



Tacis Project ENVRUS 9704

Proposals for the establishment of the Tuulos National Park

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Preface

This report contains the documents which, according to the Russian legislation, are required for the establishment of the Tuulos National Park: Feasibility Study for the establishment of the NP and Proposal for the Plan of the Tuulos National Park including an Action Plan for the five first years of the NP's operation. After handing over the documents to the Government of the Republic of Karelia, the future of the National Park is in the hands of the Republic and the Russian Federation.

The preparation of this plan has been possible due to the funding of the European Union Tacis Programme. Support to the Tuulos National Park was one of the activities in the project Karelia Parks Development, which was implemented here in 1999-2001. During the project, the Municipal Entity of the Tuulos National Park was established together with the local administration of the Muezerka district. Its main task is to develop and maintain the Park infrastructure, services and tourism before the National Park is officially established. The Municipal Entity was also the local recipient of the training and equipment, which is needed for the Park management and which was received from the Tacis project. However, it is only a transition period organisation, which will be replaced by the National Park administration.

On behalf of the consortium running this project (the consortium included Metsähallitus, Finnish Environment Institute, Indufor Oy and Kampsax International A/O), I wish to thank Oleg Kuznetsov as the author of this plan, and all the Russian and foreign experts, who have contributed to the preparation of this plan and in other ways supported the development of this peculiar territory to an internationally recognized National Park.

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ENVRUS9704

Synopsis

The proposed Tuulos National Park extends in West Karelia on the territory of the Muezerka district near the Russian-Finnish border from 63°25' to 63°45' N., and from 30°12' to 30°45' E. The area of the proposed National Park is 62 260 ha and is presented by a single landscape element: a tectonic fault line denudated by glaciations, with a large oligotrophic Lake, Tuulos, in the middle. There are 420 lakes and 80 small rivers within the Park. 29% of the territory is covered by water, 63% by forest and 8% by mires. Lake Tuulos with an area of 95 km² has picturesque broken shores with numerous bays, 140 islands and many valuable fish species. There are two rather big rivers, Lenderka and Lushma, with great rapids and beautiful shores, which run through the state border to Finland. This description makes the Park territory a wonderful object for different types of water tourism and fishing.

The Park's nature is considered typical for northern taiga in Russian terminology. According to Finnish and Nordic biogeography this area belongs to the middle boreal zone (Ahti et al 1968, Moen 1999). A complex of various species flora and fauna are presented here in the local forests, mires and waters of eastern Fennoscandia.

The natural and historical values justifying the establishment of the Tuulos National Park, can briefly be presented as follows:

Lake Tuulijärvi with 140 islands, sounds and bays is a beautiful natural formation and has beautiful landscapes. High hills around the lake make it possible to enjoy these landscapes. The lake has a high recreational value.

Old-growth forests cover about 4000 ha in the western part of the Park and they have a flora and fauna typical for forests that have never been cut.

Many endangered species (six vascular plants, 2 mosses, 5 lichens, 10 mammals, 15 birds and 2 fishes) permanently live here. Of them can be mentioned for example wild forest reindeer, flying squirrel and many other taiga species, which live here in fairly high numbers. Wolf and bear, which are nowadays rare in Western Europe, are common dwellers of this wilderness.

Rich fish resources of the lakes and rivers, especially the brown trout population, are valuable and worthy of protection so that they will not be lost.

Cultural history of the former villages.

The Tuulos National Park is an important part of the Green Belt, which covers a strip on both sides of the state border from the Barents Sea to the Gulf of Finland.

Forest ecosystems have 605 of pine types, and the share of spruce communities is 35%. Standing wood stock is 4,77 million cubic meters, of which 2,0 million cubic meters is of commercial value on this territory.

There is no permanent human population in this area and almost 905 of the Park is situated within the border zone, behind the border fence. For the Park establishment the border fence should be moved to the 2 km broad border zone. In order to develop international tourism a new international Inari cross-border checkpoint is to be open, through which nowadays timber is delivered from the Lentiira settlement to Finland.

The most serious threat to the Park establishment is forestry, because the majority of the territory enjoys only temporary protection to the end of the year 2001, based on a resolution of the Karelian Government. Wild tourism is also here, within the border fence, a remarkable threat, especially in terms of forest fires, illegal fishing and poaching.

As a result of a **socio-economic analysis** it can be found, that the establishment of the Kalevala National Park will, in the long run, mean less income from forestry to the Republic of Karelia and the Russian Federation. However, there are not large funds of forest available in this territory. Negative opinions from some logging enterprises have been expressed towards the Park establishment, but the administration of the Lentiira forestry enterprise supports the idea of the NP and is ready to create the infrastructure having financial resources for that. Some of the locals in Lentiira are not certain about the Park establishment, because they are afraid of restrictions to fishing in Lake Tuulos. The local administration of the settlement also supports the future Park because they believe in the development of the social structure and the creation of new employment. The Park idea is of great interest to teachers and schoolchildren.

The National Park would not greatly limit the rights of local people to use the natural resources. Hunting will be forbidden in the Park, but this area is not important for locals as a game resource. Picking berries and mushrooms as well as fishing will continue as earlier. The strictly protected zone will be closed for all visitors.

Functional zoning of the NP will be drawn up. 5% of the National Park would belong to the strictly protected zone with no access and 7% to the special protected zone, where access is limited. They are established in a remote and less accessible part of the territory in order to safeguard the natural succession of primeval forests for scientific purposes. At the same time, the 2 km broad border zone in the western part of the Park covers 23% of the Park territory.

A plan for the facilities and services is presented. The office of the NP is to be located in the village of Lentiira. The Visitor Centre of the Park will be constructed there later. Access to the Park will take place through two gates: the main gate is in Vostochny in the southeast, 30 km of Lentiira and the northern gate will be constructed in Tuulos village. Four camping grounds with good service (cabins, sauna, guard) would be constructed and tens of campsites with simple facilities further in to the Park. Tourism on lakes and rivers will dominate in this National Park.

In the Park **administration** 43 permanent employees and a number of temporary workers are needed to keep the Park running. It is proposed, that the staff would be taken gradually during the five first years. The construction of the Park is estimated to need investments of 36,6 million Roubles (equal to 1,464 million Euros) during the ten first years, after which the need of investments will decrease. The largest investments are proposed to be the planning and construction of the office and the Visitor Centre in Lentiira. The construction of a small hotel there would most probably need external support. During the five first years of the NP, annual expenses are estimated to grow from 4,75 million to 6,07 million Roubles (equal to 190 200 – 242 800 Euros) and the incomes from 0,17 million to 0,92 million Roubles (equal to 6 840 – 36 800 Euros).

Before the establishment of the Tuulos National Park, **the Municipal Entity of the National Park** will take care of the activities. It has been the local recipient of the Tacis project Karelia Parks Development ENVRUS9704 and developed the Park infrastructure and tourism there before the official establishment of the NP.

I. Feasibility study for the establishment of the Tuulos National Park

1. Introduction

Russia's National Parks belong to objects of federal property and are included in the single system of country's protected areas (PA). National Parks are established to resolve environmental, recreational and educational purposes.

With the aim of operative management and short-term (5-10 years) planning of the activity of certain Parks several countries and Russia has started since recently developing management plans. The establishment of Tuulos NP was prepared within "The Prospective Net of Protected Areas in Russia for the period of 1994-2005", (Decree of the Government of the Russian Federation, N 572 of April 23, 1994).

The Proposals for the establishment of the Tuulos NP has been prepared by a group of experts in the Karelian Research Centre (KRC) and the Muezerka District within the framework of the Tacis Project "Cross-border Co-operation Environment Programme: Karelia Parks Development", ENVRUS 9704 (Fig. 1). Later on it was included to the Green Belt of Fennoscandia (see the map). During the process of development different literature and materials of the Forest Research Institute such as "Inventory and study of the biodiversity of nature complexes, ecological and social-economic justification of the proposed boundaries of the Tuulos area", (Petrozavodsk, 1998), "Inventory of nature complexes and ecological study of the Tuulos NP" (Petrozavodsk, 1998) as well as data from report of Institute of Forest of the KRC "Inventory of nature complexes, ecological and socio-economic justification of the boundaries of the Tuulos NP" (Petrozavodsk, 1998). These studies were financially supported by the Ministry of Environment of Finland through the Committee of Environment of Karelia in the framework of the program of scientific-and-technical co-operation between Finland and Russia in the sphere of forest management and environment protection. The results of a field research conducted in 2000 by local experts involved in the project on the following (Gromtsev A.N. – forests, Danilov P.I. – mammals, Ilmast N.V., Pavlov V.N. – fish, Kravchenko A.V. – vascular plants, mosses, mires, Litvinenko A.V. – hydrography, Sazonov S.V. – birds), literature sources and various archive materials have been also taken into consideration. The textual content of the Management Plan was prepared by O. Kuznetsov (Karelian Research Centre)

Section I and sub-sections 1-4 of the given report have been prepared by Candidate of Biology Oleg Kuznetsov (Karelian Research Centre of the Russian Academy of Sciences), sub-sections 5-6 have been put together by Jouko Hogmänder and Oleg Kuznetsov, sub-section 7 - by Jouko Hogmänder.

Comments and proposals of local (Nikolai Konovalov) and EU experts (T. Lindholm, E. Klain, M. Maatta, A. Friman) of the Project have been taken into account in the text.

2. Current and proposed legal status

The necessity of the establishment of the Tuulos National Park with an area of 80 000 ha was considered during the elaboration of "Prospective Network of Karelia's Nature Protected Areas" (1993), then it was included into the "Prospective Network of Russia's Nature Protected Areas in 1994-2005", and approved by the Decree of the Government of the Russian Federation No 572, April 23, 1994.

Research studies by different specialists of the Karelian Scientific Centre of the RAS took place in 1994 with the aim to identify the ecosystems assessment and borders of the Park. While discussing the research materials the local administration approved a rather small area to the future Park – only 30 000 ha. This territory was reserved for the establishment of the National Park by Decree of the Chair of the Government of the Republic of Karelia (RK), No 938 of November 4, 1996. The area includes the water bodies of Lake Tuulos and neighbouring compartments N 51-55, 64-69, 72-77, 82-87, 131-136 of the Tuulos forest range within the Sukkozero forest district. The reservation period of this area is over at the end of 2000, and still there is no nature-protected status given to this area. Only the status of a part of the forests has been changed, due to the establishment of a water-protected zone with the 500 m wide and 1000 m long along the banks of Lushma and Lenderka rivers (Decree of the Government of the RK, No 456 of September 30, 1999). The forests of these water-protected zones will be moved to a group and its utilisation will be more limited.

It is important to determine the status of this nature-protected area with the aim to protect forest and lake ecosystems. Knowing the fact that the Park establishment is a long-term procedure (several years), first it is necessary to establish a regional complex **zakaznik** (game reserve) with a small number of forest rangers here. The regulations of the game reserve will allow conservation of the remaining old-growth primeval forests from cutting, and will provide protection of animals. Within the period of National Parks network development in Karelia and understanding of their importance by the Government of Karelia, a nature Park under regional supervision or a National Park could be established here. The nature and recreational potential of the territory is worth it. For the establishment of a National Park there is a need to open the Inari cross border check-point, this gives good access for foreign visitors to the Park and gives a good opportunity for the organisation of international routes in lakes Sula, Lenderskoye, Lenderka river and further to Lake Ruunaa, which is located within the Ruunaa Hiking Area, a large nature tourism centre in Finland.

3. Borders of the Park

The territory is 25 km long from northwest to southeast and 15-17 km wide. All the territory belongs to the Federal Forest Fund and referred to the Tuulos and Lentiira forest ranges of the Sukozero forest district.

For several centuries North Karels lived in the vicinity of the Park. They gradually shifted the Saami hunters who used to live on this territory earlier. That is why there are many lakes, rivers, hills and other interesting places that have names with Karelian and Finnish roots. You can see some names on the maps of this area. During the process of the assimilation of the territory and making the maps some of the names were changed or lost. So, the largest Lake, Tuulos, after which the Park was named, is a Russian version from the true Finnish word – Tuulijärvi, meaning "windy lake". The name of the second largest Lake, Koroppi, is considered a distortion from Korppijärvi – Raven Lake.

Initially 80 000 ha was proposed for the Park and the Park borders have been proposed by the Karelian Research Centre of RAS according to the hydrological parameters of the water catchments of Lake Tuulos. The regional administration and the Government of Karelia have ignored these proposals designating only 30 000 ha for the Park area. In 1997 with the order of the Ministry of Ecology and Nature Resources in Karelia the Karelian Research Centre has worked out the new boundaries of the Park according to ecological and social-economic parameters. The water areas of Lakes Korppijärvi and Mäntyjärvi and also compartments to the west of Lake Tuulos (39, 48-50, 125-130) were proposed to be included into the boundaries of the Park territory. The proposed area will be 38 500 ha (Fig. 1). The local administration of the Muezerka District has endorsed the boundaries of the Park but without the water areas of Lakes Korppijärvi and Mäntyjärvi (letter N 39 dated 15.01.98). So, in this case the area is 36 500 ha.

In the identification of boundaries of the Park in 1997 the recommendations of hydrologists were not considered and the eastern boundary of the Park did not include any of the water areas of Lake Tuulos to be protected. Contacts with the regional administration, Lentiira lespromhoz and local experts have shown the need to reconsider and enlarge the boundaries of the Park. It was linked with the importance of having a cross-border part of the Lenderka River as a significant object for international water tourism development. Then the proposed area became 62 260 ha, including 69 compartments of the Tuulos forest range (among them 26 – in border– guided area) and 7 compartments of the Lentiira forest range (4 – in border– guided area) (Fig. 1). The eastern part of the Park extends from 2 to 4 km from the Tuulos shores, which makes the natural regime possible in the future. Territories, added to the Park area in 1997, mainly represent forests with clear cuttings done. Young stands could be seen here and there will be no interest to logging enterprises in the near future. There are lakes. Channels to Lake Tuulos connect small Aitajärvi and Aitajärvi. They are very picturesque and suitable for boating. Agreement upon these boundaries has not been worked out yet nor with the regional administration or forestry organisations.

Actually the whole territory of the proposed National Park (90%) is in the restricted border zone, therefore at present visiting it is strictly limited. Establishing the Park will only be feasible if the regime of visiting this area by Russian and foreign tourists is simplified.

4. Nature

Geology, terrain and landscapes

The territory of the Park is located within the East-Karelian highland with cleaved terrain and absolute points from 143m (Lushma river) to 255-258 m on hills to the northwest connection of Lake Tuulos (Fig. 2). The emphasized geological structure here is the Tuulos shield with outcrops, which date back to the late Archei/Proterozoic period, with the age about 3 billion years old (various gneiss, granite, gneiss-granite, granodiarit). The northwest tectonic dislocations form the ridge and ridge-hilly terrain of the crystalline fundament. Basins of Lakes Tuulos and Koroppi are typical examples of the broken fissure depressions (Gorkovets et al, 2000).

The majority of the bedrock is covered with Quaternary deposits of different genesis, with size from 20m and more (Fig. 3). This area became free from the last glacier during the Salpausselkja II period (10,6 – 10,2 thousand years ago). The most typical deposits here are Upper-Pleistocene glacial and fluvio-glacial deposits, represented by basal moraines, sorted sand and pebble. Peat-lands, sediments of Lake basins and sand-pebble beaches on shores of lakes are determined as Holocene deposits. The main peculiarity of the Tuulos NP's terrain is a complicated combination of ridge forms of pre-glacial, glacial and latest glacial age terrain, oriented in C-3 directions, in accord with the broken fissures and glacier movement. The accumulative ice terrain of this territory is rather peculiar because of drumlins and drumlinoids, and also the system of esker ridges between Lakes Tuulos and Koroppi. A number of geological and geo-morphological objects on the territory of the Park are of great interest for scientific tourism: ancient crystalline outcrops, denudation-tectonic terraces, flow of ice waters, eskers and drumlins (Demidov, Lukashov, 1998).

A number of geological and geomorphologic objects in the territory of the Park may be of great interest for scientific tourism: outcrops of ancient crystalline formations, denudation-tectonic terraces, valleys of ice water drain, esker ridges and drumlins (Fig. 3).

According to the landscape map of Karelia the territory is presented by the denudo-tectonic ridge-hilly moderately-paludified landscape with pine forest dominating (Gromtsev et al, 1998). This is the most typical landscape in the northern taiga part of Karelia.

Hydrology and hydrography

The territory of the Park is located near the watershed of the White and Baltic Seas and mainly belongs to the Tula river basin (Lushma) (Fig. 3), which flows into Lake Ruunajärvi, then the Lieksanjoki and the Vuoksi water system and finally to Lake Ladoga. The Lenderka River in the southern part of the Park is directed to Finland and flows into Lake Ladoga. The hydrographic net of the Park is presented by a complicated lake-river system including about 420 small lakes and 80 small rivers, which, in general, are short channels between lakes. The average wash-off is 11 l/s per 1 sq. km. The total area covered by lakes in the Park is about 305. The largest lakes are Tuulos – 95,7 km² (water surface area), Koroppi – 16,2 km², Tuzhiozero and Aitajärvi. There are more than one hundred islands in Lake Tuulos (map scale 1:100 000 there are 141 isles in the total area – 10,9 km², on map scale 1:50 000 – 154 islands), which are formed by bedrock and loose deposits. Almost all the islands are wooded and very picturesque. Lake Tuulos with a curved shoreline, several bays and islands is the most attractive place in the Park and considered the main object for tourism development. Its depth is up to 29m with many trenches and shallows (Litvinenko, 1998). The peculiar shores of the lake are covered mainly with coniferous forests and partly old meadows instead of deserted villages.

Lake Tuulos is an oligotrophic lake with ultra-oligotrophic features and very low compound of minerals (total sum of ions about 10 mg/l) and electrical conductivity (13-16 mkCm/cm). Water in the lake is identified as a mixed sulphate-hydro carbonate class, Na-group. By ion composition this water is similar to precipitation water and has weak-acid reaction (pH 6,2-6,6). The weak acidity of the lake water is due to acid rainfalls. In the waters investigated a low percentage of nitrites, nitrates and phosphates was found, which proves the lack of anthropogenic pollution. A number of rivers and lakes have similar figures of water quality, but drainage waters (from mires) silt some of them (Vlasova et al.,1998). Tuulos has a protection zone of minimum 500 m width (Decree of the Government of RK No.456 of September 30, 1999), the width of protection zones for the rivers Lushma (Tuula) and Lenderka is 1000 m, which are established to preserve the forest vegetation on the banks of these water bodies. The Lenderka River is very picturesque and attractive for various types of water tourism, especially international links because it is connected to the Finnish Lake Ruunajärvi, where water tourism programmes have been successfully developed.

Climate and biogeography

The territory of the Park is located in the central agro-climatic region of Karelia (Atlas, 1989), implying cold winters (average temperature of January – – 11C) and rather warm summers (July +16 C). The vegetation period is 140-145 days and snow cover stays for 155-165 days. Annual average precipitation is 600 mm, including 175-200mm during the vegetation period. Summer evaporation is 300mm, river drainage – 300-350mm. The nearest meteorological station to the Park is in the Lentiira settlement.

According to the biogeographic zoning of eastern Fennoscandia, made by Finnish naturalists (Mela, Cajander 1906), the Park is included into the Karelia *pomorica occidentalis*. According to the geobotanical zoning in Russia the territory of Karelia stays within the Kola-Karelian Sub-Province of the North-European Province in Eurasia's Taiga Region. The territories neighbouring Lake Tuulos belong to the West-Karelian North-Taiga Region (Yurkovskaya, 1993).

