects
was resulted in the international recognition of the Putorana Reserve as an area worthy of
being inscribed onto the World Heritage List, and therefore the nomination process is currently
underway. A number of international research projects are being implemented in partnership
with the Working group on Anseriformes of Northern Eurasia and the Working group on waders.
Fruitful cooperation with the above mentioned organizations gives the Reserve a chance to
maintain a cooperative association with many experts and scientific research agencies in Europe,
America and Australia.

The Reserve’s staff members participate in international conferences, symposiums, working
meetings and field researches.

As far as the nomination process is not finished yet, the management personnel of the Reserve
regularly meets the UNESCO representatives. If and when the Reserve is inscribed on the List, the
cooperation with environmental units of this international organization should be systematic
and on a permanent basis.

The Reserve has also cooperated with the UNDP GEF in the framework of one of the UNDP GEF
projects.

In 2008, on the instructions of the Rosprirodnadzor (Federal Service for Oversight in the Sphere
of Nature Use), the Reserve came into the discussion on the prospects of coordination of
biodiversity monitoring in the framework of an international program “CAFF” (Conservation of
Arctic Flora and Fauna).
### 6.2.4. PROGRAMME «International Activities»

<table>
<thead>
<tr>
<th>Management tasks</th>
<th>Activities</th>
<th>Results/Indicators</th>
<th>Timeline</th>
<th>Executors</th>
<th>Source of financing</th>
<th>Costs Thousand RUB. Year/period</th>
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<tr>
<td>4.1.2. Participation in an international conference</td>
<td>Presentation of paper in a plenary session. Time and place: May 2010, Brisbane, Australia</td>
<td>Expansion of migratory bird species conservation programs; scientific publications</td>
<td>2010</td>
<td>Putorana State Nature Reserve</td>
<td>Extrabudgetary funds</td>
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<tr>
<td>4.1.4. Participation in CAFF Biodiversity Monitoring project</td>
<td>Monitoring of key elements of zoocenosis</td>
<td>Indicators of the status of populations, communities, ecosystems</td>
<td>2009-2013</td>
<td>Putorana State Nature Reserve</td>
<td>CAFF program</td>
<td>1000/5000</td>
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<tr>
<td>4.1.5. Employee training and education</td>
<td>Participation in trainings and educational workshops</td>
<td>Application of acquired innovative methods to practice in the Putorana Reserve</td>
<td>2009</td>
<td>Putorana State Nature Reserve</td>
<td>UNDP GEF</td>
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</table>
Performance parameters:
(According to the Ministry’s criteria for the evaluation of the Reports on the Results and Core Activities (so-called «DROND»), fire events and penalties cannot be planned)

<p>| Parameter 1: Protection of natural sites for the purpose of biodiversity conservation and the maintenance of natural complexes and sites in their natural state |</p>
<table>
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<tr>
<th>Parameter</th>
<th>Unit of measurement</th>
<th>Period under report</th>
<th>Planning period</th>
<th>Target value*</th>
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**Task 2: Development and execution of research programs**

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<td>Task 3: Environmental monitoring</td>
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</table>

* Rate to be achieved as the ultimate goal.

Task 5. Contribution to the training of scientists and specialists in the field of nature conservation
6.3. Monitoring of the core activities of the Reserve

1. The following criterion is used to evaluate the fulfillment of a programme «Conservation of natural complexes and sites»:

- Absolute, expert evaluation of animal population density/size.

2. Performance against scientific research plan and environmental monitoring:

- The number of current scientific research projects and monitoring programs carrying out in the territory of the Reserve;
- The presence of a scientific research plan and compliance with the plan;
- The length of routes used for the census of animals
- Monitored area
- The number of surveyed «concrete biotas»
- The number of scientific publications
- The number of joint research projects and partner organizations.
- The quantity of printed informational/illustrative materials on environmental issues (calendars, leaflets, booklets, posters, badges); the number of appearances on radio and TV.