Main ecosystems

Ecosystems in this territory were formed 10 500 years ago, i.e. they are very young. During the Holocene period nature conditions had changed many times which reflected on the vegetation. The first grassy swamps appeared 8 000 years ago at the beginning of a warm Atlantic period and gradually they spread out and filled in all the shallow kettles circling into a complicated system. Spruce arrived here from the east about 6 000 years ago and its role in the plant cover was very important 3-4 000 years ago, in comparison with the Modern period (Yelina, 1981).

A forest fire is a natural indicator of dynamics in the plant cover. Pine forests growing on dry sand water-ice deposits were susceptible to forest fires once or twice a century, which have prevented spruce undergrowth. Forest fires 2-3 times a millennium touched waterlogged depressions with spruce habitats. The transformation of small forest areas near former villages started in the 18th century in connection with resin-tapping and other settlement forestry needs. Clear human stress on vegetation was evident at the end of the 19th century when forest harvesting started to develop. Forests (63%) prevail among vegetation within the modern boundaries of the Park, water resources – 29% and open mires – 8%. In the remains of former villages there are small areas of hay meadows.

Forests. In the forest fund of the Park there are 605 pine, 35% spruce and about 6% – derivative birch trees instead of primeval coniferous forests. Intensive clear cuttings took place on the territory of the Park almost for 50 years. Only for the past 15 years about 5 000 ha has been cut in the northern part of the Park. As a result only small parts of forest communities are left now in compartments 39 (254 ha), 51 (343 ha), 72 (272 ha) and some parts of mature old growth forest aged 120-180 years (Fig. 4,5). Only within the northern part of the border area of the Park (compartments 120-136) is there a rather large fragment of the primeval practically virgin coniferous forests (over 2000 ha). The total area of primary forest within the Park makes up about 4 000 ha.

According to the type and age of forests there are two parts in the Park: the border area up to 2 km (4. 138 ha) and the rest of the Park. In the northern part of the border area (north of the Lushma river) there is pine type – 77,55, spruce type – 13,55. More than 90% of these stands are mature and over mature (over 120 years old). A high stock of timber has been reserved here, about 180 m³ per ha (Sakovets et al.,1998). The border area between the rivers Lushma and Lenderka was mostly cut and occupied by young stands. Forests younger than 120 years, including young stands aged less than 40 years (about 305) dominate in the rest part of the Park. Pine forest is evaluated at 505, spruce – 40% and birch – 6%.

Pine forests differ in types. The most typical are bilberry (35%) and lingonberry (22%) forests, which contain a reserve of 150-180 m³ old growth stands (120-180 years old). There are a lot of paludified pine forests (22%) such as sedge-Sphagnum and Ledum-types. Their old stands are rare and contain from 70 to 130 m³ per ha. The diversity of spruce types is less, the bilberry type is dominant (67%). Paludified spruce haircap-moss forest is widespread (30%). North taiga primeval spruce forests are very interesting from a scientific point of view. The age of spruce trees varies in these forests from 1 to 280 years. In old forests we can simply identify the non-stop process of the disintegration of primeval old growth and regeneration by young generations. In old growth forests the conservation of the biodiversity of many groups of organisms implies the necessity of dead trees and fallen trunks in various stages of decay. The stock of dried wood in old growth forests is 5-15 m/ha. Approximately the same can be calculated for the windfall.

The Park's forests are characterised by rather low productivity. Middle class of bonitet for pine – IV, 4; spruce – IV, 6; birch – IV, 0; average all – IV, 5. The sanitary condition of these forests in gen-

eral is satisfactory. The loss of genetic diversity of main forest – regenerating species is evident with intensive forestry use. A network of forest genetic reserves for efficient diversity conservation has been created in our country. As a result of scientific research by specialists of the Forest Research Institute of the Karelian Scientific Centre it has been recommended to organise a genetic habitat for the protection of the unique pine population on the territory of the prospective Park within the border area (quarters 132-135), area – 1 200 ha, covered with forest (92%). The forest-covered area of the habitat contains 998 ha of pine, among them 935 are mature and over-mature stands. The presence of such important stands will enhance the scientific and protective values of the future Park.

The total standing stock in this area is 4.77 mln. m³, including commercial wood – 2.0 mln m³ of which 1.28 mln m³ are in the restricted zone. The forests consist mainly of 3rd group forests (commercial wood), 1st group forests (spawning protection zones) were established only on the Lushma River. Decree of the Government of RK No.456 of September 30 1999 set a 500-meter water protection zone on Lake Tuulos and 1000-meter zones on the rivers Lushma and Lenderka. This means that the regime of forest use and its group classification should be changed for a large portion of forestland in the Park's boundaries (in 33 compartments).

Mires. According to the zoning of mires in Karelia the Park territory is included into the district of the Western-Karelia Highland with a dominance of mesotrophic grass-Sphagnum and ombrotrophic (raised) Sphagnum mires (Elina et al, 1984). Broken ridge terrain predetermined that mires be located close to lakes and rivers, and intermediate – ridge depressions. The mires are not large (up to 50 ha), several of them are connected with each other in complicated systems with an area up to 100–200 ha, 2-3 km long and only 100-300 (rare – 500m) – width. Mire systems together with open and sparsely wooded lands include sectors of forested mires with a rather high density of tree cover, developing on a thick peat layer (more than 30 cm), and other areas with thin peat. To distinguish between a forest mire and a paludified forest is very difficult because of the gradual change of peat level (from paludified forest to mire). Open and sparsely wooded mires occupy about 10% in the Park. The general paludification of the area is 305. Poor bedrock and low mineralisation of ground waters coming to mires determine the existence of poor mesotrophic grass-Sphagnum mires. In depressions with slope surfaces and rich ground water influence mires aapa-type are formed. Aapa mires are rare in the Park. Ombrotrophic ridge-hollow Sphagnum and pine-shrub-Sphagnum bogs develop without the influence of ground waters. Ombrotrophic stage started on them only 2-3 thousand years ago. Parts of mire systems on terraces with spring and ground water influence are known as "sloping mires". The classical "sloping mires" in the Kuusamo Province and the Paanajärvi NP are eutrophic with the rich specific flora due to the edaphic conditions. Sloping mires in the Tuulos NP are mesotrophic, which preserves some plants rather rare for this region, (*Molinia caerulea*, *Carex dioica*, *Potentilla erecta*, *Sphagnum warnstorffii*, *S.subnitens*, *S.subfilvum*, *S.denticulatum*, *Campyllum stellatum*). Narrow grassy mire communities (sedge, horse-tail) with willow bushes occurring along the banks of small rivers and streams.

There are peat deposits in the mires about 4-5 meters thick. Many of them formed in place of small lakes, which is proved by layers of gyttia (sapropel) under peat (Shevelin, Tokarev, 1995). All mires in the Park are in their natural condition.

Water resources

The vegetation of the water reservoirs in the Park has not been studied well enough. In terms of open shores and a great number of rocks on the bottom of Lake Tuulos there are communities of macrophytes that have developed here in small spots. In the calm shallows of the lake rare reed-horse-tail species can be found (*Phragmites australis-Equisetum fluviatile*), *Sparganium angustifolium* and *Nuphar luteum* communities. Water lobelia *Lobelia dortmanna*, and quillwort *Isoetes setacea*, *I. lacustris* (both species are entered into the Red Books of Russia (1988) and Karelia 1995), and *Eleocharis acicularis* (very rare in Northern Karelia) can be found in some parts of the sand shallows. There is no information regarding other reservoirs.

In the list of the phyto-plankton, periphyton and microphytobenthos of Lake Tuulos and its tributaries there are about 71 species of algae among 5 types: *Cyanophyta*, *Chrisophyta*, *Bacillariophyta*, *Pyrrophyta* and *Chlorophyta*. Arctic-Alpine and boreal species are dominant in this list, which is typical for the lakes of northern Karelia. There is a great variety of green and diatomic algae species (Komulainen, 1998).

Other ecosystems

There are parts of the grain-motley-grass meadows left around deserted villages such as Lushma, Tuulivaara, Tuulos, forest harvesting settlements and surrounding agricultural fields and hayfields. Meadows are found in different stages of forest reclamation, what could be explained by the location and regime of nature use. The population of Lentira and Repola settlements mows the most vast and productive meadows in the former villages Lushma and Tuulivaara annually, and small hayfields are gradually overgrown by deciduous forest. Meadows are full of archeophytes, a number of rare, for mid Karelia, species of plants, (*Alopecurus pratensis*, *Dactylis glomerata*, *Bistorta major*, *Dianthus deltoides*, *Campanula patula*).

There are not many steep rocky outcrops in the territory of the Park. Although outcrops of primeval formations with sparsely standing lichen – pine forest grow on a number of islands of Lake Tuulos and its shores. One of the most interesting objects for observation is the Mt. Kozhavaara (248 m height) located to the southeast of Lake Tuulijärvi, at the northwest part of compartment 77, the eastern steep edge flies over 100 m up and a wonderful panorama of the Park can be seen from above.

Flora

According to the floristic zoning of Karelia the Park is located in the Kem floristic region (Ramenskaya, 1983), fringes of which border the **Karelia pomorica occidentalis** bio-geographical province (Fig. 3), the flora of any region is represented by the community of all plant species growing in this area. The Park flora is typical for north taiga regions being considered as poor by southern (nemoral) species and northern (arctic and arctic-alpine) ones. Poor basic formations and soils do not allow calcium species to grow here.

Vascular plants. Only in 1994 were the vascular plants of the Park studied (Kravchenko et al. 1997, 1998, Shevelin, Tokarev 1995). A lot of additional information on the vascular plant species composition has been collected in the summer of 2000. There are 352 of vascular plant species here, which are in 181 genus and 63 families (Annexes). The Tuulos flora is similar to the floras of the Kostomuksha zapovednik (395 species) and the Kalevala NP (403 species) (Kravchenko, 1997, (Kravchenko et al., 2000). It comprises a list of species typical for poor coniferous forests: heather (*Calluna vulgaris*), lingonberry (*Vaccinium vitis-idaea*), bilberry (*V. mirtyllus*), *Pyrola*, *Maianthemum*, etc), Sphagnum mires: wild rosemary (*Chamaedaphne calyculata*), cloudberry (*Rubus chamaemorus*), cotton grass (*Eriophorum vaginatum*), sedges, sundew (*Drosera*), etc) and oligotrophic waters: horsetail (*Equisetum fluviatile*), quillwort (*Isoetes*), water lobelia (*Lobelia dortmanna*). The flora consists of 270 native species, which accounts for 77% of the full species list. Among the native flora next families are leading: *Cyperaceae* – 39 species, *Poaceae* – 26, *Rosaceae* – 22, *Asteraceae* – 20.

There are 61 species of *alien plants* (17% of the flora composition), which are represented mostly by weeds. They are to be met on meadows, forest roads, near building remains, deserted frontier posts and villages. Their role in the vegetation is insignificant, the majority of which are found as single examples and will possibly disappear soon from the Park flora in overgrowing damaged habitats. The most interesting from the *alien species* is *Carex vulpina* collected from the meadow in the Vostochny settlement. It is entered into the Red Book of Karelia (1995) and the only place this species is known to grow in Karelia is the Pudozh District. *Carex hirta* is rare in Karelia but it is found in some places in the Tuulos area.

Naturalised species (archeophytes) are to be met in the Park mainly in the meadow communities, which are presented by 21 species and which is 6% of the flora list (*Agrostis tenuis*, *Anthoxanthum odoratum*, *Poa pratensis*, *Melandrium dioicum*, *Fragaria vesca*, *Carum carvi*, *Heracleum sibiricum*, *Glechoma hederacea*, etc.). The role of archeophytes is insignificant in the vegetation of the Park.

A geographical analysis has registered the dominance of boreal species (62%), plurisolar (21%) and other element of flora with less numbers of species. From the *latitude* type area circumpolar (43%) and euroasiatic (35%) species dominate here. A number of species are located near the borders of their areas or their populations are separate from the main area: marsh clubmoss, plicate sweet-grass, hairy sedge, true fox-sedge, wood club-rush, common bistort, wood stitchwort, dwarf spearwort, clustered bur-reed (*Lycopodiella inundata*, *Glyceria notata*, *Carex hirta*, *C. vulpina*, *Scirpus sylvaticus*, *Bistorta major*, *Stellaria nemorum*, *Ranunculus flammula*, *Sparganium glomeratum*). There are not many rare and endangered species in the Park. Water lobelia, spring quillwort, livid sedge and narrow-leaved marsh-orchid (*Lobelia dortmanna*, *Isoetes setacea*, *Carex livida* and *Dactylorhiza traun-*

steineri) are entered into the Red Book of Karelia. *Carex vulpina* was found on a meadow near the Vostochny settlement. The distribution of these species is displayed on figure 8.

Mosses. At present 106 species 46 genera and 22 families of mosses are known from the territory of the Park. The main families of bryoflora are *Sphagnaceae* – 34 species, *Dicranaceae* – 13 species, *Polytrichaceae*, *Amblystegiaceae* – 10 of each, they are mainly typical and widely spread species of forests, mires, shorelines and rocks of northern taiga. The above-mentioned list does not represent the whole bryoflora diversity of the Park (Maksimov et al. 1998). More detailed research studies in the northern territories have investigated a high diversity of bryophytes: 175 species in the Kostomuksha zapovednik and 160 species in the Kalevala NP (Boichuk, 1999). A number of moss met in the Tuulos NP are quite rare for Karelia and its northern parts (*Sphagnum denticulatum*, *S. inundatum*, *S. subnitens*, *S. quinquefarium*, *S. rubellum*, *Racomitrium aciculare*), where two species *Sphagnum denticulatum* and *S. subnitens* are entered into the Red Book of Karelia (1995).

Lichens. The first information about lichens in this area was collected in 1876-1878 by a Finnish botanist E.Vainio and published in some materials (Vainio, 1881, 1922-1934). The lichen flora was studied in the northern part of the Park in 1994 and mainly forest epiphytes have been collected. It has resulted in reports as 77 species of lichens from 40 genera (Fadeeva, 1998). It is certainly not a full list of lichens of the Park and there is a lot to be investigated in the future. There are 12 species of lichens, which, in Finland (Kuusinen, et al, 1995), considered to be indicators of primeval taiga forests and also species of secondary habitats (Fadeeva, 1998). Five lichen species of the Park are considered to be rare and endangered species and entered into the Red Data Book of Karelia (1995) and the Red Data Book of East Fennoscandia (Kotiranta & all., 1998): *Bryoria fremontii*, *Evernia divaricata*, *Lecidea albofuscescens*, *Lobaria pulmonaria*, *Nephroma bellum*. *Bryoria fremontii* and *Lobaria pulmonaria* are in the Red Book of Russia (1988). The location of these species is shown on Fig. 2. Fungi species were not studied in the Park.

Fauna.

The territory of the Park is located in between the north and south-Karelia zoogeographical regions, and, correspondingly, has its specific fauna complexes. At present only the main groups of vertebrates in the Park have been studied.

Mammals. 40 species of mammal have been registered in the Park. They are presented by 7 Insectivorous species: mole (*Talpa europaea*), shrew (*Sorex*), water cutora (*Neomys fodiens*), 1 – Bats: northern bat (*Eptesicus nilssonii*), 1 – Hare type: blue hare (*Lepus timidus*), 16 – Rodents: squirrel (*Sciurus vulgaris*), beaver (*Castor canadensis*), rat (*Rattus norvegicus*), mice (*Mus musculus*), muskrat (*Ondatra zibethica*), etc, 13 – Predators: wolf (*Canis lupus*), bear (*Ursus arctus*), weasel (*Mustela nivalis*), pine marten (*Martes martes*) and 2 – Artiodactyla: elk (*Alces alces*) and wild reindeer (*Rangifer tarandus fennicus*). Among them there are quite common species (common shrew, russey vole, blue hare, squirrel, fox, elk, etc.) and species which are rare in this area (mole, flying squirrel, pole cat, badger, etc.). All mammals inhabiting the researched territory are interesting from a nature protection point of view, science and recreation goals in the National Park regardless of their number and frequency of occurrence (Danilov et al.1998).

Visitors of a Park are always interested in coming across evidence of the presence of the hunted species and especially in meeting the animals. A winter inventory made in the area of Lake Tuulos in 1999 gave the following relative figures of game species population: squirrel – 3.6 foot prints per 10-km trail, blue hare – 4.7, stoat – 1.4, marten – 1.5, fox – 1.2, pole cat – 0.2, wolf – 0.1, elk – 1.0 per 10 km. The population of elk is much higher than in the rest of the territory of the Muezerka District (0,57). The peculiarities of distribution and habitation of the other species are much the same as on the bordering territories.

A special study confirmed a very high density of bear (1,6 animals per 1000 hectares), which is typical for all the Park's territory. Footprints of very big bears – with width of the front paw about 14-16 cm, which corresponds to a weight of 200-270 kg – have been observed.

The Park's territory is extremely important for both Russia and Finland as regards the southernmost sub-population of wild reindeer (*Rangifer tarandus fennicus*) in the boundaries of its present habitation. The numerous islands on Lake Tuulos have special value as summer calving lands for the reindeer.

The barbed wire construction was the reason for changing the number of reindeer species. As the result a part of the Ruunaa-Lendery sub-population become isolated from the main part and also from other principal calving places of these animals. During recent years the areas near Lakes Ko-

roppi, Sula and Aita were the most popular calving areas. Isolation has caused a decrease in the number of reindeer in the Tuulos region. The isolation process was intensified because of illegal hunting, especially during the last 15 years. At the end of 80-s there was a herd of 70 animals but at present on the islands and shores of the lake there are only 25-30 reindeers on the Russian side and 20-25 – in Finland (as reported by K.Heikura). So, at the moment the overall number of the species in the Ruunaa–Lendery herd is no more than 50-60 animals. Such a number in an isolated group is considered to be lower than critical. Without special protection and human support these animals will invariably disappear in this region.

It is necessary to emphasise that from the genetic point of view, the species of the Ruunaa – Lendery sub-population are the best examples of forest Reindeer in Europe. This herd is very valuable as a resource for reviving the natural numbers of this population in Russia and Finland. The closest Kuhmo sub-population is more numerous (**Heikura 1997**).

Special attention should be paid to another game animal – the Canadian beaver. It appeared here in the middle of the 1950s and inhabited widely. The population reached its peak at the end of the 1960s but then decreased because of the lack of food in the western Karelia. Today we are witnessing the return of the beavers to the former habitats where the brush-and-shrub vegetation has been restored. According to inventories and reports from local people at present there are 10 beaver habitats on the territory of the Park.

Birds. The fauna of the Park consists of 128 species of birds where 113 – nesting ones (102 nest regularly, 11 – are reportedly nesting or have been nesting in the past. (Annexes). The indigenous taiga species are the most representative in the bird fauna, including indicators of the native coniferous forests – capercaillie, three-toed woodpecker, Siberian jay, mistle thrush and tree creeper. Birds inhabiting the crowns of coniferous stands are very common here: the goldcrest, waxwing, crested tit, chiffchaff and crossbills. The species typical for high forest are also well represented: the great grey owl, Ural owl, Tengmalm's owl, hobby, raven, black woodpecker, goldeneye, goosander and others (Sazonov 1998, Zimin et al. 1998). The population of capercaillie in 1994 and 2000 was 19,5 and 16,7 birds/1000ha respectively, which is rather high compared to the generally decreasing population of wood fowl in Karelia (beginning from 1992). The population of mature hazel grouse near Lake Tuulos was 10,3 and 13,3 birds per 1000 ha, of black grouse – 12,3 and 12,1.

The waters and mire lands in the Park, regarding their role in the process of the reproduction of bird fauna, can be graded as lands of regional (Karelian) importance. It is an important reproduction site of the black-throated diver, whooper swan and bean goose. The oligotrophic nature of the lakes in the Park is favourable for a stable population of the lesser black-backed gull, common tern and black-throated diver. Birds common for eutrophic waters (black-headed gull, great crested grebe) are absent here.

There are lot of ospreys breeding here. At least 6 pairs of this fish-catching bird have been observed near Lake Tuulos. This is one of the largest colonies in the border region of Karelia.

The total density of bird population according to the 1994 inventory in the areas of mature forests domination is 95 pairs/km² (120 pairs/km² to adjust for the incompleteness of inventory), which is much lower than average figures for this zoogeographic region. Only in coniferous-broadleaf young stands on the former fields near the Tuulos township is this number 145 pairs/km² (Sazonov, 1998).

The Park's territory is a refuge for a great number of rare and endangered species of birds. At present 15 species of birds registered in the Red Book of Russia (1984), in the Red Book of Karelia (1995) and of Finland (1991) have been observed there. Five species are regarded as rare in the region or endangered species:

- Red Book of Russia (1985): golden eagle (*Aquila chrysaetos*), white-tailed eagle (*Haliaeetus albicilla*) and osprey (*Pandion haliaetus*).
- Red Book of Karelia (1995): red-throated diver (*Gavia stellata*), whooper swan (*Cygnus cygnus*), bean goose (*Anser fabalis*), merlin (*Falco columbarius*), crane (*Grus grus*), lesser black-backed gull (*Larus fuscus*), great grey owl (*Strix nebulosa*), redstart (*Phoenicurus phoenicurus*), great grey shrike (*Lanius excubitor*).
- Red Book of Finland (Rassi & all., 1992): black-throated diver (*Gavia arctica*), hobby (*Falco subbuteo*), long-tailed tit (*Aegithalos caudatus*).

Nesting areas of some species could be seen on Fig. 7.

Reptiles and amphibians. There was not any special research of the reptiles and amphibians fauna carried out in the Park. Specialists-biologists have registered the lizard (*Lacerta vivipara*), common frog (*Rana temporaria*) and toad (*Bufo bufo*). Local people confirm the occurrence of adders (*Vipera berus*) in the meadows of Lushma village.

Fish. The research studies of ichthyofauna in Lake Tuulos have revealed 14 species of fish (Annexes). There is a domination of species of the boreal plain complex – 45% (perch, roach, pike, ide, ruff, dace) over arctic fresh-water species (whitefish, vendace, burbot) and boreal pre-mountain species (trout, grayling), which make up to 20% each, 15% are represented by pontic fresh-water species: bream, etc. The main share of ichthyoproducts of the lake is made of the fish of arctic fresh-water complex (Kitaev et al. 1998). The most prolific species in the lake are perch, whitefish, vendace, roach, more rare are pike, dace, ruff, bream, grayling and burbot. The diversity of species, dense population (on average 500-700 g per net/day) and availability of big samples (whitefish over 1,5 kg and pike up to 10 kg) present favourable conditions for the development in the proposed Park of sports and amateur fishing by licence. A peculiar feature of Lake Tuulos is that different forms of whitefish live there. According to documents from 1915 and reports of local people fresh-water salmon can be caught there. No salmon species have been caught during the ichthyological research (salmon or trout), so it has not been verified which of them inhabits the lake. The availability of various forms of whitefish and salmon species makes the lake even more attractive for organised tourism. The main spawning sites for whitefish and salmon are in the Lushma River, which at present is cluttered with debris after many years of timber floating. Cleaning and restoration of the spawning sites will significantly increase the population of valuable fish in Lake Tuulos. To protect the migrating form of whitefish it is advisable to prohibit fishing for it during spawning in October in the upper part of the Lushma River.

Vendace is a small fish from 8 to 15 cm, age 4+ years. Perch species are not big due to bad food resources, 300 g – weigh, 14+ years age (Vlasova et al., 1998).

Salmon and whitefish have been entered into the Red Book of Karelia, which makes Lake Tuulos important for conservation.

5. History and culture

Prehistory

No archaeological research studies have been done on the territory of the Park, so, there is no information about early inhabitants or other monuments of ancient times. Though near the Repola and Lentiira settlements there are findings of primeval people staying from the Mesolithic Period, meaning that the first people came here after the glacier – about 9 thousand years ago. The culture of forest Saami (Lopari) appeared in the Iron and early Middle Ages in northwest and east Karelia. (Makurov, Korablev, 1998).

History of settlement, wars, religions and border contacts.

The territory of western Karelia was located near the northwest borders of Russia from the Middle Ages. In the 16th century the Karels coming from the Ladoga area settled down in the vicinity of Lake Tuulos. The colonisation of ancient Saami lands by Karels created the Rebolskaja volost (unit) within the Ilomantsi Pogost of the Karel community. There is a fact of the Finnish migration here. The connection to political, military and foreign affairs played a very important role in the organisation of the Rebolskaya volost, on the border with the Swedish community on the territory of the modern Finland – the Kajani region. During the 16-17th centuries this area was conquered several times by Swedes. The modern border with Finland on the Rebolsky area is similar to "mezha" in 1617-1621. The signs of the former border are considered to be very important monuments of the past. In the 20-s of the 18th century the Rebolskaya volost was changed to a pogost and became subordinate to the Solovetski Monastery.

Detailed annals concerning the first settlement in Tuulos date back to the beginning of the 18th century and connected to the inventory of all inhabitants – "revisia". In the middle of the 18th century on the shores of the Tuulos water system there was a group of villages – Lushma, Koroppi, Tuulos and Tuulivaara. At the beginning of the 19th century the population was relatively stable because of migration, army recruitment and running from taxes and other burdens.

A specific feature of Tuulos economic development is explained by its border location. In the 18th century this region suffered from the wars between Russia and Sweden. Though in peacetime the location close to the border gave rise to good opportunities for earning extra money in terms trade. In 1832 E. Lönnrot visiting the Rebolsky pogost said, " ...peasants have been trading the whole winter and nothing wrong happens to them" (Lönnrot's travelling, 1985). The export products from this region were mostly furs and in the 18th century – iron implements. Food was an import commodity be-

cause poor crops limited agriculture. The base of farming was the clearing up of lands. In 1715 the Rebolosky pogost was handed over to the subordination of Peter the Great's Olonets plants and then in 1784 was entered into the list of the Olonetskaya gubernia (region). Dependence on these plants was a horrible disaster for peasants but it was cancelled in 1725 (Balagurov, 1962).

The population of the Lake Tuulos area belonged to the Orthodox Church but at the same time there was a strong influence of the old-believers of Orthodox Christianity was very strong here. According to church documents one third of the population of the villages Lushma and Tuulos did not support the church in 1836. This may be explained by having no common language between priests and parishioners, and also by remoteness of the Tuulos villages from the main church.

At the end of the 19th – beginning of the 20th centuries the population was continually increasing. In 1873 it was 132 inhabitants and in 1905 – 249 people. Practically the whole population consisted of Karels and spoke their local Karelian dialect.

The Tuulozero culture in comparison with general Karelian features had a number of peculiarities borrowed from Finnish traditions. So, if the peasant house-complexes were typical of the main part of Karelia, here we see a house with an open yard and separate household premises. Everyday cloths were very similar to Finnish (Taroeva, 1965). The type of village structure was disorder, typical of Finno-Ugric tribes. It means that the length of a village was rather long, for example the Lushma township was up to two miles long (about 3 km).

The Karelian people are well known for their rich folklore heritage. Even in the 19-20th centuries different styles of folklore were widespread here. Besides that examples of folklore of this area were included in a book "Ancient songs of the Finnish people", (Niemi, 1921).

Soviet and Modern History

During the Soviet period the Tuulos area had to cope with big changes, which took place in the former USSR. In 1926 the Tuulivaara population was 234 people, in 1933 – 297 (289 Karels, 5 – Finns and 3 – Russians). The appearance of the forestry settlements as Lushma and Nizhnaya Tuulivaara caused an increase in population. Another crisis for the peasants was collectivisation. In 1932 its power collapsed.

The main industry of this area is connected to forestry. In 1925 the Lushma forest range was open and exporting timber to Finland. New forestry enterprises, roads, schools and telephone connections appeared after 1929.

During World War II, between 1941 and 1944, the Finnish army occupied the Tuulos area. The local population were evacuated and all the men were recruited into the army. The villages of Lushma and Koroppi became prison camps. There is a monument to the unknown soldiers who perished in 1941 in Tuulivaara.

After the war the Repola settlements were revived in terms of forestry development. In 1959 the population of the Tuulos region was 920 people with Belorussians prevailing. Then in the 1960-70s the forest resources reduced and the majority of the population left the area. Some people settled in the Lentiira settlement, located 30 km to the east of Lake Tuulos, where there is still a working forestry division forest harvesting on large areas round the prospective Park. At present there is no settlement on the territory of the Park and no forestry activity because this area has been reserved as a nature protected area by Resolution of the Government of RK No 938, of November 4, 1996.

A short review of the Tuulos area's history shows that this region has its own unique historical and cultural values. The Repola volost is the only part of the ancient Karelian region, ever being within Russian territory, and at the same time keeping close relations with Finland. This explains similar traditions. Herewith, the establishment of a National Park will allow the use of the historical and cultural values of this region with the aim of achieving scientific, educational and tourism goals (Makurov, Korablev, 1998).

Land use history

Hunting was the main trade for the first people in the Tuulos area. Although in the 16th – beginning of the 17th century some farming areas around settlements were described in the first annals. E.Lönnrot, in his diaries, marked out that agricultural development started in the middle of the 19th century. The basic agricultural method before the land reform in 1866 was slash-and-burn technology. After the reform in 1866 severe nature conditions and limited land use resulted in agricultural disaster giving bread for 3-4 months a year (Fesvitaninov, 1911). So, the economic life in the Tuulos area started to captivate the logging industry in the beginning of the 20th century. The local forest became

one of the sources of raw materials for the timber industry in Finland. In the period from 1870 to 1910 the timber export to the neighbouring country increased 3 times and reached 90 000 logs a year. Logs were floated from Lake Tuulos through the Lushma River to Lake Pielijärvi, which is connected with the Sajma system and the Baltic Sea. Timber exporting to Finland restarted in 1929 and then again after the war until the beginning of the 1970s. This has resulted in strong decrease of forest resources and its structure.

Agriculture was practically ignored during Soviet times. Some villages were surrounded by arable lands, hay fields and farms, which have been partly used recently for haymaking in the Lentiira settlement.

6. Summary of values

The natural and historical values of the proposed Park territory can briefly be presented as follows:

- Lake Tuulijärvi with 140 islands, sounds and bays is a beautiful nature formation and has beautiful landscapes. The high hills around the lake make it possible to enjoy these landscapes. The lake has a high recreational value.
- Old-growth forests cover about 4000 ha in the western part of the Park and they have a flora and fauna typical for forests that have never been cut.
- Many endangered species (6 vascular plants, 2 mosses, 5 lichens, 10 mammals, 15 birds and 2 fishes) live here permanently. Of them can be mentioned for example wild forest reindeer, flying squirrel and many other taiga species (wolf, brown bear), which live here in fairly high numbers.
- Rich fish resources of the lakes and rivers, especially the brown trout population, are valuable and in need of conservation.
- Cultural history of the former villages.
- The Tuulos National Park is an important part of the Green Belt, which covers a strip on both sides of the state border from the Barents Sea to the Gulf of Finland.

7. Threats

A part of the proposed Park (30 000 ha) has been reserved by the Decree of the Chair of the Government of Karelia (N 2 000) until December 31, 2001. When this temporary protection is removed a part of the most valuable primeval forest can be cut by the Lentiira forestry enterprise along the western shore of Lake Tuulos because a logging road was repaired here several years ago.

Wild tourism entails a big risk of forest fires, untidy shores, illegal constructions and littering in nature.

Unrestricted fishing has been taking place in Lake Tuulos for more than 20 years in such settlements as Lentiira, Repola and the frontier guard stations, which may lead to a population drop of some species (brown trout, whitefish and pike). Actually, due to the floating constructions in some rivers the migration and reproduction of at least brown trout, grayling and whitefish has already been disturbed, but there is no scientific estimation of this.

Fishing cabins on the shores and islands of the lake could cause a littering problem.

Over the last decade poaching in this area has caused a reduction in the forest reindeer population. In the long run the whole unique sub-population of the Ruunaa-Lentiira area is at risk of extinction without effective protection in the National Park.

8. Evaluation of impacts of the Park establishment.

Current environmental situation. The territory of the Park is situated quite far from industrial centres, which means there are no sources of air pollution. So far no monitoring study has been done to give an environmental assessment. The present one-time analyses of the water chemical composition in Lake Tuulos bear no evidence of local anthropogenic influence on the lake but excess acidity, which might be reflected by long and distant transfers. Changes of the land biota are presented in corresponding parts of the Feasibility Study.

Modern socio-economic situation. The territory of the Park is situated within the Muezerski District, which is specified by its industrial and social infrastructure, to be compared with other regions in Karelia. The dominating branch of economics in the district is forestry (provides 50% of jobs). The local economy has practically been formed by the logging industry. Today there are five active logging

forestry enterprises. The socio-economic situation in the region depends on the stable development of their activity. The region is sparsely populated (18 500 people), density is 1 person/km², and an active decrease of population is evident. The population of working age in the region is 49%, the elderly make up 30% and the young is only 21%. The social infrastructure is rather poor, e.g. no hotels, canteens or cafes in the settlements. The only hotel in the Muezerka settlement has to be reconstructed. The region is not included into the tourist business, however the nature conditions and unique objects may develop this sphere (Lake Tuulos, Leksozero, Sula, etc, Lenderka river, Chirka-Kem, Sula, etc.). There is a wonderful tourist complex Kivi-Koivu in the Chirka-Kem River that has not been used in recent years.

At present there is no permanent population in the Tuulos National Park. The lands are controlled by the Lentiira township administration of the Muezerka district. Here, the state Russian – Finnish border is situated, so there is a system of frontier constructions such as border posts, its infrastructure includes roads. More than 905 of the area is located within two kilometres of the border. The proposed area of the Park is 62 260 ha, of which 40 000 ha are forestlands with a standing stock of 4.77 mln.m³, including commercial timber – 2.0 mln.m³. The main part of commercial stock (1.3 mln. m³) is located in the restricted border zone and is difficult to access. All this land is a part of the state forest fund of the Sukkozerski leshoz. The Lentiira logging enterprise conducted logging operations there for a long time. At present the northern part of this territory (30 000 hectares) is designated for the would-be National Park, whereas in the southern part there are practically no mature or over mature stands. Logging is going on to the north of the boundaries of the Park.

There are three access roads to the Park. The first one is from the Lentiira settlement through the eastern connection of Lake Tuulos to the former Vostochny settlement. From Lentiira by road to the Inari border crossing point it is possible to reach the southern part of the Park and the river Lenderka. From the Repola settlement a 30-km road runs to the north eastern shore of Lake Tuulos and to the former Tuulos village. This road goes to the Kivivara cross border checkpoint (which is also used for timber export to Finland). The Lentiira settlement is a centre of the large lespromhoz, connected by road and railway to the Suksozero settlement, where there is a regular connection of trains between Kostomuksha, Petrozavodsk and St. Petersburg. These trains have carriages straight to the Lentiira station. Roads connect to the main St. Petersburg – Murmansk highway. It supplies a good opportunity for easy access to the Park for Russian tourists but having nearly the whole territory of the Park within the border fence area makes access complicated for foreigners. There is a need to solve this problem during the initial planning of the Park.

To the south of the Lentiira settlement there is another border checkpoint – Inari with good roads to Finland and Lentiira. In the further development of the Park establishment, this question of border crossing (at least Inari), will make this area more accessible and attractive for foreign tourists. The route via Kostomuksha adds 200 kms to the journey from Finland to the Park. The Finnish Lieksa community (bordering the Park area) has expressed a great interest in water tourism development within the Leksozero lake-Lenderka river system and then to Finland, where the large recreation zone (hiking area) of Ruunaa attracts thousands of tourists from different countries.

The Lentiira settlement is to be appointed as the administrative centre of the Park. The population of the Lentiira settlement at the moment is about 1 800 people. The majority of the population has been working in the Lentiira forestry enterprise (about 350 people). There is a post office, a number of shops in the township, but no hotel or canteen. There is a secondary school where the basic education of the personnel of the National Park can be arranged (guides, rangers) with the help of experts from different organisations in the region as well as from Petrozavodsk and Finland.

The idea of establishing Tuulos NP has been discussed with the local administration since 1996. It was supported by the regional administration but according to the first proposal of the Karelian Research Centre the area was decreased and only Lake Tuulos with cut areas was left in the Park. In 1999 a public meeting was organised in the Lentiira settlement in order to inform local people about the planning of the National Park. Negative opinions from some logging enterprises have been expressed towards the Park's establishment during public meeting. At present the local administration has new leaders and the question of the Park will be discussed in a new way. The administration of the Lentiira forestry enterprise supports the idea of the Park and is ready to create the infrastructure if it has finance for it. Some of the population of the settlement is uncertain about the establishment of the Park because some people are afraid of restrictions to fishing in Lake Tuulos. The local administration of the settlement also supports the future Park because they believe in the development of the social structure and the creation of new employment. The idea of the Park is of a great interest to teachers and schoolchildren.

A number of special governmental resolutions aimed at the regulation of the recreation and tourism development in the Park behind the border fence (almost the whole area of the Park) will be needed. Only with all these answers will the appropriate establishment of the Park be possible.

The advantages and disadvantages of the establishment of the Tuulos National Park can be summarised as follows:

Table 1

Advantage	Disadvantage
According to this proposal, establishment of the National Park will bring about 50 permanent job opportunities. Most of the staff will be local people and it is to be expected, that well educated people would move to Lentiira and other settlements after the Park establishment.	About 2 million m ³ of timber with economic value will be saved and not logged from the Park territory. On the other hand, two thirds of it is in a narrow border zone with difficult access and a remarkable part is in the water conservation zones of the river Lushma and Lake Tuulos.
Old growth forests, mires, lakes and rivers of the Park with many rare species will be preserved for future generations.	Hunting will be forbidden in the Park (but fishing with license is still possible).
The establishment of the Park will also indirectly provide job opportunities, when tourism develops. Job opportunities can be created in many small enterprises in accommodation, guiding etc. in future in the Muezerski District.	
The establishment of the Park can speed up the opening of the Inari cross-border point for tourism traffic, which will have a wider significance for the development of Muezerka district.	
Migrating routes and spawning grounds in rivers and rapids can be re-constructed for brown trout, white fish, grayling and other valuable fishes. This will make the sustainable catch of them possible both for locals and tourists also in future.	