<table>
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<th>2.1. Monitoring programs for various regions and life forms</th>
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<td>2.2. Scientific research plan</td>
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<td>2.3. The length of routes for animal record (kilometers) / Monitored area (km²)</td>
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<td>120/50</td>
<td>130/50</td>
<td>150/60</td>
<td>170/60</td>
<td>190/60</td>
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<td>2.5. Research themes in the «Nature Records»</td>
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<td>2.6. «National Strategy for the lesser white-fronted goose conservation »</td>
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<td>2.7. The number of partner organizations participated in joint research projects</td>
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<td>2.8. The number of scientific publications</td>
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<td>2.9. Appearances in the mass-media</td>
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ANNEX C
LISTS OF PLANT AND ANIMAL SPECIES
DESCRIPTION OF WATERFALLS

C1. Endemic plant species and sub-species of the Putorana plateau
C2. Endemic fish species and forms of the Putoransky reserve
C3. Rare and disappearing bird species of the Putorana plateau
C4. List of fish species noted in reservoirs of the Putoransky reserve
C5. Description of waterfalls of the Putoransky State Nature Reserve
Endemic plant species and sub-species of the Putorana plateau.

**Draba sambukii** - high number of its locations is known on the plateau.

**Caltha serotina** - is found disperse on the plateau, most commonly in mo- chezhinas and on flooded banks of rivers and lakes in the forest zone (see map 7).

**Oxytropis putoranica** – its population is found on chipping of bald peak near lake Baselak.

**Euphrasia putoranica** – grows on limonite near lake Khaya-Kiuel’.

**Festuca auriculata var. Pilosa** – abundantly grow dry sandy gravel river terraces near lake Bokovoye.

**Papaver variegatum** – is widely spread in the western and central part of the plateau: on the east it is found only in places of contact of basalt cover with limonite (lakes Darima and Sirkiuarvit).
Endemic fish species and forms of the Putoransky reserve:

1. Salvelinus boganidae Berg, 1926
Within the reserve and its protected zone is noted in lakes of Norilo-Pyasinskaya system: Lama, Glubokoye, Sobach’e, Keta and in basin of river Khatanga (small population). Has a lake and river-lake form. In lake Lama reaches length of 70 sm., with mass of 2.7 kg and age of 16 years; in lake Sobach’e reaches length of 52 sm., mass of 1.75 kg and age of 13 years; in river Khatanga basin – 60 sm., 3.0 kg and 13 years. Feeds on fish and insects’ water larvas. Proliferates in August-September in the depth of about 10 m, in rivers. Reaches maturity with length of 35-40 sm., mass of 0.8 kg, at the age of 6-8 years. Population size is low, caused by irrational fishing and poaching.

2. Salvelinus tolmachoffi Berg, 1926
Is met in lake Khantayskoye. Maximum length is 53.5 sm., mass – 2.1 kg, age – 10 years. Spawns in near-shore zone of the lake in the depth of 2.5-4.0 m, in October-November. Fertility 2600-3100 fish eggs. Feeds on sand hoppers, copepods, midges’ larvas and fish.

3. Salvelinus drijagini Logaschev, 1940
Is noted in lakes of Norilo-Pyasinskaya system: Lama, Glubokoye, Sobach’e, Keta, and also in lake Khantayskoye. It is morphologically and ecologically variable specie: it has lake-river, lake, semi-passing, melanistic, “long-staminal” and “short-staminal” forms; winter and spring races. Reaches length of 90 sm. and mass of 8.5 kg. Spawns in rivers in August-September. Fertility 2255-9078 fish eggs. Feeds on fish, flying insects, insects’ water larvas, sand hoppers. Population size is relatively small. Is an object of local fishing. In some reservoirs is in threatened state.

4. Salvelinus taimyricus Michin, 1949
Is met in lake Keta. Length up to 77 sm., mass up to 4.8 kg, maximum age is 11 years. Spawns in near-shore zone of the lake in autumn.

5. “Putoranchik” loach
Is noted in lake Ayan (river Khatanga basin). Reaches length of 33.5 sm., mass of 220 g and age of 16 years. Reaches maturity in the age of 6-7 years. Spawns from late August till October, in the lake in the depth of 5-15 m. Feeds on zooplankton. Population size is high.

6. Abyssal loach “Pucheglazka”
Is noted in lakes Lama and Sobach’e and, probably, in lake Khantayskoye. Has forms varying in morphology. Reaches length of 45 sm., mass of 300 g and age of 18 years. Reaches maturity with length of 29 sm., at the age of 12 years. Spawns in rivers in the depth of 5-15 m, in late August-early September. Fertility 546 fish eggs. Feeds on benthos organisms and insects. Population size is relatively high. Is an object of poaching.
7. “Gornyi golets” – mountain loach
Is noted only in basin of river Mikchanga, which falls into lake Lama. Has morphological and genetic features differing from other loach species. Biology is not studied.