II. Proposals for the plan of the Tuulos National Park

1. Objectives of the Park

The objectives for the establishment and management of the Tuulos National Park are based on the values of the natural and cultural heritage of the territory. The main objectives are:

- ❑ **Conservation of the taiga ecosystems**, especially the virgin forests, mires and lake-river ecosystems.
- ❑ **Offering a refuge for a great number of rare species.** Particularly wild forest reindeer are in need of effective protection.
- ❑ **Protection, managing of migrating routes and spawning grounds and sustainable use of the rich fish population** in the lakes and rivers.
- ❑ **Conservation and restoration of historical objects and remnants** in connection with former human activity in the territory.
- ❑ **Developing ecological education for children and grown-ups** in the Park by constructing facilities, organising services and keeping contact with schools, institutes and NGOs.
- ❑ **Organising tourism in the Park** in co-operation with people in the nearest villages. In tourism development the values of the Park shall be respected and Environmental and Quality Principles for National Parks should be followed.
- ❑ **Offering a territory for scientific research and environmental monitoring.** The National Park is one of the few examples of large areas, including unique lake Tuulos, practically untouched by human activity in the whole of northwestern Europe.
- ❑ **Developing the National Park so that jobs and opportunities for small-scale tourism livelihoods can be offered for local people.** Traditional rights for picking of berries and mushrooms, and fishing shall be guaranteed for locals.

2. Regulation of the Park

Legislation

National Parks are set up by statute of the Government of the Russian Federation, provided a subject of the Russian Federation agreed to designate corresponding territories under the status of federal property. The legal framework regulating the activity of a National Park is "Provisions on National Parks of the Russian Federation" (approved by Regulation of Russia's Council of Ministers No 769 of August 10, 1993). According to this Law land and water areas, flora and fauna and also historical and cultural objects on the territory of the Park are handed over (for ownership) to a National Park. In March 14, 1995, the Uniform Federal Act on Protected Areas was accepted. One of the chapters of the Act was dedicated to overall provisions on a National Park. In accordance with that document **"National Parks are environmental, eco-educational and research institutions, territories of which comprise natural complexes and objects of special ecological, historic and aesthetic value, and which are intended for environmental, educational, scientific and cultural purposes and for well-managed tourism"**. Any activity on the territory of the Park leading to damage to ecosystems, historical and cultural heritage or contradictory to the Parks' goals is prohibited.

The process of laying out the National Park implies the development of a Feasibility Study on Establishment of the Park, including a description of its natural and historical values, zoning, main tasks and organisational actions aimed at improvements of the territory of the Park. Then, on the basis of the model "Provisions on Russian Federation National Parks" for each new Park. Regulations are worked out with an emphasis on the Park's specific features of nature and tasks, which, afterwards, is approved by the Government of Russia (No 769 of August 10, 1993). The Park Administration will supervise the Regulations and the director of the Park has the right to issue permissions for different activities, and even make exceptions in emergency situations.

General regulation of the Park activities

The main task of a National Park is the conservation of the natural and cultural heritage of the territory. All activities shall be subordinate to that. Planning of the Park activities should be based on scientific information and analysis.

The primary actions both allowed and prohibited in National Parks are adjusted by the model "Regulation of a National Park" (August 10, 1993). Specific features of each Park are reflected in its Regulation, and annual plans of the Park to be approved by its Director. All this information is included in the Regulation of the Park, which is brought to the notice of visitors through information boards, leaflets and mass media.

Hereby, a Regulation is proposed for the Tuulos National Park. According to it, the following activities are forbidden in the National Park:

- ❑ any action threatening natural complexes and objects of history and culture;
- ❑ geological surveys and mining actions;
- ❑ actions changing the hydrology (melioration, channelling, construction of dams, etc.), timber floating, and other forms of water contamination;
- ❑ construction of trunk roads, pipelines, electricity lines and other communications not related to the work of the National Park;
- ❑ making new land for agriculture and summer cottage co-operatives;
- ❑ construction of apartment houses, cottages, recreation centres not related with the infrastructure of the Park or frontier guard;
- ❑ construction of roads, pipelines, electric lines or digging down cables not related to National Park or frontier guard activities;
- ❑ conduct of mass sports and entertainment events;
- ❑ organisation of campsites, placement of tents, making fire outside designated places;
- ❑ movement and Parking of motor vehicles outside roads and waterway routes of general purpose and designated Parking spaces;
- ❑ clear cuttings and resin-tapping;
- ❑ landing of aircraft outside equipped landing sites and water areas;
- ❑ hunting of game animals, catching, shooting and causing death to all species of animals (except for fish), destruction and damage to their habitats and nests, intentional interfering with these animals (across the whole territory of the Park);
- ❑ collection and destruction of rare and endangered plant species;
- ❑ gathering of herbariums and collections (insects, minerals, mushrooms etc.) without a permit from the administration of the Park;
- ❑ introduction of species of animals and plants alien to Park's ecosystems (except for greenery management in the visitor service zones);
- ❑ destruction or damage to objects of historic or cultural importance. In the Park, it is prohibited to commercially use flora and fauna resources, and timber resources;
- ❑ leaving litter in nature and living untidily in the cabins and campsites of the Park
- ❑ contaminating rivers and lakes

To ensure the functioning of the Park, conserve the diversity of species and communities and create conditions for the stay and recreation of visitors, a series of activities are possible, even if they are forbidden above. Their timing and methods are worked out in the annual plans of Park activities.

The following actions are allowed in the Park:

- ❑ construction and repair of roads (except for the strictly protected and special protected zones);
- ❑ making of hiking routes with field marking, foot bridges on mires, bridges across streams, fireplaces in campsites, overnight accommodations, toilets, garbage collectors;
- ❑ construction of camping sites with Parking spaces, maintenance facilities, apartment houses for the Park staff and maintenance personnel;
- ❑ construction of piers for small-size vessels, repair and storage hangars (recreation zone and visitor service zone);
- ❑ exploitation and repair of frontier guard facilities, border fence and roads along such facilities;
- ❑ carrying out of forest cuttings (selection, landscape, tendering, rejuvenation) in the forestry zone and felling a small number of trees when it is necessary for making firewood for fireplaces or opening of trails and campsites (except for the strictly protected and special protected zones);
- ❑ sports and amateur fishing by Park's license (including licenses for frontier guard stations);
- ❑ collection of wild berries and mushrooms, and ground parts of some plants as medical material (except for the strictly protected and special protected zones). However, these activities can be regulated by the decision of the Park Director.

Supervision of the Regulation of the Park is the responsibility of the Park Director and belong to the tasks of all the Park staff. Besides that, the Park inspectors have authorised rights to stop illegal activities in the Park and arrest the violators.

Forestry. All forests within the Park area are referred to as forests of category I. Forests in the system of the Park management are not considered as a resource of timber and other products but first of all, as a habitat for flora and fauna, object of ecological tourism and recreation for visitors of the Park. According to the Protected Areas Federal Act (1995) principal felling and accretion cuttings are banned in National Parks. Cleaning cuttings (except clear cutting), landscape and salvage cuttings are allowed in a National Park. The document that regulates the forestry operations is "Recommendations on Forestry Operations in National Parks". The recommendations were developed by the St.-Petersburg Forestry Research Institute and approved by the Federal Forest Service of Russia (1998).

The recommendations describe in detail: 1) objectives and principles of forestry actions, 2) cleaning cuttings, 3) salvage and sanitary cuttings, 4) silviculture requirements to technological processes, and 5) afforestation actions. So, pursuant to this document, "the base of planning of forestry actions is provided by the Regulations of every Park and inventory materials with a justification of the prospective single structure of the forest stock of functional zones and other functional and territorial units, and also target parameters of biogeocenoses on separate sites" (p. 2). The priority of the criteria of forest ecosystem sustainability over the productivity criterion is declared. Evidently, that any felling is prohibited in the strictly protected zone of a National Park or in natural complexes preserved in natural state.

Cleaning of wind fallen and resin tapped trees can only be done in the forestry zone and along tourist routes, in the case of dangerous situations for visitors or spoiling picturesque views on the way. Questions concerning the reproduction of pests are to be considered individually in each case after consultancy work with scientists.

Anthropogenic forest fires on the territory of the Park should be extinguished or contained in small areas, which after fire will be monitored as in after fire dynamics of forest ecosystems.

Agriculture and management of meadows. There are no farming lands in the territory of the Park. A number of small parts of the Federal Forest Fund lands in deserted villages are being used by the local population of the villages Lentiira and Repola for haymaking. These meadows are interesting from the flora conservation aspect due to regular moving and bush cutting. Hay collectors could work with the Park administration on a contractual basis using meadows in line with official regulations. The Park personnel could sustain meadows.

Mire management. Mires in Karelia make an integral component of all landscapes. They impact the hydrology of the territory, forest succession and lake dynamics through the gradual paludification of terrain depressions. Mires expand the diversity of the vegetation and fauna of any region because they give refuge to many organisms. In National Parks located in the taiga zone, it is necessary to preserve mires in their natural state and not to change hydrology of mires and adjacent areas. The construction of roads and other communications should take into consideration the hydrology. The vegetation and surface of mires are vulnerable to walking. Footbridges should necessarily be constructed for hiking trails. Mires can be used as sites of ecological and research tourism, especially for bird-watching. Open mires offer good views of surrounding forest. Practically all trails will touch mires, which will make hikes more diversified. Picking of cloudberry, blueberry and cranberry (except for the strictly prohibited zone) and ground parts of some herbs may be allowed in periods specified by the Park Director.

Fishing. The lakes and rivers of the Park are rich with fish, including valuable species: brown trout, whitefish, and vendace). Fish resources are used for sport and amateur fishing by license as sold by the administration of the Park in line with the "Temporal Fishing Regulations in Karelia", issued by the Chair of the Government of Karelia (Decree No 8 of January 12, 2000). Border guarded posts located within the Park boundaries should also be issued licenses for fishing. Later, the administration of the Park together with Karelrybvod will adopt special instructions which will determine the fishing periods, permitted devices, maximum allowable catch, places prohibited for fishing, etc., for the main water bodies in the Park. Instructions of this kind already work in the Paanajärvi National Park.

Any constructions close to water, which are needed for the Park infrastructure, should be provided with a system according to the present standards. No saunas without sewage purification are allowed on the shoreline.

Fauna and hunting. All hunting is prohibited in the Park as it is forbidden in almost all Russian National Parks. The Park will serve as a reproduction area for many species of game animals, which can also move outside the Park boundaries, where hunting could take place for visitors of the Park and local people.

Shooting or trapping of animals or birds for scientific purposes or resettling to other areas is possible and may be allowed as an exception only with permission from the Park Director and the scientific department (except species in the Red Book of Russia and Karelia).

Picking of wild mushrooms, berries and medicinal herbs. Picking of wild mushrooms and berries in the Park's territory is allowed with the exception of the strictly protected and special protected zones, where access is limited. Picking of berries can be regulated by special instructions on picking periods and allowable volumes and places of harvesting.

Tourism and recreation. One of the main objectives of a National Park is to develop different types of tourism and recreation. A National Park is to be integrated into the tourist network of a region and country, as a whole. A National Park plans tourist activity and attracting visitors as juridical and physical persons (on the basis of licenses and contracts), first of all – from local people. The Park itself carries out tourist activity, route improvements and recreation/sport infrastructure. Tourism is permitted on the whole of the Park's territory except the strictly protected and frontier zones. The tourist activity is limited mainly to the recreation zone. The recreational use of the territory is oriented towards the creation of the tourists' traffic along the specially marked and arranged treks with permanent camping sites. The following types of tourism are planned in the Tuulos National Park: in summer – water (boats, canoes, etc.), hiking; in winter – skiing and snowmobiling.

Principles for ecotourism prepared for the Green Belt National Parks (Environmental and Quality Principles for National Parks) shall be followed in all tourism activities (Annexes).

3. Functional zoning of the National Park

Goals of functional zoning in National Parks. Functional zoning of NP(s) is intended to regulate anthropogenic stress on the Park zones and the effective conservation of unique nature complexes. Zoning has been elaborated on the basis of the Law of Protected Areas in Russia adopted on May 14, 1995 (Part III, article 15) with up to 7 zones depending on the specific conditions and goals of the Park.

Zones and their parts are determined according to the three main objectives of the Park: protection of natural ecosystems, recreation organisation and economic activity. Each zone has its own regime, functions and nature use regulations. Functional zoning is a basic tool for the Park decision-making and management in terms of regulated recreation flows and stress. Visitors to the Park will be informed about zones and rules applied in all parts of the Park.

The main zones in the Russian National Parks are as follows: strictly protected zone, special protected zone, ecological education zone, recreation zone and visitor service zone. There can also be zones of protection of historical and cultural objects and forestry zones.

Some National Parks incline the division into sub-zones (National Parks., 1996), and some of the above mentioned zones are considered as sub-zones or two zones are combined into one (e.g. zone of recreation and tourism). Division into zones depends on the conditions and goals of each Park. The share of different zones in various Parks in Russia differs, so the strictly protected zone makes up from 0,1 (Meshersky NP) to 73% (Prielbrusye NP) of the territory, and the recreation zone – from 1 (Prielbrusye NP) to 69% (Paanajärvi NP). The zoning of the Park can be improved later on. These changes may take place during the process of receiving more detailed information about nature and experience about Park activities.

The Tuulos NP is located near the state border with a special frontier area 2 km wide. According to the Law of the RF "State Border of the Russian Federation", special restrictions take place within this borderland. That is why the Park's territory included into the latter borderland is identified as a zone of a special regime or Frontier zone.

The approach to zoning of the territories of National Parks in Russia practically meets the recommendations of the IUCN.

Description and regulation of functional zones in the Tuulos NP

Taking into consideration the latest database of the Park, good access, developed road infrastructure and location (Fig. 8), several zones have been determined:

STRICTLY PROTECTED ZONE is identified in the northwest part of the Park (compartments 51– west *part*, 62,63,72) with typical ridge terrain and large parts of primeval forests. There are typical narrow lakes and mires in the ridge lowerings with small streams and paludified forests. The area of the zone is almost 3,000 ha, what makes only 5% of the total Park area. This zone is intended for

the conservation of nature heritage and protection of biodiversity in this region. Only scientific research studies are allowed here by the Park administration.

Regulation in the Strictly Protected Zone. There is no access for visitors to the Strictly Protected Zone. Only scientists and the Park staff can move there with permission of the Park Director. All nature resource use is forbidden in this area. Forestry, including felling of separate trees is forbidden. Construction of buildings, roads or facilities is forbidden.

FRONTIER ZONE – is including the 2 km broad border zone, which is intended for the State Border Protection according to the Law of the State Border in the Russian Federation (Fig. 8). Its territory is 14 490 ha, which is about 23% of the Park's area. In the Russian law on NPA's there is no such zone however in this instance it is necessary to set up such a zone due to the special border protection regime in this area. Any tourist visit is strictly prohibited (except frontier guards), the Park personnel are allowed in only with a special permission of the main Frontier Guard Service. Any economic activity connected with the aim of the State Border Protection is implemented in accordance with the Park Administration and the Frontier Guard Service agreement with minimal harm to environment. As for the level of protection this zone is very similar in its functions to the strictly protected zone and could be considered as its sub-zone. It comprises practically all the primeval forests in the Park.

Regulation in the Frontier Zone. There is no access for visitors without permission from the Frontier Guard and Park Director. The utilisation of natural resources is forbidden with three exceptions: picking of berries and mushrooms is allowed for the Frontier Guard staff and fishing is allowed for them with the permission of the Park Director. Scientific research is possible with the permission of the Frontier Guard and Park Director. All kinds of forestry and felling of trees is forbidden. Construction and repair of buildings, constructions, border fence and electrical lines is possible when it is necessary because of the border control. The Park Director shall be informed in advance about these types of activities.

SPECIAL PROTECTED ZONE – includes territories of a special protection regime with a strictly limited access of organised tourism attendance or to support several types of eco-system (e.g. haymaking). This type of a zone is determined in every Park in the RF. In the Tuulos NP it has been planned to include parts of the primeval forests growing in compartments N 48,49, 50 and 51 (eastern part). These two parts could be visited by official groups of tourists along special trails from the Koroppi-Kivivara road (48,49) and also on the tourist route along the western shore of Bay Suopohja of Lake Tuulijärvi (51,64). The area of this zone is about 4 270 ha or 6,85 of the total area of the Park. As for its functions this zone is intended for scientific research, its recreation use should be minimal. In the Tuulos Park it is adjacent to the strictly protected zone and special restricted zone, where both form a vast strictly protected zone along the state border with a total area 21 860 ha (35,15 of the Park).

Regulation in the Special Protected Zone. Access for visitors as well as scientific research is allowed with permission from the Park Director, mainly with guides from the Park staff. All nature use is forbidden there. Forestry, including the felling of separate trees is forbidden. The construction of buildings, roads or facilities is forbidden. Reconstruction of tourist road along the west shore of the lake is needed.

RECREATION ZONE – is the central and northern area of the Park together with Lakes Tuulos, Koroppi and Mäntyjärvi (Fig 10). Recreation stress should not damage the quality of ecosystems. Lake Tuulos is considered as the most valuable nature object and at the same time the most important object for tourism and recreation. The water areas of Lakes Tuulos, Koroppi and Mäntyjärvi should not be closed for visitors, only temporal restrictions for visiting certain islands and bays during the spawning and nesting periods. Some parts of this forest area have been affected by human economic activities. The majority of forests including those on the many islands of Lake Tuulos have been cut in different ways for the last 40 years. Its area is 29 400 ha (47,25 of the Park area).

This zone should contain water and combine routes of different lengths starting from small camping sites and year round use. The recreation zone should be well equipped for favourable conditions of active sport and tourism development. There is a need to elaborate a variety of trails, campsites (including overnight stay), mooring places and watchtowers. During the planning process the old and existing road nets, former villages and meadows, which are the real places of interest, should be considered. Water routes could start from both of the villages Vostochny and Tuulos.

Regulation in the Recreation Zone. There is free access to this zone. Overnighting and making fire is only allowed in designated places. Scientific research is possible with the permission of

the Park Director. The utilization of natural resources is allowed here as in the Park in general. Forestry is forbidden, but the felling of trees in order to prepare small amounts of firewood for fireplaces and to open trails and campsites is possible. The construction of buildings and roads is forbidden, but facilities for visitors and cabins for supervision can be constructed.

ECOLOGICAL EDUCATION ZONE includes territories for environmental education activities, ecological trails and tourist routes. Therefore it is a zone where tourist activity is applied only on the identified routes without any special accommodation for tourists. This zone includes compartments N 64,72 (offshore zone), 73,82,84 (Fig. 8). The area of the zone is 2 400 ha (3,85 of the Park area). A large parcel of old native pine stands growing on ridges with narrow mires between them is well preserved there.

Herewith, from the northward connection of the Shoupogoi Bay till the former Lushma village we have an old road. After the proposed repairs of this road tourist facilities will be needed (night shelters, special places for fire with a reserve of firewood, toilets). Hiking routes or combined water-hiking routes of different lengths should be available (from 3-5 to 20km). According to zoologists these trails will allow the visitors to get acquainted with wild animals and signs of their presence in the Park, with the main species of birds inhabiting their native forests and lakeshores in the arctic taiga. It will be necessary to build watchtowers in the former villages of Tuulos and Lushma for better views of the lake and surrounding forest landscapes. To attract wild animals – bear, wolverine, fox, marten, and birds of prey – it is planned to feed them (sowing oats, providing carcasses). Observation posts will be built close to such feeding sites. It is recommended to make a shorter hiking trail from Lushma village along the river to the dam (about 2 km) to pass through anthropogenically-transformed forests and watch the fauna and flora.

The road in the western shore of the lake meets the actual shore, so, mooring places for small motorboats should be ready in Suolahti, Levielakshi and Lushma village. Routes in this zone could be arranged either from the north or south of Lushma. In winter this road could be used for skiing and ice fishing. Warm cabins (shelters) will be constructed for accommodation and overnight stay in Lushma, the territory of which (compartment 83) is in the recreation zone.

Visitors to this zone can get accommodation in camping sites or sites in the recreation zone, take a motorboat or drive from the Koroppi-Kivivara road.

Regulation in the Ecological Education Zone. There is free access to this zone. Staying over night and making fire is allowed only in designated places. Scientific research is possible with the permission of the Park Director. Utilization of natural resources is allowed here as in the Park in general. Forestry is forbidden, but felling of trees in order to prepare small amounts of firewood for fireplaces and to open trails and campsites is possible. Construction of buildings and roads and facilities for ecological education activities is possible.

VISITOR SERVICE ZONE consists of two small sectors situated before the Park entrances from the Repola settlement (eastern connection of Lake Koroppi (compartment 41) and the former Vostochny village (c.76), (Fig. 8). Camping sites for year-round use, mooring places and information boards should be built here. The administration of the Park, its service points and main information centre should be located in the Lentiira settlement, 30 km east of the Park. Roads leading to the Park should be repaired, construction and use of camping sites is impossible without having an electrical line connection provided.

Regulation in the Visitor Service Zone. There is free access to this zone. Staying over night and making fire is allowed only in designated places. Scientific research is possible with the permission of the Park Director. The utilization of natural resources is allowed here as in the Park in general. Forestry is forbidden, but the felling of trees in order to prepare small amount of firewood for fireplaces and to open trails and campsites is possible. Construction of buildings, roads and all kind of tourist facilities, which are needed in the Park, is allowed here.

FORESTRY ZONE is used for forestry and nature regeneration aims. It is located in the eastern part of the Park within 11 compartments mainly with young and middle-age stands. Its area is 8 400 ha (13,5%). Thinning is possible there, as well as landscape cutting. The wood from such cutting can be used for the construction of camping sites and as firewood. Today this territory is not very attractive for tourism. Later on it would be possible to arrange hiking trails there after the repair of the forest roads and landscape cutting. Water routes from Lake Tuulos to the lake system of Small Aitajärvi and Aitajärvi are very interesting and perspective. There is a road from the Lentiira settlement towards the Inari checkpoint, along which landscape thinning and improvement will be necessary.

Regulation in the Forestry Zone. There is free access to this zone. Staying over night and making fire is allowed only in designated places. Scientific research is possible with the permission of the Park Director. Utilization of natural resources is allowed here as in the Park in general. Forestry is possible here when it is necessary for the Park management. Commercial forestry is not allowed. Construction of buildings and new roads is forbidden, but facilities for visitors can be constructed.

Reconstruction of old forest roads is needed.

4. Infrastructure

Location of facilities

The Park activity includes the following elements of infrastructure: administrative and utility buildings and constructions, roads and special tourist sites. All these elements could not be created at the same time in the beginning of the Park establishment but gradually in the long run of the Park development.

Park office and visitor centre

The Park must have a convenient administrative building or premises. The best place for the administration of the Park is the settlement of Lentiira, which has railway and road connections with Petrozavodsk and St.-Petersburg, and with Finland through the Inari cross-border station. The station is located 30 km to the east of the Park and connected with the Park by a gravel road, which is in need of repair. At the beginning of the Park's operations some premises could be rented in Lentiira for the administration and departments. Further, a visitor centre should be erected here to include several structures: an administrative building with the area of 400 m², a visitor centre with a museum of nature, a lecture hall, classrooms of the area of 150-200 m², and a hotel to accommodate 25-30 persons, a garage, a Parking lot, and a warehouse. The administrative premises and the visitor centre can be placed under one roof. The construction of the visitor centre should be conducted upon a special project, if there are funds for this purpose. The Park cannot own the hotel. Its construction and maintenance may be carried out by a private company, with which the Park could co-operate in the visitor accommodation. At the moment, there are no hotels in Lentiira, and this hampers the Park servicing visitors.

Access to the Park territory

At present the Park's territory can be reached by road from Lentiira, to the former village Vostochny on the eastern shore of Lake Tuulijärvi, to the Lenderka River (southern part of the Park) and from Repola settlement to the northern part of the Park (the road to the state border and cross-border point Kivivaara). Wooden gates with attractive signs advertising the Park, information boards showing regulation of the Park (Fig. 9) are to be placed at the Park border on Vostochny road and in the Tuulos Village.

Unfortunately all the roads (except those used by the timber trade through Inari and Kivivaara) are in very poor condition and shall be repaired during the first few years, so that not only Vostochny, but also the former villages of Tuulos and Lushma are available by car from Lentiira. To arrange tourist trails on the western shore of Tuulos lake Tuulijärvi from Suopohja bay to Lushma village the old forest road (20 km) between them and collapsed bridges should be repaired. Altogether 80 km of roads and several bridges should be repaired during the first five years. When the question of tourist transportation along the border fence or of the move of the border fence in the eastern sector of the Park is resolved, a road along the border fence from Tuulos village to Vostochny settlement (25 km long) will need repair works. The repair of these roads costs a lot, therefore the priority is the road Lentiira – Vostochny.

The establishment of information points beyond the Park looks unreasonable. Information about the Park's nature, operations, offered routes and services should be promoted through mass media, Internet, leaflets, travel agencies, and general information points dedicated to protected areas as done in other countries (for instance, in Finland).

Information boards

Information boards about the Park's boundaries, protection regime and rules of behaviour should be arranged on all access roads as well as in the townships Lentiira, Repola, Sukkozero, Muezerka, Kostomuksha. Individual boards with information concerning nature peculiarities and historical events should be placed on the hiking trails.

Tourist routes

In this National Park, the emphasis is on water tourism, because Lake Tuulos and many other lakes offer extraordinarily good opportunities for this kind of recreation. Lakes and rivers are the speciality in the Tuulos National Park. The central open part of Lake Tuulijärvi is suitable for the organisation of excursion tours on reliable motorboats. They can start from Vostochny to the former villages Lushma, Tuulos and Tuulivaara, with plenty of panoramic views and picturesque islands. Several routes are planned to in the streams at special camping sites. The most interesting and proposed as most perspective are as follows (Fig. 9).

1. Vostochny – Aitajärvi – Vostochny. The duration is 2-3 days, length – 15-20 km. A campsite is needed near Lake Aitajärvi, dismantling and reconstruction of the semi-broken bridge at the mouth of the Aita river, preventing off going from the river to lake.
2. Vostochny – Ukonlahti – Vostochny (eastern side). The duration is 2-3 days, length – 15km a single way. The route is rather complicated so, a professional guide is needed. The construction of a camping site is to take place on the shore of Ukonlahti Bay.
3. Lushma – Suolahti (Tuulivaara, western side). The duration is from 2 days, length – 20 km. A camping site is planned in the Linnovelahti Bay. Buses are available from Tuulivaara to Vostochny, or Lentiira and Repola (after repairs of roads).
4. Lushma – Suolahti – Lushma (village). The duration of stay is up to 4 days, length – 40 km. A site is important to have in Tuulivaara village.
5. Water routes in any season could be combined with the organisation of amateur fishing, including licensed fishing of species representing a stated value (whitefish, brown trout).

An important object for the organisation of water tourism in the southern part of the Park – Lenderka River running through some lake system. If rafting and canoeing from Lenderka to Finland will be permitted, an international water route can be arranged. Two campsites for overnighing and a mooring place are planned by the Lenderka River. The river is in poor condition after timber floating and in need of cleaning.

In the long run water routes will be prepared on Lake Koroppi. Snowmobiling, skiing and ice fishing are on the list of winter tourism.

Lake Koroppi is suitable for organisation of boat trips because it is not as windy as Tuulijärvi. Routes and the improvement of campsites should be planned as secondary actions (after 5 years of the Park activity), because the road connection to the northern part of the Park from the Lentiira settlement needs repairing.

Some hiking trails will be prepared for nature enthusiasts, who are interested in getting acquainted in the forests and mires of the NP. In the long run, a hiking trail around Lake Tuulijärvi is possible to open and mark. It could utilise the same camping grounds and campsites, which are to be built around Lake Tuulijärvi. The eastern part of the Park is less suitable for long hiking routes due to the dense forests and strongly rigged shoreline. Short circular routes (up to 2-3 km) could be prepared in the former Tuulivaara village, along the Koroppi River and up to the Mt. Kozhavaara (248 m height, compartment 77), from the Ruoholahti Bay and along Lushma River from the Lushma village. The Park can construct approximately 15 km of new hiking trail annually.

In wintertime recreation can involve skiing routes of various length and complication, snow mobile trips and also ice fishing.

Accommodation

At the moment there is no accommodation available for visitors to the Park, near it or in Lentiira. Before tourism to the Park can be organised, facilities for accommodation must be constructed.

The Tuulos National Park is a wilderness Park, which is visited by tourists mainly during the summer. A network of camping grounds and campsites can be constructed with fairly small investments. In addition, a small hotel in Lentiira will help overcome the problems in tourism development.

The underlying principle is that inside the Park camping and cabin accommodation will take place under Park's infrastructure and territory where permitted. Outside the Park and in the private lands inside it, accommodation is preferably to be provided by local entrepreneurs.

Camping grounds comprise a number of facilities for visitors: service centre of 60 m² (with one room for the Park staff) information board, four cabins 40 m² each, of sauna, workshop, toilet, tent site etc. Altogether, four camping grounds are planned for construction on the shores of all large lakes:

- Vostochny, southeastern side of lake Tuulijärvi, the main access point to the Park. A larger service centre and a ranger station.
- Lushma, western side of lake Tuulijärvi, meadows of old settlement, road connection from the north
- Suopohja Bay, northern head of lake Tuulijärvi, fairly good road (from Repola to Kivivaara cross-border point, timber transport only)
- Tuulos village, old frontier guards station, by road from Repola, 2 km north of lake Tuulijärvi. A stone building of 120 sq. m available for the service centre and ranger station

In the former settlement of Vostochny, a camping ground will be constructed with the best facilities in the Park including rental cabins for 40 people, sauna, service centre and a teepee with a fireplace to prepare food, pier for boats, tent camp, and a ranger station Vostochny is also the start for various water routes.

Another gate to the Park is in the former Tuulos village, a bit north of lake Tuulijärvi. There an old frontier guard station, which will be repaired for service centre and a camping ground, is constructed in the meadows. That is also a place for ranger station, five cabins and sauna.

Campsites include only a flat place for 5-10 tents, a fireplace and sometimes also a table with benches and a shed for firewood. A number of them will be constructed in suitable places along hiking trails and on islands and shores of the lakes. Approximately 20 campsites need to be constructed in the Park during the first ten years. The first ones are to be constructed by the river Lenderka close to the village of Lentiira and on two islands of Lake Tuulos.

There is clearly a need to improve the facilities for accommodation of domestic and foreign visitors, by constructing for nature tourists a small hotel, which meets international standards. This investment would naturally belong to private investors, but the Park can contribute to the procedure by preparing architectural plans for it. If necessary and possible, the NP can also participate in constructing it, because it is very important for the development of tourism in the Park. It is roughly estimated, that the total area of the house would be about 400 m² and at least 10 double rooms, a café, sauna etc. are needed in the hotel.

Locations of ecological camps

One of the main functions of the National Parks is ecological education, especially for children. This work is carried out in the visitor centres, through mass media, lectures and other activities. Many Parks organise ecological camps for children. In the Tuulos Park ecological camps can be set up in the former villages of Tuulivaara and Lushma, where it will be possible to get acquainted with the diversity of the natural and transformed ecosystems. Participants of such camps can help in arranging hiking trails and ecological trails. The ecological camps will need a tent site, kitchen, and a toilet. The groups must not exceed 30 children because this is the optimal number for the best recreation and classes.

5. Park staff and administration.

Administration

A National Park is headed by a director, which is nominated by the federal authority responsible for National Parks. According to the legislation of the Russian Federation and subjects of the Federation as well as other norms and federal decrees, the director of a National Park assumes full responsibility for the achievement of all the tasks in the Park. Responsibility for the separate directions of the Park activities is prescribed to the deputies or chiefs of the departments (deputy director rights).

The Park area, its specific objectives and tasks define the staff and general personnel structure. The Park staff shall be approved by the director of the Park in line with the prescribed manner and budget for salaries.

The Tuulos National Park administration is proposed to consist of five departments. The chiefs of each department report and have responsibility to the Park Director.

The following structure and personnel is proposed for the National Park.

Table 2

Task	Officers	Nr of peers.	Grade	Year of hiring
Administrative department		6		
Management of the Park activities, economy, activity planning, reporting, personnel policy, contracts, legal matters, permissions for visitors, tele-communications, training of staff	Park Director	1	18	1
	Assistant manager	1	16	2
	Legal adviser	1	14	5
	Chief accountant	1	16	1
	Secretary	1	9	1
	Cashier	1	5	1
Department of forestry and protection of natural and cultural heritage		18		
Nature protection, protection of historical objects, forestry, supervision of the Park territory, construction and maintenance of houses and facilities, fire fighting	Deputy Director	1	17	1
	Scientist	1	14	2
	Engineer	1	10	2
	Inspector	5	5	1
	Lumberjack	5	5	3
	Constructor	5	5	2
Tourism Department		10		
Development of tourism products and services, marketing, selling, production of information material, ecological education, organisation of guiding, visitor centre, booking of cabins	Tourism chief	1	16	1
	Economist	1	11	2
	Marketing expert	1	15	2
	Guide	5	14	3
	Secretary	1	9	2
	Teacher	1	14	5
Scientific Department		3		
Carrying out of inventories and research related to Park management, develop research activities, keep contact with research institutes, interpreting of scientific information to other departments, maintain files about the species and ecosystems of the Park	Scientific director	1	16	1
	Scientist	2	14	3
Department for supporting services		6		
Transport services, maintenance of vehicles and equipment, assistance in construction work, supporting the other departments, waste disposal, cleaning of premises	Transport chief	1	10	1
	Driver, Boat operator	3	5	1
	Technician	1	5	1
	Office cleaner	1	2	2
Total		43		

The final staff will be ready during the process of the Park establishment, based on limited financing. First years of the Park activity will demand less staff. But as soon as the logistical base and infrastructure of the Park are improved, the staff will be correspondingly increased in number. Later on, the construction and maintenance of a hotel in Lentiira will require additional personnel.

The administration will be entered into the so-called Scientific and Technical Council (STC), which is appointed by the federal authority. The director of the Park is the chief of this STC, and the deputy director is, correspondingly, the deputy of the STC.

The STC approves plans and programmes of scientific research studies, management plans of natural resources, protection actions, ecological education activities, forestry and Park development.

The STC is searching for new main directions, questions of co-ordination, finalising reports of projects, programmes, ecological education, recreational and economic activities.

6. Organisation of main activities in the Park

6.1. Conservation of biodiversity and cultural heritage

Pursuant to the Regulation on Russia's National Parks (1993, chapter 5) a differentiated regime of protection, conservation and use is to be established in the National Parks with a focus on their local natural, historical and cultural, and social features. The Park administration defines marginal tourist traffic in the Park.

The most important objective of National Parks is the protection of natural and cultural heritage. In line with this, the regulations of the Park and rules for visitors have been elaborated. According to official documents regarding "Decrees of National Parks" the regulations of National Parks are provided with a department for the protection of natural and cultural heritage. In this Park the department of forestry is combined with that one. The department has the responsibility of supervision and monitoring the natural state, even if they can be considered as the task of each Park staff member, whenever seeing or hearing something relevant from the point of view of supervision.

The administration of the Park and its departments co-operate with federal authorities of protection of different nature resources (water, fish, animals), security services and the frontier guard. Public inspections could also take part in protection of a National Park.

Federal inspectors have specific rights to control activities and prevent infringements of the Park regulations. Experts of this service have the right to use guns.

The main duty of inspectors is to supervise the Park territory so that visitors are well instructed and guided and all illegal activities are impeded. Particularly, in a National Park the Park Regulation and the regulations in the functional zones are the main target of supervision. It is organised so, that patrols cover the whole Park territory, but is more frequent in areas where people are moving actively or where access is easy by car or boat. The mating seasons of animals, hunting and fishing seasons and dry seasons in summer are to be taken as special challenges for the inspectors.

Due to the dominance of forests, fire prevention and fighting are important in order to protect the natural and cultural heritage of the NP. The aim is fire prevention improvement of the territory to allow preventing fires and if they occur, timely detection, localisation and extinguishing. They are organised in compliance with the "Guidelines on Fire Prevention Projecting., 1982".

The key element of fire prevention actions is control and instructions on making fire outside specially designated places and encouragement to use fireplaces whenever in the vicinity. Fireplaces are established across the territory of the Park and supplied with firewood. Visitors are presented with a detailed map where all these sites are located (including those marked in the field) and instructed on making fires.

Detection of fires. In case of too small investments, fire detection will be done through regular tours by staff (inspectors) of the Park equipped with communication devices.

Fire fighting. During the fire risk period a group of inspectors are appointed and equipped with fire extinguishing tools. The size of the group, manner of gathering, necessary equipment and other parameters are described in a separate specially designed regulation.

Adequate monitoring and proactive actions should be stressed in the Park activities. They can include four main elements:

1. inventory and mapping of habitats, where the number (occurrence, distribution) of protected objects and revelation of factors threatening their existence are indicated. The main protected objects embrace species enlisted in the Red Data Books of Karelia, Eastern Fennoscandia, and Russia. Above all, it is necessary to plan out periodical surveys of the territory by researchers and qualified staff of the National Park, who are responsible for making and upgrading the package of the maps mentioned above;
2. training the Park staff in nature knowledge skills so that they can identify themselves the valuable habitats and species and develop the best ways to protect them. In addition, with a higher level of knowledge, the guides can also improve the level of their message to visitors.
3. development and implementation of restrictive measures on allotted sites (place, manner and time of tourists' visits, their maximum amount, etc.). So, to prevent harm it is necessary to field-mark sites where rare plants are found, and to use only sightseeing towers to observe flocks of waterfowl during spring migrations in order to minimise the anxiety factor;
4. monitoring of habitats, communities and populations of species. For instance, periodical accounts of the population of wild reindeer and labelling and radio tracking of individual specimens. This will make it possible to not only monitor the state of the population and migratory patterns but to greatly enlarge opportunities for tourists to watch this species.

The key obstacle limiting the success of conservation is the border fence limiting the movement of large mammals, especially wild forest reindeer and thus isolating populations. Discussions on options of removing the fence fully or partly in the Park territory, or opening gates should be held with the frontier guards.

It is a lot more difficult to maintain the cultural heritage of the area. The people living in the area, especially the older generation still maintain the traditions and local knowledge. The Park management should be well aware of all this and favour the recruitment of people with roots in the area, and have the capacity to utilise and disseminate the information in the daily work. The development of tourism should be based both on culture and nature.

A series of actions aimed at finding, partial recovery and reconstruction is planned in concern with objects found in the NP and which have historic and cultural importance:

- household dwellings and facilities with traditional kinds of nature use (hayfield sheds, dams, hayfield sites, etc.);
- religious structures (graveyards, stone signposts, etc.);
- archaeological and historic sites (settlements of the primitive man, historic paths, etc.).

This activity is executed within a specially designed programme. The programme should comprise:

1. extensive utilisation of local knowledge
2. searching for and inventory of data about objects,
3. marking them in field with signs,
4. controlling safety,
5. development of individual projects to restore and reconstruct some of them, and
6. utilising them in nature interpretation.