8. Coregonus lavaretus pidschian (Gmelin, 1788)
Is met in river Pyasina basin (lakes Lama and Keta), basins of Khatanga and Yenisei (lake Khantayskoye). In lake Lama were noted three endemic morph-ecological forms of the specie. Another few forms were described in other reservoirs of the region. Maximum size is 71 sm., mass – 4 kg and higher, age – 14 years. Reaches maturity at the age of 7-8 years, with length of 28-33 sm. Spawns as in rivers, as in lakes in November-January. Fertility 6288-21720 fish eggs. Feeds on benthos organisms. Population size is relatively high.

9. Coregonus muksun (Pallas, 1814)
Is noted in reservoirs of river Pyasina basin (lakes Glubokoye and Lama) and river Khatanga basin (lake Ayan). Has two morphological forms in Pyasina basin. Reaches length of 71 sm. and mass of 3.6 kg. Age is up to 20 years. Reaches maturity at the age of 9-13 years with length of 35- 40 sm. Spawns as in rivers, as in lakes in autumn. Fertility 8964-11760 fish eggs. Feeds on plankton, benthos organisms and flying insects. Population size is high.

10. Prosopium cylindraceum (Pallas et Pennant, 1784)
Is noted in reservoirs of river Pyasina basin: lakes Glubokoye and Lama and their tributaries; in lake Khantayskoye and its greater tributaries; in river Khatanga basin (lake Ayan). Has two local forms with not yet defined location in structure of the specie. Reaches length of 52 sm. and mass of 2.19 kg. Maximum age is 14 years. Reaches sexual maturity at the age of 5 years with length of 25 sm. and with mass of 100-150 g. Spawns in September-October in rivers. Fertility 4505-20221 fish eggs. Feeds on benthos. In most reservoirs has low population size.

11. Thymallus arcticus (Pallas, 1776)
Is noted in rivers and lakes of all three river basins (Yenisei, Pyasina and Khatanga). Has two morphological forms with not yet defined location in structure of the specie. Reaches length of 51 sm., mass of 1.67 kg and age of 10 years. Reaches maturity at the age of 6 years with length of 24-28 sm. and mass of 240-300 g. Spawns in rivers in June-July. Fertility 4100-5200 fish eggs. Feeds on insects’ water larvae, flying insects and fish eggs. Has relatively high population size.
Rare and disappearing bird species met on the Putorana plateau.

<table>
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<tr>
<th>Bird Species</th>
<th>Status and Location</th>
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<tbody>
<tr>
<td>Gavia adamsii Gray</td>
<td>Is probably nesting. Included into the Red Book of Russia.</td>
</tr>
<tr>
<td>Rufibrenta ruficollis Pall</td>
<td>Is met during migrations. Included into the Red Book of the former USSR and Russia. Endemic specie of polar Asian part of Russia.</td>
</tr>
<tr>
<td>Anser erythropus L.</td>
<td>Is nesting. Included into the Red Book of Russia.</td>
</tr>
<tr>
<td>Cugnus cugnus L.</td>
<td>Is nesting.</td>
</tr>
<tr>
<td>Cygnus bewickii Yarr.</td>
<td>Is nesting. Included into the Red Book of the former USSR and Russia.</td>
</tr>
<tr>
<td>Anas formosa Georgi</td>
<td>Is probably nesting.</td>
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<td>Pandion haliaetus L.</td>
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</tr>
<tr>
<td>Aquila chrysaetos L</td>
<td>Is nesting. Included into the Red Book of the former USSR and Russia.</td>
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<td>Haliaeetus albicilla L.</td>
<td>Is nesting. Included into the Red Book of IUCN, the former USSR and Russia.</td>
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<tr>
<td>Falco rusticolus L.</td>
<td>Is nesting. Included into the Red Book of the former USSR and Russia.</td>
</tr>
<tr>
<td>Falco peregrinus Tunst.</td>
<td>Is probably nesting. Included into the Red Book of the former USSR and Russia.</td>
</tr>
<tr>
<td>Grus monacha Temm.</td>
<td>Is nesting. Included into the Red Book of IUCN, the former USSR and Russia. Endemic specie of Asian part of Russia.</td>
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</tbody>
</table>
List of fish species noted in reservoirs of the Putoransky reserve.