6.2 Nature interpretation

Nature interpretation means guiding visitors, supplying them with information of the natural and cultural heritage of the Park, development of information material and the maintenance of the visitor centre and other information points. This activity is the task of the Tourism Department in the Park administration.

The Park needs a leaflet explaining about the Park in at least three languages (Russian, Finnish and English). On information boards there should be material about the Park Regulation, the nature of the Park and general information about how to behave in nature. Also a map with the functional zones is shown on every information board.

The guides of the Park prepare themselves to guide groups on the hiking trails and water routes of the Park. They shall continually develop their skills and knowledge related to the nature and history of the Park territory and surroundings. The Scientific Department will support training and the development of material. Nature trails with small leaflets or permanent info signs can be constructed on popular trails.

Guides are a very important group among the Park staff, because professional, well-trained guides give a positive impression, not only of the National Park and its services, but also the Park administration. A good image brings more tourists to the Park.

6.3 Ecological education.

Ecological education of the Park's visitors is implemented in the process of communication between the tourist and science departments. Ecological information is presented on information boards, booklets and visitor centre exhibitions. So far ecological education is a task of the tourism department. In the long run the Park can have a department of ecological education with the aim of co-operation with educational institutions, federal and regional authorities, mass media. International funds and non-governmental organisations should be attracted for the development of ecological education. The work should be improved not only with visitors of the Park but various target groups from the local population, especially schoolchildren. Forms of communication are different: excursions, lectures, conferences, courses, events, summer camps, etc. All activities of this kind should be supported by the professional training of specialists in the Park for the better feedback of the Park personnel and local population.

6.4 Scientific research

Research is possible on the whole territory of the Park, including the strictly protected and special protected zones. Permission from the Park Director is required, whenever access to these protected zones or any other measures exceed that which is allowed for ordinary visitors. Research is coordinated by the Scientific Board of the Park so, that the co-operation between the Park and researchers will advance in a way with mutual benefit. The Park administration shall request annual reports from the scientists who work in the Park. Special attention should be paid in reporting the information in spatial form so, that it can be utilised in the Geographical Information System of the Park.

Research is carried out by the staff of the Park, and – upon a contract – by research organisations, higher education and vocational training institutions of relevant profiles. External organisations must agree with the administration of the Park as to what the research can entail.

During the first phase of Park's existence research activities should be concentrated on inventory work. Many of the valuable habitats and endangered species in the Park are still unknown. At the same time, momentum must be built for long-term monitoring by means of facilitating training grounds, stations and test sites etc.

Subjects of research must be balanced with the needs of the Park. The Park administration needs information about the natural and cultural heritage of the Park. This information is essential so that the Park can do its best in allocating resources and avoiding mistakes in management. Information is also needed in tourism development, training of guides and ecological education. The preparation of popular scientific publications about nature, cultural and historical heritage of the Park, booklets describing tourist trails and tourist routes with expert description of all natural sights, and recommendations on rational natural resource utilisation and Park's biodiversity conservation will be one of the major results of research activities.

6.5. Tourism

Tourism is allowed on the whole of the Park's territory except for the strictly protected and frontier zones. Tourist activity is concentrated mainly within the recreation zone. Recreation use of the territory means the organisation of tourist flow onto officially appointed sites of visit. The organisation of tourism belongs to the Tourism Department of the Park.

The carrying capacity can theoretically be estimated as a sum of max allowable stress per 1 ha of the whole area and as numbers of persons/ha at a time ("Temporal Methods of Identification of Recreational Capacity for Tourism, Excursions, and Recreation" 1987). The real carrying capacity of a National Park is very difficult to assess. It is not only dependent on the terrain or the infrastructure but also on the cultural attachments of the visitors. As an extreme example unconcerned visitors can be mentioned. They do not care about any rules or recommendations, walk where they want, fell live trees for making fire and leave all their refuse after them in campsites. The opposite types of visitors are nature enthusiasts, who avoid all disturbance to nature or other people and who do not leave any mark of their visit in nature. It is evident that the National Park would tolerate tens of times more visitors of the latter type compared with the previous ones.

The whole Lake Tuulijärvi, with the shores around, is still on the border zone, within the border fence. Only Lake Korppijärvi is outside the fence. Thus, there is so far no tourism in the territory. Access to the border zones is possible only with special permission. At the moment about 50 persons a month, mainly locals from Lentiira, have access to Tuulijärvi. For non-locals it takes time to get permission and it is not always given. Only a number of local people, mainly from Lentiira, have access to Lake Tuulijärvi, mainly for fishing and picking of berries and mushrooms. Also the frontier guard personnel utilise the natural resources of the territory. There are no statistics about fishing or hunting licenses, because they are permitted to a larger area. There is no more statistics about the number of visitors to the proposed Park available.

The estimated number of visitor-days in the year 2000 was about 600. This figure mainly consists of locals who fish on Lake Tuulijärvi. Also the users of the twenty cabins on the islands of the lake are included. Due to two scientific expeditions, about 100 visitor days can be allocated for scientists. Provided that the Park and its infrastructure can be developed in the direction described in this plan, the number of visitor days can rise up to 4 000 within the first ten years.

Lake Tuulijärvi is not the only pearl in this area. A real string of pearls formed by beautiful landscapes, clear water, sand beaches and rapids starts from lake Lieksanjärvi near Repola village (east of the proposed Park), through lakes Karujärvi and Sulajärvi to the river Lieksanjoki. It discharges

through eight rapids, 16 meters down passing the village Lentiira. After the rapids the river runs west, touching the southern corner of the proposed National Park just before the Finnish border.

Serious attempts have been made together by Russians and Finns, the Muezerka administration, Ministry of Finance in Karelia, State Committee of Tourism and many Finnish organisations, to develop a canoe and rafting route across the state border. A connection is planned over the border to the Finnish Ruuna hiking area. Both rivers, Lieksanjoki and Lushmajoki (Tuulijoki in the Finnish side) from Tuulijärvi empty their waters through this popular hiking area into lake Pielisjärvi in Finland.

Conditions for eco-tourism are developed on the whole western part of the Muezerka district in co-operation between the Russian and Finnish authorities and entrepreneurs. At the moment the establishment of the Tuulos National Park, the canoe and rafting routes from Lieksanjärvi, preparation of border crossing options for tourists and improving the living conditions of salmonids spawning in rapids belong to this development program.

The main tourism attractions in the proposed Tuulos National Park are following:

- Lake Tuulijärvi with 140 islands and rich fish populations.
- Most of the 420 lakes and 80 rivers that can be used for trips with canoes and rowing boats. The planned connections to a water route from Lieksanjärvi and Lieksanjoki across the border would increase the recreational value.
- Old forests and the forest nature in general

There are a large number of lakes (more than 400) starting from small lakes (1-2 ha) up to large Lake Tuulos. The river net is presented by parts of the rivers Koroppi, Lushma and Lenderka, and also by many streams and brooks among lakes. The use of water should not negatively reflect on its natural state, pollution and underwater organisms. Use of large lakes (Tuulos, Koroppi, Aita) and rivers Lushma and Lenderka will be principally recreational. Water routes of different lengths will imply the use of motorboats, canoes and kayaks. A complex of safety measures is very important to stop water contamination by oil.

Tourist recreation capacity of the Park should be calculated as a result of special research, though during the first years of the Park establishment it must be not more than 5000 visitor days a year. In the case of opening a new international cross border checkpoint in Inari and improving the tourist infrastructure, the number of tourists may grow to 15 000 visitor days a year. Check that the figures are in line with TS!

A complicated hydro-meteorological regime of Lake Tuulos and its bottom relief are very important to consider when planning water routes. Main water routes in open areas will require reliable (seaworthy) motorboats with experienced skippers, to avoid risks of sudden changes of weather in small tourist boats (kayak, canoe). Therefore, majority of water bodies will allow only short-term excursions. These types of routes should start from the Vostochny settlement and the deserted villages Lushma, Tuulos and Tuulivaara, this would allow the most picturesque views of the lake and the numerous islands and shores. As regards present navigation rules (due to the complicated bottom relief), an annual investigation of hydrographic activities to provide safe shipping by the determination of main waterways and main risks with the help of buoys and landmarks is definitely needed.

Organisation of sport routes on small boats is possible only within the shoreline sheltered by islands no further than 100 m from the shore or tributaries. Routes lasting several days could take place along the extensive shoreline with overnighting in camping sites.

7. Action plan for the first five years of the Park

7.1 The priority actions

The most urgent tasks for the first five years of the Park's activity are:

1. creation of the administration with the departments,
2. to get the Park territory under control in terms of supervision
3. to start planning and realising infrastructure (office, visitor centre, ranger stations, camping grounds, hiking trails etc.),
4. to start designing information material for visitors,
5. tourism development and inclusion of the Park into the network of tourism business

The list of investments planned for the Park is given in the Annex. Below, there is a short list of the main actions to be fulfilled in the first five years of the Park work.

Table 3.

Plan of actions for a five-year period.

Year	Main actions for each year	Remark
1	Creation of the National Park's administration by hiring the first eighteen employees	Park director, heads of the future departments, five inspectors and some others
	Agreeing with the Municipal Entity of the Tuulos National Park about handing over of the equipment purchased by the Tacis project ENVRUS9704	See a separate list of equipment
	Finding temporary office premises for the Park in Lentiira until the final office is repaired	
	Providing the office with furniture and equipment needed	
	Purchase vehicles and tools	
	Designing of an individual; Karelian construction style for the facilities of the NP	Architectural planning
	Designing the premises for the Park Office and Visitor Centre for the repair needed	Architectural planning
	Start training the staff, particularly inspectors to know the territory	To be done by a special team of workers of the NP
	Repair the road from Lentiira to Vostochny	
2	Hiring twelve more persons in the Park administration	Including 5 constructors
	The NP takes in use a practise to hire annually temporary workers for the season May-October	Mainly constructors, guides
	Creation of Tourist Department	Tourist Dept will be established as a separate result unit in order to follow the economy of tourism
	Creation of the other departments	
	Preparing and forwarding the Tuulos National Park Regulation	
	Repairing the office premises for the Park	
	Constructing the Lentiira Park gate	
	Start constructing the first camping ground in Vostochny and campsite by Lenderka river	
	Starting constructing the first hiking trails	
	Repair roads in order to get access from Lentiira to the northern part of the Park	
	Purchasing more vehicles and equipment	See the full list in the Annex
	Continuing training of personnel, particularly those in the tourist department	External trainees should be used
3	Hiring twelve more persons in the Park administration	Five guides, five lumberjacks etc
	Starting planning information material for info boards and leaflets	Park staff together with experts
	Purchasing more vehicles and equipment	See the full list in the Annex
	Continuing road repair in the northern part of the Park.	
	Constructing the Tuulos Park gate	
	Constructing the second camping ground in Lushma and campsites in Linnovelahdi and two islands of lake Tuulijärvi	
	Constructing the second hiking trail	Park staff together with experts
4	Preparing information material of the NP	
	Preparing program packages for visitors	See the Tourism Strategy of the Karelian Green Belt
	Starting marketing of the Park with co-operation with entrepreneurs and tour operators	Model contract taken in use
	Preparing a plan for scientific work in the NP including a monitoring program	By the Scientific Department of the NP, co-ordination in the Scientific Board of the NP
	Preparing a recurrent training program for the Park staff and take it in use	By the Administrative Dept.
	Purchasing more vehicles and equipment	See the full list in the Annex
	Setting up information boards with relevant information of the NP and its regulation	

Year	Main actions for each year	Remark
	Constructing the third camping ground in Tuulos village and five campsites	
	Constructing the third hiking trail	Park staff together with experts
	Continuing road repair in the northern part of the Park	
5	Hiring two more Park employees	
	Starting designing and manufacturing souvenirs of the NP	By professional designer
	Purchasing more vehicles and equipment	See the full list in the Annex
	Constructing the fourth camping ground in Suopoga and five campsites	
	Constructing the fourth hiking trail	Park staff together with experts
	Start marking the NP borders and Strictly protected zone in terrain	

7.2 Funding of the activities

A rough budget estimate is prepared based on realising the most important and urgent parts of this plan. This budget is for the five first years of the Park. The circumstances can still change before the Park is established. Some of these activities can have been realised already before by the Municipal Entity of the Tuulos National Park and also new investments can appear, for example with the help of unexpected external funding.

Table 4.

The estimated expenses of the Tuulos National Park during the first five years

	First year in 1000 Rbls	Second year in 1000 Rbls	Third year in 1000 Rbls	Fourth year in 1000 Rbls	Fifth year in 1000 Rbls
Running costs					
Salaries of permanent staff	366	553	736	825	888
Salaries of temporary staff		100	200	200	300
Purchase of services	200	200	200	200	200
Rent of premises	120	120	120	120	120
Office expenses	10	20	30	40	40
Service & maintenance of vehicles	50	50	100	100	100
Maintenance of Park Infrastructure		100	200	250	300
Travel expenses	20	40	80	80	80
Telecommunication	50	10	10	10	10
Training of staff	20	40	40	40	40
Subtotal	836	1233	1716	1865	2078
Investments*					
Equipment, tools	540	640	140	0	0
Facility construction	100	853	589	1380	643
House repair & construction	450	2900	1970	1750	1400
Road repair & construction	3000	500	1000	1000	2000
Vehicles	0	0	1225	850	300
Subtotal	4090	4893	4924	4980	4343
Total in 1000 Rbls	4926	6126	6640	6845	6421
Total in 1000 Euros**	197	1 531	266	274	257

* Details of the investments can be seen from the List of investments in Annexes

** Here 25 Rbls are equal 1 Euro (exchange rate in April 2001)

There will be some income from the Park activities. All income will be invested in tourism development, because a National Park cannot be and should not show any profit of its activities. In order to follow and develop the economy of tourism, the tourism department of the Park should be established

as a separate result unit. It means that the department has its own budget and accounts, which helps to recognise all the expenses and incomes originating from tourism activities.

All these incomes are possible only if the Park, especially the infrastructure and services, will be developed approximately according to the guidelines of this plan. Before the Park establishment the Municipal Entity of the Tuulos National Park has already some equipment, which can produce income for it (see Annexes). Boats, snowmobiles and microbus for transport already generate some income. On the investment list attached to this plan, there is time scheduled the purchase of one more boat, some canoes, snowmobiles and two more minibuses, which all support tourism development together with some saunas and rental cabins.

An estimate of incomes is shown in table 5.

The estimated income of the Tuulos National Park during the first five years.

All figures are gross incomes, the corresponding expenses are included in the expense table above.

Table 5

Year	First year in 1000 Rbls	Second year in 1000 Rbls	Third year in 1000 Rbls	Fourth year in 1000 Rbls	Fifth year in 1000 Rbls
Entrance fee					
– to the NP	0	10	20	30	30
– to Visitor Centre	0	0	0	0	0
Transports					
– boat, car	100	100	200	300	300
Renting					
– cabins	0	0	100	100	150
– canoes and rowing-boats	50	100	150	200	250
– other equipment	0	10	17	25	30
Selling of products					
– tour packages	20	40	80	120	150
– souvenirs, postcards etc	1	2	3	5	10
Total in 1000 Rbls	171	262	570	780	920
Total in 1000 Euros*	7	10	23	31	37

* Here 25 Rbls are equal 1 Euro (exchange rate in April 2001)

There will be an income fee to the Tuulos National Park. The grounds for the fee will be defined later.

7.3 Funding sources

At least in the beginning, the main source of funding is budget income from the Federal Budget for National Parks. However, the Tuulos National Park has good possibilities for getting so called external funding. In the best case, this can cover a part of the investments during the first decades of the Park.

So far the establishment of the Tuulos National Park has been supported by the Finnish Ministries of Environment and Agriculture and Forestry (supported inventories) and the European Union through the Tacis project "Karelia Parks Development". In 2001 the Municipal Entity of the Tuulos National Park started co-operation with Metsähallitus, which manages Finnish National Parks. The Eastern Finland Natural Heritage Services of Metsähallitus has directly on the other side of the border from the Tuulos proposed Park the Ruunaa Hiking Area, where the part closest to the Russian border is a nature reserve. In the beginning this co-operation is concentrated in constructing the first campsites for visitors to Tuulos.

In future the Tuulos National Park can get more external funding through projects funded by foreign or domestic bodies. There are some preconditions, which are of great importance when this kind of co-operation is considered by the funding party:

1. the Park is working purposefully
2. there are clear and well prepared plans of the Park activities and they are followed
3. the Park gives a reliable impression of itself
4. the Park has realistic plans, preferably even skilfully prepared documents of future projects

5. communication and co-operation with the Park is easy
6. the Park administration holds in high esteem training, environmental education, good management
7. the Park has good relations with the local administration.

Due to the location of the Park close to Finnish, and European Union, border, it is expected that some new projects with external funding will be initiated in the near future.

The need of budget funding and external funding in accomplishing this plan can be estimated as follows:

Table 6

	First year in 1000 Rbls	Second year in 1000 Rbls	Third year in 1000 Rbls	Fourth year in 1000 Rbls	Fifth year in 1000 Rbls
Running costs	-836	-1233	-1716	-1865	-2078
Investments	-4090	-4893	-4924	-4980	-4343
Income	+171	+262	+570	+780	+920
Need of budget and external funding	-4755	-5864	-6070	-6065	-5501

The Tuulos National Park has a good opportunity to increase its annual income year by year. It is expected that this favourable situation will continue, perhaps even improve after the first five years. Without the risk of overrating the chances, it can be appraised that after about ten years work the income from own activities (mainly selling of services) may exceed that of budget funding. This optimistic forecast can be explained with following:

1. there are good chances to develop tourism in the territory
2. due to the closeness of the border and the railway connection to Lentiira, plenty of potential clients are close
3. the Park is in the Green Belt, which is about to be developed as a brandy in nature tourism

III. Annexes

Annex 1. References

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Annex 2.

List of vascular plants

(compilers A.Kravchenko and O.Kuznetsov)

Latin name	English name	Russian name	Family
<i>Woodsia ilvensis</i> (L.) R. Br.	Oblong Woodsia	Вудсия эльбская	Woodsiaceae
<i>Athyrium filix-femina</i> (L.) Roth	Lady-fern	Кочедыжник женский	Athyriaceae
<i>Gymnocarpium dryopteris</i> (L.) Newm.	Oak fern	Голокучник трехраздельный	Athyriaceae
<i>Dryopteris carthusiana</i> (Vill.) H. P. Fuchs	Narrow Buckler-fern	Щитовник остистый	Dryopteridaceae
<i>Dryopteris expansa</i> (C.Presl) Frazer-Jenkins & Jermy	Northern Buckler-fern	Щ. австрийский	Dryopteridaceae
<i>Phegopteris connectilis</i> (Michx.) Watt	Beech Fern	Фегоптерис буковый	Thelypteridaceae
<i>Polypodium vulgare</i> L.	Polypody	Многоножка обыкновенная	Polypodiaceae
<i>Equisetum arvense</i> L.	Field Horsetail	Хвощ полевой	Equisetaceae
<i>Equisetum fluviatile</i> L.	Water Horsetail	Х. топяной	Equisetaceae
<i>Equisetum palustre</i> L.	Marsh Horsetail	Х. болотный	Equisetaceae
<i>Equisetum pratense</i> Ehrh.	Shady Horsetail	Х. луговой	Equisetaceae
<i>Equisetum sylvaticum</i> L.	Wood Horsetail	Х. лесной	Equisetaceae
<i>Huperzia selago</i> (L.) Bernch. ex Schrank & Mart.	Apresed Clubmoss	Баранец обыкновенный	Huperziaceae
<i>Huperzia apressa</i> (Desv.) Á. & D. Löve	Apresed Bog Clubmoss	Б. сплюснutoлистный	Huperziaceae
<i>Diphasiastrum complanatum</i> (L.) Holub	Issler's Clubmoss	Плаун сплюснутый	Lycopodiaceae
<i>Lycopodiella inundata</i> (L.) Holub	Marsh Clubmoss	П. заливаемый (топяной)	Lycopodiaceae
<i>Lycopodium annotinum</i> L.	Interrupted Clubmoss	П. годичный	Lycopodiaceae
<i>Lycopodium clavatum</i> L.	Stag's-horn Clubmoss	П. булавовидный	Lycopodiaceae
<i>Lycopodium dubium</i> Zoega	Stiff Clubmoss	П. сомнительный	Lycopodiaceae
<i>Isoetes lacustris</i> L.	Lake Quillwort	Полушник озерный	Isoetaceae
<i>Isoetes setacea</i> Durieu	Spring Quillwort	П. колючеспоровый	Isoetaceae
<i>Picea abies</i> (L.) Karst.	Norway (common) Spruce	Ель обыкновенная	Pinaceae
<i>Picea x fennica</i> (Regel) Kom.		Е. финская	Pinaceae
<i>Picea obovata</i> Ledeb.	Siberian Spruce	Е. сибирская	Pinaceae
<i>Pinus sylvestris</i> L.	Scots Pine	Сосна обыкновенная	Pinaceae
<i>Juniperus communis</i> L.	Common Juniper	Можжевельник обыкновенный	Cupressaceae
<i>Typha latifolia</i> L.		Рогоз широколистный	Typhaceae
<i>Sparganium angustifolium</i> Michx.	Floating Bur-reed	Ежеголовка узколистная	Sparganiaceae
<i>Sparganium emersum</i> Rehm.	Unbranched Bur-reed	Е. простая	Sparganiaceae
<i>Sparganium glomeratum</i> (Laest.) L. Neum.	Clustered Bur-reed	Е. скрученная	Sparganiaceae
<i>Sparganium gramineum</i> Georgi		Е. Фриза	Sparganiaceae
<i>Sparganium minimum</i> Wallr.	Least Bur-reed	Е. малая	Sparganiaceae
<i>Potamogeton alpinus</i> Balb.	Red Pondweed	Рдест альпийский	Potamogetonaceae
<i>Potamogeton berchtoldii</i> Fieb.	Small Pondweed	Р. Берхтольда	Potamogetonaceae
<i>Potamogeton gramineus</i> L.	Various-leaved Pondweed	Р. разнолистный	Potamogetonaceae
<i>Scheuchzeria palustris</i> L.	Runnoch-ruch (Pod-grass)	Шейхцерия болотная	Scheuchzeriaceae
<i>Alisma plantago-aquatica</i> L.	Water-plantain	Частуха водяной подорожник	Alismataceae
<i>Agrostis canina</i> L.	Velvet Bent	Полевица собачья	Poaceae
<i>Agrostis gigantea</i> Roth	Black Bent	П. гигантская	Poaceae

Latin name	English name	Russian name	Family
<i>Agrostis tenuis</i> Sibth.	Common Bent	П. тонкая	Poaceae
<i>Alopecurus aequalis</i> Sobol.	Orange Foxtail	Лисохвост ровный	Poaceae
<i>Alopecurus geniculatus</i> L.	Marsh Foxtail	Л. коленчатый	Poaceae
<i>Alopecurus pratensis</i> L.	Meadow Foxtail	Л. луговой	Poaceae
<i>Anthoxanthum alpinum</i> A. & D. Löve	Alpine Vernal-grass	Душистocolосник альпийский	Poaceae
<i>Anthoxanthum odoratum</i> L.	Sweet Vernal-grass	Душистый колосок	Poaceae
<i>Avenella flexuosa</i> (L.) Drej.	Wavy Hair-grass	Луговик извилистый	Poaceae
<i>Briza media</i> L.	Quaking-grass	Трясунка средняя	Poaceae
<i>Calamagrostis arundinacea</i> (L.) Roth	Common Small-reed	Вейник лесной	Poaceae
<i>Calamagrostis canescens</i> (Web.) Roth	Purple Small-reed	В. ланцетный	Poaceae
<i>Calamagrostis epigeios</i> (L.) Roth	Wood Small-reed	В. наземный	Poaceae
<i>Calamagrostis neglecta</i> (Ehrh.) Gaertn., Mey. & Scherb.	Narrow Small-reed	В. незамечаемый	Poaceae
<i>Calamagrostis phragmitoides</i> C. Hartm.	Reed-grass	В. тростниковидный	Poaceae
<i>Dactylis glomerata</i> L.	Cock's-foot	Ежа сборная	Poaceae
<i>Deschampsia cespitosa</i> (L.) Beauv.	Tufted Hair-grass	Щучка дернистая	Poaceae
<i>Elytrigia repens</i> (L.) Nevski	Common Couch	Пырей ползучий	Poaceae
<i>Festuca ovina</i> L.	Sheep's-fescue	Овсяница овечья	Poaceae
<i>Festuca rubra</i> L.	Red Fescue	О. красная	Poaceae
<i>Glyceria fluitans</i> (L.) R.Br.	Floating Sweet-grass	Манник плавающий	Poaceae
<i>Glyceria notata</i> Chevall	Plicate Sweet-grass	М. заметный (складчатый)	Poaceae
<i>Hierochloë arctica</i> C. Presl	Arctic Holy-grass	Зубровка арктическая	Poaceae
<i>Melica nutans</i> L.	Mountain Melick	Перловник поникший	Poaceae
<i>Molinia caerulea</i> (L.) Moench	Purple Moor-grass	Молиния голубая	Poaceae
<i>Nardus stricta</i> L.	Mat-grass	Белоус торчащий	Poaceae
<i>Phalaroides arundinacea</i> (L.) Rauschert	Reed Canary-grass	Двуклосточник тростниковый	Poaceae
<i>Phleum alpinum</i> L.	Alpine Cat's-tail	Тимофеевка альпийская	Poaceae
<i>Phleum pratense</i> L.	Timothy	Т. луговая	Poaceae
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Common Reed	Тростник обыкновенный	Poaceae
<i>Poa annua</i> L.	Annual Meadow-grass	Мятлик однолетний	Poaceae
<i>Poa nemoralis</i> L.	Wood Meadow-grass	М. дубравный	Poaceae
<i>Poa palustris</i> L.	Marsh Meadow-grass	М. болотный	Poaceae
<i>Poa pratensis</i> L.	Smooth Meadow-grass	М. луговой	Poaceae
<i>Poa subcaerulea</i> Smith	Spreading Meadow-grass	М. сизоватый	Poaceae
<i>Poa trivialis</i> L.	Rough Meadow-grass	М. обыкновенный	Poaceae
<i>Baeothryon alpinum</i> (L.) Egor.	Cotton Deergrass	Пухонос альпийский	Superaceae
<i>Baeothryon cespitosum</i> (L.) A. Dietr.	Deergrass	П. дернистый	Superaceae
<i>Carex acuta</i> L.	Slender Tufted-sedge	Осока острая	Superaceae
<i>Carex aquatilis</i> Wahlenb.	Water Sedge	О. водная	Superaceae
<i>Carex atherodes</i> Spreng.	Awne d Sedge	О. прямоколосая	Superaceae
<i>Carex brunnescens</i> (Pers.) Poir	Short Sedge	О. буроватая	Superaceae
<i>Carex buxbaumii</i> Wahlenb.	Club Sedge	О. Буксбаума	Superaceae
<i>Carex cespitosa</i> L.	Tufted Sedge	О. дернистая	Superaceae
<i>Carex chordorrhiza</i> Ehrh.	String Sedge	О. струннокоренная	Superaceae
<i>Carex cinerea</i> Poll.	White Sedge	О. пепельно-серая	Superaceae
<i>Carex diandra</i> Schrank	Lesser Tussock-sedge	О. двутычинковая	Superaceae
<i>Carex dioica</i> L.		О. двудомная	Superaceae
<i>Carex disperma</i> Dew.	Soft-leaved Sedge	О. двусеменная	Superaceae

Latin name	English name	Russian name	Family
<i>Carex echinata</i> Murr.	Star Sedge	О. звездчатая	Cyperaceae
<i>Carex flava</i> L.	Large Yellow-sedge	О. желтая	Cyperaceae
<i>Carex globularis</i> L.		О. шаровидная	Cyperaceae
<i>Carex hirta</i> L.	Hairy Sedge	О. коротковолосистая	Cyperaceae
<i>Carex juncella</i> (Fries) Th. Fries		О. ситниковая	Cyperaceae
<i>Carex lasiocarpa</i> Ehrh.	Slender Sedge	О. нитевидная	Cyperaceae
<i>Carex limosa</i> L.	Bog-sedge	О. топяная	Cyperaceae
<i>Carex livida</i> (Wahlenb.) Willd.	Livid Sedge	О. синеватая	Cyperaceae
<i>Carex loliacea</i> L.		О. плевеловидная	Cyperaceae
<i>Carex nigra</i> (L.) Reichard	Common Sedge	О. черная (обыкновенная)	Cyperaceae
<i>Carex omskiana</i> Meinsh.	Omsk' Sedge	О. омская	Cyperaceae
<i>Carex ovalis</i> (leporina) Good.	Oval Sedge	О. овальная	Cyperaceae
<i>Carex pallescens</i> L.	Pale Sedge	О. бледноватая	Cyperaceae
<i>Carex panicea</i> L.	Carnation Sedge	О. просьяная	Cyperaceae
<i>Carex pauciflora</i> Lightf.	Few-flowered Sedge	О. малоцветковая	Cyperaceae
<i>Carex paupercula</i> Michx.	Tall Bog-sedge	О. заливная	Cyperaceae
<i>Carex rostrata</i> Stokes	Bottle Sedge	О. носатая	Cyperaceae
<i>Carex serotina</i> Merat	Yellow-sedge	О. поздняя	Cyperaceae
<i>Carex vaginata</i> Tausch	Sheathed Sedge	О. влагалищная	Cyperaceae
<i>Carex vesicaria</i> L.	Bladder-sedge	О. пузырчатая	Cyperaceae
<i>Carex vulpina</i> L.	True Fox-sedge	О. лисья	Cyperaceae
<i>Eleocharis acicularis</i> (L.) Roem. & Schult.	Needle Spike-rush	Ситняг игольчатый	Cyperaceae
<i>Eleocharis palustris</i> (L.) Roem. & Schult.	Common Spike-rush	С. болотный	Cyperaceae
<i>Eriophorum polystachion</i> L.	Common Cottongrass	Пушица многоколосковая	Cyperaceae
<i>Eriophorum vaginatum</i> L.	Hare's-tail Cottongrass	П. влагалищная	Cyperaceae
<i>Rhynchospora alba</i> (L.) Vahl	White Beak-sedge	Очеретник белый	Cyperaceae
<i>Scirpus lacustris</i> L.	Common Club-rush	Камыш озерный	Cyperaceae
<i>Scirpus sylvaticus</i> L.	Wood Club-rush	К. лесной	Cyperaceae
<i>Calla palustris</i> L.	Water Arum (Marsh Calla)	Белокрыльник болотный	Araceae
<i>Juncus alpino-articulatus</i> Chaix	Alpine Rush	Ситник альпийский	Juncaceae
<i>Juncus articulatus</i> L.	Jointed Rush	С. членистый	Juncaceae
<i>Juncus bufonius</i> L. s. l.	Toad Rush	С. лягушачий	Juncaceae
<i>Juncus bulbosus</i> L.	Bulbous Rush	С. луковичный	Juncaceae
<i>Juncus compressus</i> Jacq.	Round-fruited Rush	С. сплюснутый	Juncaceae
<i>Juncus conglomeratus</i> L.	Compact Rush	С. скрученный	Juncaceae
<i>Juncus effusus</i> L.	Soft-rush	С. развесистый	Juncaceae
<i>Juncus filiformis</i> L.	Thread Rush	С. нитевидный	Juncaceae
<i>Juncus nodulosus</i> Wahlenb.	Blunt-flowered Rush	С. узловатый	Juncaceae
<i>Juncus stygius</i> L.	Marsh Rush	С. стигийский	Juncaceae
<i>Luzula multiflora</i> (Ehrh.) Lej.	Heath Wood-rush	Ожика многоцветковая	Juncaceae
<i>Luzula pallidula</i> Kirschner	Fen Wood-rush	О. бледная	Juncaceae
<i>Luzula pilosa</i> (L.) Willd.	Hairy Wood-rush	О. волосистая	Juncaceae
<i>Luzula sudetica</i> (Willd.) Schult.	Field Wood-rush	О. судетская	Juncaceae
<i>Convallaria majalis</i> L.	Lily-of-the-valley	Ландыш майский	Convallariaceae
<i>Maianthemum bifolium</i> (L.) F. W. Schmidt	May Lily	Майник двулистный	Convallariaceae
<i>Paris quadrifolia</i> L.	Herb-paris	Вороний глаз четырёхлистный	Trilliaceae
<i>Corallorhiza trifida</i> Chatel.	Coralroot Orchid	Ладьян трехнадрезный	Orchidaceae
<i>Dactylorhiza incarnata</i> (L.) Soo		Пальчатокоренник мясокрасный	Orchidaceae
<i>Dactylorhiza fuchsii</i> (Druce) Soo	Common Spotted-orchid	П. Фукса	Orchidaceae
<i>Dactylorhiza maculata</i> (L.) Soo	Heath Spotted-orchid	П. пятнистый	Orchidaceae

Latin name	English name	Russian name	Family
<i>Dactylorhiza traunsteineri</i> (Saut.) Soo	Narrow-leaved Marsh-orchid	П. Траунштейнера	Orchidaceae
<i>Goodyera repens</i> (L.) R. Br.	Creeping Lady's-tresses	Гудайера ползучая	Orchidaceae
<i>Gymnadenia conopsea</i> (L.) R. Br.	Fragrant Orchid	Кокушник длиннорогий	Orchidaceae
<i>Hammarbya paludosa</i> (L.) O. Kuntze	Bog Orchid	Гаммарбия болотная	Orchidaceae
<i>Listera cordata</i> (L.) R. Br.	Lesser Twayblade	Тайник сердцевидный	Orchidaceae
<i>Platanthera bifolia</i> (L.) Rich.	Lesser Butterfly-orchid	Любка двулистная	Orchidaceae
<i>Populus tremula</i> L.	European Aspen	Тополь дрожащий (осина)	Salicaceae
<i>Salix aurita</i> L.	Eared Williw	Ива ушастая	Salicaceae
<i>Salix caprea</i> L.	Goat Willow	И. козья	Salicaceae
<i>Salix cinerea</i> L.	Grey Willow	И. пепельная	Salicaceae
<i>Salix lapponum</i> L.	Downy Willow	И. лапландская	Salicaceae
<i>Salix myrsinifolia</i> Salisb	Dark-leaved Willow	И. мирзинолистная	Salicaceae
<i>Salix pentandra</i> L.	Bay Willow	И. пятитычинковая	Salicaceae
<i>Salix phylicifolia</i> L.	Tea-leaved Willow	И. филиколистная	Salicaceae
<i>Salix starkeana</i> Willd.		И. Штарке (ива сизоватая)	Salicaceae
<i>Alnus glutinosa</i> (L.) Gaertn.	Black Alder	Ольха черная (ольха клейкая)	Betulaceae
<i>Alnus incana</i> (L.) Moench	Grey Alder (White A., Speckled A.)	О. серая	Betulaceae
<i>Alnus kolaensis</i> Orlova	Kola Alder	О. кольская	Betulaceae
<i>Betula x intermedia</i> Thomas.		Береза ботническая	Betulaceae
<i>Betula nana</i> L.	Dwarf Birch	Б. карликовая (ерник)	Betulaceae
<i>Betula pendula</i> Roth	Silver Birch	Б. бородавчатая	Betulaceae
<i>Betula pubescens</i> Ehrh.	Downy Birch	Б. пушистая	Betulaceae
<i>Urtica dioica</i> L.	Common Nettle	Крапива двудомная	Urticaceae
<i>Bistorta major</i> S. F. Gray	Common Bistort, Snake-root Knotgrass	Горец змеиный	Polygonaceae
<i>Bistorta vivipara</i> (L.) S. F. Gray	Alpine Bistort	Г. живородящий	Polygonaceae
<i>Fallopia convolvulus</i> (L.) A. Löve	Black-bindweed	Гречишка вьюнковая	Polygonaceae
<i>Persicaria minor</i> (Huds.) Opiz	Small Water-pepper	Горец малый	Polygonaceae
<i>Polygonum aviculare</i> L.	Knotgrass	Г. птичий, спорыш	Polygonaceae
<i>Rumex acetosa</i> L.	Common Sorrel	Щавель кислый	Polygonaceae
<i>Rumex acetosella</i> L.	Sheep's Sorrel	Щ. малый, щавелёк	Polygonaceae
<i>Rumex aquaticus</i> L.	Scottish Dock	Щ. водный	Polygonaceae
<i>Rumex confertus</i> Willd.	Horse Sorrel	Щ. конский	Polygonaceae
<i>Rumex longifolius</i> DC.	Northern Dock	Щ. длиннолистный	Polygonaceae
<i>Chenopodium album</i> L.		Марь белая	Chenopodiaceae
<i>Montia fontana</i> L.	Blinks	Монция блестящесеменная	Portulacaceae
<i>Cerastium holosteoides</i> Fries	Common Mouse-ear	Ясколка дернистая	Caryophyllaceae
<i>Dianthus deltoides</i> L.	Maiden Pink	Гвоздика травянка	Caryophyllaceae
<i>Melandrium dioicum</i> (L.) Coss. & Germ.	Red Campion	Дрема двудомная	Caryophyllaceae
<i>Oberna behen</i> (L.) Ikonn.	Bladder Campion	Смолевка хлопущка	Caryophyllaceae
<i>Melandrium album</i> (Mill.) Garske		Дрема белая	Caryophyllaceae
<i>Sagina procumbens</i> L.	Procumbent Pearlwort	Мшанка лежачая	Caryophyllaceae
<i>Spergula arvensis</i> L.		Торица пашенная	Caryophyllaceae
<i>Spergularia rubra</i> (L.) J. & C. Presl	Sand Spurray	Торичник красный	Caryophyllaceae
<i>Stellaria graminea</i> L.	Lesser Stitchwort	Звездчатка злаковая	Caryophyllaceae
<i>Stellaria media</i> (L.) Vill.	Common Chickweed	З. средняя, мокрица	Caryophyllaceae
<i>Stellaria nemorum</i> L.	Wood Stitchwort	З. дубравная	Caryophyllaceae
<i>Nuphar lutea</i> (L.) Smith	Yellow Water-lily	Кубышка желтая	Nymphaeaceae