**Family Acipenseridae**
*Acipenser ruthenus*
*A. baeri*

**Family Salmonidae**
*Salvelinus alpinus*
*S. drjagini*
*S. boganidae Berg*
*S. tolmachoffi*
*S. taimyricus*
*Brachymystax lenok*
*Hucho taimen*

**Family Coregonidae**
*Stenodus leucichthys nelma*
*Coregonus sardinella*
*C. peled*
*C. autuminalis*
*C. nasus*
*C. lavaretus pidschian*
*C. muksun*
*C. tugun*
*Prosopium cylindraceum*

**Family Thymallidae**
*Thymallus arcticus*

**Family Osmeridae**
*Osmerus mordax dentex*

**Family Esocidae**
*Esox lucius*

**Family Cyprinidae**
*Rutilus rutilus*
*Leuciscus leuciscus baicalensis*
*L. Idus*
*Phoxinus phoxinus*
*Carassius auratus gibelio*
*Gobio gobio cynocephalus*
Family Balitoridae
*Barbatula toni*

Family Lotidae
*Lota lota*

Family Gasterosteidae
*Pungitius pungitius*

Family Percidae
*Perca fluviatilis*
*Gymnocephalus cernuus*

Family Cottidae
*Cottus gobio*
*C. poecilopus*
*C. sibiricus*
*Triglopsis quadricorni*
Bolshoi Honnamakhit is a left tributary of the Ayan River. The source of the river is situated at a height of 1300 meters in the western side of the plateau, south of the Bogatir Massif. The river is 78 kilometer long; drainage area is about 1860 square kilometers, an average annual discharge at the river mouth is 43 cubic meters per second. The tributaries of the Bolshoi Honnamakhit are the rivers South Nerakachi (left), Amnundalak, Pedei, Gulyami-Ikon, Chopko 1 and Chopko 2 (right). The stretch of the river from the upper lakes to the waterfall is 65 - 70 kilometers long, its average slope is 7.5 meters per kilometer.

The first waterfall on the Bolshoi Honnamakhit River is a vertical 8-meter drop of water to a narrow canyon. The river’s width here is 20 meters.

The second waterfall is 9 meters high. Here the river is raging in a narrow curved channel under the rocky overhang on the right bank of the river.

Kholokit is a right tributary of the Ayan River; its length is 112 kilometers. Kholokit begins at the bottom of the Kholokit Mountain (1564 m.), in the highest part of the Central Putorans. Drainage area is 1980 sq. km. The river receives a large tributary called Duluk (enters the Kholokit 6 km upstream from the river mouth) and three small left tributaries in the upstream of the river. A beautiful 18-meter waterfall.

There is another large 17-meter waterfall 6 kilometers upstream. Two waterfalls, 20 and 21 meters high, are located on a left tributary of the Kholokit River – the Nerakachi River, not far from the Nerakachi river mouth. Within the canyon the river is 20 - 30 meters broad.

Duluk River is a left tributary of the Kholokit River. Its length is 55 kilometers; the floatable segment (from the bend of the river to the north to the river mouth) is 30 kilometers long and has an average slope of 10 m/km. An average annual discharge at the river mouth is about 20 m$^3$/sec.

There is a 100-meter waterfall on the Upper Duluk River. Before the river reaches Lake Dulouk it flows in a water gap with steep banks. After the lake, forest appears at the channel’s bottom and the valley takes the U-shape. There is a river stretch with numerous waterfalls before the river mouth.

Kotyi is one of the largest Putorana rivers and the largest source of the Khatanga River. It begins in the highest portion of the plateau, on the slopes of the Mountain Kotyiskaya. The river is 1460 kilometers long. Drainage area is 36 000 sq. km. Discharge at the mouth is 2700 m$^3$/sec. In its upper and middle flow Kotyi River runs through the Putorana plateau to south-east, and further on it rolls down over gradually sloping eastern branches of the plateau. 360 kilometers away, after a sharp turn to north-east, the Kotyi River scours canyons in lime rock of the Kotyi plateau and flows to the Arctic Ocean.

An average slope of a 70-kilometer section of the Upper Kotyi (before the Lake Kharpich) is 2.4 m/km. Within this section the river receives large tributaries Nonnomakhit (left) and Delochi (right). At an altitude of 700 meters above sea level the Kotyi River runs down the hill from a mountain pass on the Upper Kapchug River and then meanders through a broad valley encircled by steep slopes of the plateau. Cripples and shallow waters with large, chaotically scattered underwater stones (shivera) are common here.
In this part of the river’s course the riverbed is only gently inclined. Downstream the river meets no obstacles and therefore has many slow-stream reaches. The landscape is pacifying: boggy meadows, floodplain lakes and – occasionally – field woodlands. Valley sides are 1-2 kilometers away from the river banks.

There are several shivera and two easy overcomable rapids near the mouth of a left tributary Nonnomakhit. After that the valley is getting narrow and the river speeds up. There are about 40 shivera and small rapids on a 33-kilometer reach before the Delochi River’s mouth.

About 4 - 5 kilometers upstream from the confluence with the Delochi River, the Kotyi River is squeezed between steep walls, and therefore the slope gradient increases. Beautiful waterfalls gush out from the walls. The riverbed is totally covered with small-sized shivera. 150-meter sheer cliffs form of amphitheatre around a wide reach of the river and an aufeis. This cup-like hollow is followed by a short semi-canyon with a few slide waterfalls. This is the Chomugurdakh - isolated terrain feature. At the end of it, there is a 20-meter residual outcrop in the center of the riverbed. The stone breaks the heavy water flow in to currents. There is a powerful waterfall on the left side of the Chomugurdakh. One more kilometer of a gentle flow - and the Delochi mouth comes in sight.

**River Neral** is a tributary of the Yagtaly Kureiskaya River. It is 50 kilometers long; its drainage area is 1150 sq. km. The river has the following tributaries: Kungal’dyik (left), Negu-Yikon and Burgil’ (right).

24 meters downstream from the confluence with the River Burgil’, after a smooth bend to the right, a complex waterfall begins with 200-meter long rapids. It includes 3 powerful slide waterfalls and a cataract rushing down amidst steep banks. Here the water descends from a deep cleft of about 7 meters wide to a large «bowl» surrounded by sheer slopes of a 30-meter canyon. Continuing on, the Neral River runs 7,5 kilometers at the bottom of the canyon and forms a continuous chain of complicated rapids. In the canyon the stream slope is 20 m/km within the first 4 kilometers, and 15,4 m/km over the next 3 kilometers.

The farther from the waterfall, the deeper the canyon and the more well-defined «steps» over which the water flows down. The steps are divided by ponds; there are also a few powerful rapids and two low waterfalls.

In these parts of the river’s course the left slope of the canyon is composed of 60-meter high, amazingly eroded sheer cliffs. A very interesting nature monument called the Four Crows site - an aufeis coming close to and hanging over the Neral River canyon - is located in a woodless stony valley. It is 200 meters wide and 2 kilometers long and occupies the upper zone of a stream - a tributary of the River Yagtali. The site is surrounded by taiga forest. In warm years the stream scours long tunnels in a 3-meter thick ice mass.

Near the river mouth the canyon is 180 meters high. The distance between the end of the canyon and the place of the confluence of rivers Neral and Yagtali doesn’t exceed 700 meters.

**River Dulismar** is a tributary of the Yagtali River. It begins at a height of 1350 meters south-east of the Lake Ayan. The length of the Dulismar is 55 kilometers; its drainage area is 930 sq. km. The river receives rivers Left and Right Dulismar and Delochi-Yikon from the left and the Ulan River from the right.
The first waterfall is 3.5 high; it is located in the canyon downstream from the Ulan River mouth. The next one is 7.5 meters high, and there is the third (4 meters high) waterfall 300 meters away. Coming out from the canyon, the Dulismar bends to the east, flows over a monolithic rocky streambed and rushes down the canyon in the form of 14-meter complex cascade. 100 meters below the cascade, in a canyon with 20-30 meter-high slopes the Dulismar meets the Yagtali. Waters of the Yagtali River also descend to this cup-like canyon and form a 10-meter waterfall. The confluence of the Dulismar and the Yagtali – Ribtochka Stepanischeva - is one of the most beautiful places of the Central Putorans. Standing on the banks of a steep-sloped canyon where emerald-green waters of the Yagtaly slowly flow at the bottom, one can see two waterfalls at once: slender parabola-shaped Yagtalinsky waterfall and the complex multi-stepped cascade on the Dulismar River. In low-water periods both the Dulismar and the Yagtali flow before the waterfalls in narrow and deep, 3-5 meter wide chasms. Hundreds of graylings play under the waterfalls.

**Lake Dupkun** is the longest lake of the Putorans. It is 135 kilometers long and from 700 meters to 4 kilometers wide. This running-water lake lies at a height of 109 meters above sea level and occupies the Kureika River valley. Rivers 1 & 2 Gaggarya and a stream Bolishoy Medvezhy join the lake from the north.

This is the most elongated lake in the world – it has the biggest length-to-width ratio.

Narrow north-western portion of the lake is situated in a narrow hollow between table rocks. An average width of the hollow is 1200 meters. This stretch from the mouth of the 1 Gagarya River to the mouth of Tesnaya River is, perhaps, one of the most spectacular places in the Putorans. Its main attraction is a mountain Trapezium (1208 m.) on the left bank of the lake. The mountain slope drops to the thin ribbon of the lake. In June or - in rainy years – all summer long a multi-stepped waterfall with total height of 500 meters – one of the highest in Russia - descends from the northern slope of the mountain. Many beautiful waterfalls are located on the tributaries of the Lake Dupkun – rivers 1 and 2 Gagariya.

**River Kutaramakan** begins north of the Lake Manumakhli at a height of 950 meters above sea level. In the middle-stream reaches the Kutaramakan River flows through a long lake of the same name. Large tributaries of the Kutaramakan are Khukta River and Moya-Achin River (right) and Irkinda River (left).

Moya-Achin River is a large tributary of Kutaramakan River. Its length is 42 km; drainage area is 625 sq. km. The river takes off from the Lake Dlinnoye in the Chaya-Ayan Mountains at a height of 850 meters above sea level. Discharge at the river mouth is up to 30 cubic meters per second. Stream slopes are from 12 to 26 m/km.

A stretch with many rapids and with 9 waterfalls in the canyons begins 3 - 4 kilometers downstream from the Blagodatnaya River mouth.

The first waterfall is 600 meters downstream from the beginning of the rapids. It is 7 meters high. Three waterfalls - 6, 4 and 16 meters high - are 4 kilometers away, in a steep-sloped, up to 50 meter-high canyon. Powerful rapids called «Gates» and the fifth waterfall (7 meters high) are at the end of the canyon. The sixth waterfall – the largest on the river - is 32 meters high; it’s located 1,5 kilometer upstream from the point where a right tributary enters the Moya-Achin. The seventh waterfall is further downstream; its height is 5 meters.
The eighth waterfall is 7 meters high; it is located in a narrow gorge 1.5 kilometers downstream from the Nyandikhan. 4 kilometers away the Moya-Achin River significantly widens and 300 meters before it meets the Kutaramakan it forms the last (ninth) waterfall, which is 8-10 meter high.

**The length of the River Irkinda** — *a tributary of the River Kutaramakan* — is 71 kilometer; drainage area - 900 sq. km. The Irkinda begins from the Lake Manumakhli (457 m. above sea level), flows in latitudinal direction and disgorges itself into the Lake Kutaramakan (109 m. above sea level). Major tributaries are the rivers Hukta, Ozernaya, Khitabo-Chayakhit – all join the Irkinda River from the right. In summertime the water discharge in the Upper Irkinda is 20 - 50 m²/sec. Average stream slope is 5 m/km.

Irkinda is a beautiful river. Along its whole length it runs through a deep valley. The sides of the valley are steep and have plenty of waterfalls. The valley is covered with larch trees. It is especially picturesque because of a group of waterfalls in its lower part, which includes one of the most beautiful cascades in Russia – 27-meter high Khitabo-Oron.

The Upper Kitabo waterfall is a nature monument, one of the finest spots of Eastern Siberia. It is located at the place where the Khitabo-Chayakit enters the Irkinda, and has a remarkable feature: it changes its habitus depending on the quantity of water and weather conditions.

In dry years and during hot weather periods the river waters descend as three individual currents to a deep hole with vertical walls. The right branch is 27 meters long and falls straight down while two left branches form cascading waterfalls. Before approximately 10-12 meters from the lower water edge all three branches run into one to fall vertically to a deep bowl filled with slightly green water. There is the yawn of a 10-meter grot behind the waterfall. The canyon with absolutely vertical slopes stretches for half a kilometer; it contains 4 rapids and the second waterfall, 4 meters high, located 1.5 kilometer downstream from the first one.

In high-water periods the river fills up the upper pond and the upper waterfall looks like a magnificent 50-meter-wide horseshoe. Splashes produced by huge water mass spread out all over the canyon. The canyon’s bottlenecks are half-filled with water. About a quarter of the entire water mass comes in a dry channel located to the left of a stony islet and another, 15-meter-high, waterfall appears on the left bank. In high-water periods the lower waterfall on the Irkinda River does not exist because the narrow canyon is flooded.
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