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<i>Nuphar pumila</i> (Timm) DC.	Least Water-lily	К. малая	Nymphaeaceae
<i>Nuphar x spenneriana</i> Gaudin		К. промежуточная	Nymphaeaceae
<i>Nymphaea candida</i> J. Presl	White Water-lily	Кувшинка чисто-белая	Nymphaeaceae
<i>Nymphaea tetragona</i> Georgi	Pygmy Water-lily	К. четырехгранная	Nymphaeaceae
<i>Caltha palustris</i> L.	Marsh-marigold	Калужница болотная	Ranunculaceae
<i>Ranunculus acris</i> L.	Meadow Buttercup	Люттик едкий	Ranunculaceae
<i>Ranunculus auricomus</i> L. s.l.	Goldilocks Buttercup	Л. золотистый	Ranunculaceae
<i>Ranunculus flammula</i> L.	Lesser Spearwort	Л. жгучий (прыщенец)	Ranunculaceae
<i>Ranunculus polyanthemos</i> L.	Many-flowered Buttercup	Л. многоцветковый	Ranunculaceae
<i>Ranunculus repens</i> L.	Creeping Buttercup	Л. ползучий	Ranunculaceae
<i>Ranunculus reptans</i> L.	Creeping Spearwort	Л. стелющийся	Ranunculaceae
<i>Thalictrum flavum</i> L.	Common Meadow-rue	Василистник желтый	Ranunculaceae
<i>Barbarea arcuata</i>	Winter-cress	Сурепка обыкновенная	Brassicaceae
<i>Capsella bursa-pastoris</i> (L.) Medik.	Shepherd's-purse	Пастушья сумка обыкновенная	Brassicaceae
<i>Raphanus raphanistrum</i> L.	Sea Radish	Редька дикая	Brassicaceae
<i>Rorippa austriaca</i> (Crantz) Bess.		Жерушник австрийский	Brassicaceae
<i>Rorippa palustris</i> (L.) Bess.	Marsh Yellow-cress	Ж. болотный	Brassicaceae
<i>Subularia aquatica</i> L.	Awlwort	Шильник водный	Brassicaceae
<i>Thlaspi arvense</i> L.		Ярутка полевая	Brassicaceae
<i>Drosera anglica</i> Huds.	Great Sundew	Росянка английская	Droseraceae
<i>Drosera rotundifolia</i> L.	Round-leaved Sundew	Р. круглолистная	Droseraceae
<i>Ribes nigrum</i> L.	Black Currant	Смородина черная	Grossulariaceae
<i>Alchemilla acutiloba</i> Opiz	Lady's-mantle	Манжетка остролопастная	Rosaceae
<i>Alchemilla baltica</i> Sam. ex Juz.		М. балтийская	Rosaceae
<i>Alchemilla glaucescens</i> Wallr.		М. сизоватая	Rosaceae
<i>Alchemilla gracilis</i> Opiz		М. изящная	Rosaceae
<i>Alchemilla monticola</i> Opiz		М. пастбищная	Rosaceae
<i>Alchemilla propinqua</i> Lindb. fil. ex Juz.		М. близкая	Rosaceae
<i>Alchemilla sarmatica</i> Juz.		М. сарматская	Rosaceae
<i>Alchemilla semilunaris</i> Alech.		М. полулунная	Rosaceae
<i>Alchemilla subcrenata</i> Bus.		М. городчатая	Rosaceae
<i>Comarum palustre</i> L.	Marsh Cinquefoil	Сабельник болотный	Rosaceae
<i>Filipendula ulmaria</i> (L.) Maxim.	Meadowsweet	Таволга вязолистная	Rosaceae
<i>Fragaria vesca</i> L.	Wild Strawberry	Земляника лесная	Rosaceae
<i>Geum rivale</i> L.	Water Avens	Гравилат речной	Rosaceae
<i>Padus avium</i> Mill.	Bird Cherry	Черемуха обыкновенная	Rosaceae
<i>Potentilla anserina</i> L.	Silver Weed	Лапчатка гусиная	Rosaceae
<i>Potentilla argentea</i> L.	Hoary Cinquefoil	Л. серебристая	Rosaceae
<i>Potentilla erecta</i> (L.) Raeusch.	Common Tormentil	Л. прямая, калган	Rosaceae
<i>Potentilla intermedia</i> L.	Medium Cinquefoil	Л. средняя	Rosaceae
<i>Potentilla norvegica</i> L.	Ternate-leaved Cinquefoil	Л. норвежская	Rosaceae
<i>Rosa majalis</i> Herrm.	Cinnamon Rose	Шиповник майский	Rosaceae
<i>Rubus arcticus</i> L.	Arctic Bramble	Поляника, княженика	Rosaceae
<i>Rubus x castoreus</i> Laest.		Костяника бобровая	Rosaceae
<i>Rubus chamaemorus</i> L.	Cloudberry	Морошка приземистая	Rosaceae
<i>Rubus idaeus</i> L.	Common Raspberry	Малина обыкновенная	Rosaceae
<i>Rubus saxatilis</i> L.	Stone Bramble	Костяника	Rosaceae
<i>Sorbus aucuparia</i> L.	Rown	Рябина обыкновенная	Rosaceae
<i>Amoria hybrida</i> (L.) C.Presl	Bastard Clover, Alsike C.	Клевер гибридный	Fabaceae
<i>Amoria montana</i> (L.) Sojak	Mountain Clover	К. горный	Fabaceae
<i>Amoria repens</i> (L.) C. Presl.	White Clover	К. ползучий	Fabaceae
<i>Chrysopsis spadicea</i> (L.) Greene	Large Brown Clover	К. темноцветный	Fabaceae

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<i>Lathyrus pratensis</i> L.	Meadow Vetchling	Чина луговая	Fabaceae
<i>Lotus corniculatus</i> L.	Common Bird's-foot-trefoil	Лядвенец рогатый	Fabaceae
<i>Trifolium pratense</i> L.	Red Clover	Клевер луговой	Fabaceae
<i>Trifolium medium</i> L.	Zigzag Clover, Mammoth C.	К. средний	Fabaceae
<i>Vicia cracca</i> L.	Tufted Vetch	Горошек мышинный	Fabaceae
<i>Vicia sepium</i> L.	Bush Vetch	Г. заборный	Fabaceae
<i>Geranium sylvaticum</i> L.	Wood Crane's-bill	Герань лесная	Geraniaceae
<i>Callitriche palustris</i> L.	Marsh Water-starwort	Болотник обыкновенный	Callitrichaceae
<i>Empetrum hermaphroditum</i> Hagerup		Водяника обополая	Empetraceae
<i>Empetrum nigrum</i> L.	Crowberry	В. черная	Empetraceae
<i>Frangula alnus</i> Mill.	Alder Buckthorn	Крушина ломкая	Rhamnaceae
<i>Hypericum maculatum</i> Crantz	Imperfoliate St John's-wort	Зверобой пятнистый	Hypericaceae
<i>Viola arvensis</i> Murr.	Field Pansy	Фиалка полевая	Violaceae
<i>Viola epipsila</i> Ledeb.	Dwarf Marsh Violet	Ф. сверху голая	Violaceae
<i>Viola montana</i> L.	Mountain Dog-violet	Ф. горная	Violaceae
<i>Viola palustris</i> L.	Marsh Violet	Ф. болотная	Violaceae
<i>Chamaenerion angustifolium</i> (L.) Scop.	Rosebay Willowherb	Иван-чай узколистый	Onagraceae
<i>Epilobium adenocaulon</i> Hausskn.	American Willow-weed	Кипрей железистостебельный	Onagraceae
<i>Epilobium palustre</i> L.	Marsh Willowherb	К. болотный	Onagraceae
<i>Myriophyllum alterniflorum</i> DC.	Alternate Water-milfoil	Уруть очередноцветковая	Haloragaceae
<i>Hippuris vulgaris</i> L.	Mare's-tail	Хвостник обыкновенный	Hippuridaceae
<i>Angelica sylvestris</i> L.	Wild Angelica	Дудник лесной	Apiaceae
<i>Anthriscus sylvestris</i> (L.) Hoffm.	Cow Parsley	Купырь лесной	Apiaceae
<i>Carum carvi</i> L.	Common Caraway	Тмин обыкновенный	Apiaceae
<i>Cicuta virosa</i> L.	Cowbane	Вех ядовитый	Apiaceae
<i>Heracleum sibiricum</i> L.	Hogweed	Борщевик сибирский	Apiaceae
<i>Pimpinella saxifraga</i> L.	Burnet-saxifrage	Бедренец камнеломковый	Apiaceae
<i>Thyselium palustre</i> (L.) Rafin.	Milk-parsley	Горичник болотный	Apiaceae
<i>Chamaepericlymenum suecicum</i> (L.) Aschers. & Graebn.	Dwarf Cornel	Дерен шведский	Cornaceae
<i>Moneses uniflora</i> (L.) A. Gray	One-flowered Wintergreen	Одноцветка обыкновенная	Pyrolaceae
<i>Orthilia secunda</i> (L.) House	Serrated Wintergreen	Ортилия однобокая	Pyrolaceae
<i>Pyrola chlorantha</i> Sw.	Green-flowered Wintergreen	Грушанка зеленоцветковая	Pyrolaceae
<i>Pyrola media</i> Sw.	Intermediate Wintergreen	Г. средняя	Pyrolaceae
<i>Pyrola minor</i> L.	Common Wintergreen	Г. малая	Pyrolaceae
<i>Pyrola rotundifolia</i> L.	Round-leaved Wintergreen	Г. круглолистная	Pyrolaceae
<i>Andromeda polifolia</i> L.	Bog-rosemary	Подбел многолистный	Ericaceae
<i>Arctostaphylos uva-ursi</i> (L.) Spreng.	Bearberry	Толокнянка обыкновенная	Ericaceae
<i>Calluna vulgaris</i> (L.) Hull	Heather	Вереск обыкновенный	Ericaceae
<i>Chamaedaphne calyculata</i> (L.) Moench	Leather-leaf	Хамедафне обыкновенная	Ericaceae
<i>Ledum palustre</i> L.	Dutch Myrthe	Багульник болотный	Ericaceae
<i>Oxycoccus microcarpus</i> Turcz. ex Rupr.	Small Cranberry, Northern C.	Клюква мелкоплодная	Ericaceae
<i>Oxycoccus palustris</i> Pers.	Cranberry	К. болотная	Ericaceae
<i>Vaccinium myrtillus</i> L.	Bilberry, Whortlberry	Черника	Ericaceae
<i>Vaccinium uliginosum</i> L.	Bog Bilberry	Голубика, гонобобель	Ericaceae
<i>Vaccinium vitis-idaea</i> L.	Cowberry	Брусника обыкновенная	Ericaceae
<i>Lysimachia vulgaris</i> L.	Yellow Loosestrife	Вербейник обыкновенный	Primulaceae
<i>Naumburgia thyrsoflora</i> (L.) Reichenb.	Tufted Loosestrife	Кизляк кистецветный	Primulaceae

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<i>Trientalis europaea</i> L.	Chickweed-wintergrass	Седмичник европейский	Primulaceae
<i>Menyanthes trifoliata</i> L.	Bogbean	Вахта трехлистная	Menyanthaceae
<i>Polemonium caeruleum</i> L.	Jacob's-ladder	Синюха голубая	Polemoniaceae
<i>Galeopsis bifida</i> Boenn.	Bifid Hemp-nettle	Пикульник двураздельный	Lamiaceae
<i>Galeopsis speciosa</i> Mill.	Large-flowered Hemp-nettle	П. красивый	Lamiaceae
<i>Glechoma hederacea</i> L.	Ground-ivy	Будра плющевидная	Lamiaceae
<i>Mentha arvensis</i> L.	Corn Ment	Мята полевая	Lamiaceae
<i>Prunella vulgaris</i> L.	Selfheal	Черноголовка обыкновенная	Lamiaceae
<i>Scutellaria galericulata</i> L.	Scullcap	Шлемник обыкновенный	Lamiaceae
<i>Euphrasia brevipila</i> Burn. et Gremli	Eyebright	Очанка коротковолосая	Scrophulariaceae
<i>Linaria vulgaris</i> Mill.	Common Toadflax	Льянка обыкновенная	Scrophulariaceae
<i>Melampyrum pratense</i> L.	Common Cow-wheat	Марьянник луговой	Scrophulariaceae
<i>Melampyrum sylvaticum</i> L.	Small Cow-wheat	М. лесной	Scrophulariaceae
<i>Pedicularis palustris</i> L.	Marsh Lousewort	Мытник болотный	Scrophulariaceae
<i>Rhinanthus minor</i> L.	Yellow-rattle	Погремок малый	Scrophulariaceae
<i>Rhinanthus serotinus</i> (Schoenh.) Oborny	Greater Yellow-rattle	П. осенний	Scrophulariaceae
<i>Veronica chamaedrys</i> L.	Germander Speedwell	Вероника дубравная	Scrophulariaceae
<i>Veronica longifolia</i> L.	Long-leaved Speedwell	В. длиннолистная	Scrophulariaceae
<i>Veronica officinalis</i> L.	Heath Speedwell	В. лекарственная	Scrophulariaceae
<i>Veronica scutellata</i> L.	Marsh Speedwell	В. щитковая	Scrophulariaceae
<i>Veronica serpyllifolia</i> L.	Thyme-leaved Speedwell	В. тимьянолистная	Scrophulariaceae
<i>Pinguicula vulgaris</i> L.	Common Butterwort	Жирянка обыкновенная	Lentibulariaceae
<i>Utricularia intermedia</i> Hayne	Intermediate Bladderwort	Пузырчатка средняя	Lentibulariaceae
<i>Utricularia minor</i> L.		П. малая	Lentibulariaceae
<i>Utricularia vulgaris</i> L.	Greater Bladderwort	П. обыкновенная	Lentibulariaceae
<i>Plantago lanceolata</i> L.	Ribwort Plantain	Подорожник ланцетный	Plantaginaceae
<i>Plantago major</i> L.	Greater Plantain	П. большой	Plantaginaceae
<i>Plantago media</i> L.	Hoary Plantain	П. средний	Plantaginaceae
<i>Galium album</i> Mill.	Hedge Bedstraw	Подмаренник белый	Rubiaceae
<i>Galium boreale</i> L.		П. северный	Rubiaceae
<i>Galium palustre</i> L.	Common Marsh-bedstraw	П. болотный	Rubiaceae
<i>Galium uliginosum</i> L.	Fen Bedstraw	П. топяной	Rubiaceae
<i>Linnaea borealis</i> L.	Twinflower	Линнея северная	Caprifoliaceae
<i>Knautia arvensis</i> (L.) Coult.	Field Scabious	Короставник полевой	Dipsacaceae
<i>Campanula patula</i> L.	Spreading Bellflower	Колокольчик раскидистый	Campanulaceae
<i>Campanula rotundifolia</i> L.	Harebell	К. круглолистный	Campanulaceae
<i>Lobelia dortmanna</i> L.	Water Lobelia	Лобелия Дортмана	Lobeliaceae
<i>Achillea millefolium</i> L.	Yarrow	Тысячелистник обыкновенный	Asteraceae
<i>Antennaria dioica</i> (L.) Gaertn.	Mountain Everlasting	Кошачья лапка двудомная	Asteraceae
<i>Arctium tomentosum</i> Mill.	Greater Burdock	Лопух паутинистый	Asteraceae
<i>Carduus crispus</i> L.	Wetted Thistle	Чертополох курчавый	Asteraceae
<i>Centaurea cyanus</i> L.	Cornflower	Василек синий	Asteraceae
<i>Centaurea jacea</i> L.	Brown Knapweed	В. луговой	Asteraceae
<i>Centaurea phrygia</i> L.	Wig Knapweed	В. фригийский	Asteraceae
<i>Cirsium heterophyllum</i> (L.) Hill	Melancholy Thistle	Бодяк разнолистный	Asteraceae
<i>Cirsium palustre</i> (L.) Scop.	Marsh Thistle	Б. болотный	Asteraceae
<i>Cirsium setosum</i> (Willd.) Bess.	Creeping Thistle	Б. щетинистый	Asteraceae
<i>Cirsium vulgare</i> (Savi) Ten.	Spear Thistle	Б. обыкновенный	Asteraceae
<i>Crepis paludosa</i> (L.) Moench	Marsh Hawk's-beard	Скерда болотная	Asteraceae
<i>Crepis tectorum</i> L.		С. кровельная	Asteraceae
<i>Erigeron acris</i> L.	Blue Fleabane	Мелколепестник едкий	Asteraceae
<i>Filaginella uliginosa</i> (L.) Opiz	Marsh Cudweed	Сушеница топяная	Asteraceae

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Hieracium caesium (Fries) Fries	Hawkweed	Ястребинка сизая	Asteraceae
Hieracium multiglandulosum Juxip	Hawkweed	Я. многожелезковая	Asteraceae
Hieracium umbellatum L.	Hawkweed	Я. зонтичная	Asteraceae
Hieracium vulgatum Fries	Hawkweed	Я. обычная	Asteraceae
Leontodon autumnalis L.	Autumn Hawkbit	Кульбаба осенняя	Asteraceae
Leontodon hispidus L.	Rough Hawkbit	К. щетинистая	Asteraceae
Lepidotheca suaveolens (Pursh) Nutt.	Rayless Camomile	Ромашка пахучая	Asteraceae
Leucanthemum vulgare Lam.	Oxeye Daisy	Нивяник обыкновенный	Asteraceae
Omalotheca sylvatica (L.) Sch. Bip. & F. Schultz	Heath Cudweed	Сухоцветка лесная	Asteraceae
Pilosella floribundum Wimm. & Grab.	Smoothish Mouse-ear- hawkweed	Ястребиночка обильноцветущая	Asteraceae
Pilosella officinarum F. Schultz & Sch. Bip.	Mouse-ear Hawkweed	Я. обыкновенная	Asteraceae
Ptarmica vulgaris Hill.	Sneezewort	Чихотник обыкновенный	Asteraceae
Solidago virgaurea L.	Goldenrod	Золотая розга	Asteraceae
Sonchus arvensis L.	Perennial Sow-thistle	Осот полевой	Asteraceae
Tanacetum vulgare L.	Tansy	Пижма обыкновенная	Asteraceae
Taraxacum officinale Wigg., coll.	Dandelion	Одуванчик лекарственный	Asteraceae
Tripleurospermum perforatum (Merat) M. Lainz	German camomile	Трехреберник пронзеннолистный	Asteraceae
Tussilago farfara L.	Colt's-foot	Мать-и-мачеха обыкновенная	Asteraceae

Annex 3

List of mammals

(by Danilov et al., 1998)

Latin name	English name	Russian name	Order	Frequency
<i>Talpa europaea</i> L.	Mole	Крот	Insectifora	very rare
<i>Sorex araneus</i> L.	Common shrew	Бурозубка обыкновенная	Insectifora	common
<i>Sorex caecutiens</i> Laxm.	Masked shrew	Б. средняя	Insectifora	rare
<i>Sorex minutus</i> L.	Lesser shrew	Б. малая	Insectifora	common
<i>Sorex minutissimus</i> Zimm.	Pygmy shrew	Б. крошечная	Insectifora	very rare
<i>Sorex isodon</i> Turov	Graves shrew	Б. равнозубая	Insectifora	rare
<i>Neomys fodiens</i> Penn.	Water shrew	Водяная кутора	Insectifora	rare
<i>Eptesicus nilssoni</i> Keys. et Blas	Northern bat	Кожанок северный	Chiroptera	common
<i>Plecotus auritus</i> L.	Brown long-eared bat	Ушан	Chiroptera	?
<i>Lepus timidus</i> L.	Mountain (Arctic) hare	Зяц-беляк	Lagomorpha	common
<i>Sciurus vulgaris</i> L.	Red squirrel	Белка обыкновенная	Rodentia	common
<i>Pteromys volans</i> L.	Flying squirrel	Белка-летяга	Rodentia	rare
<i>Castor canadensis</i> Kuhl.	Canadian beaver	Бобр канадский	Rodentia	common
<i>Sicista betulina</i> Pall.	Birch mouse	Мышовка лесная	Rodentia	?
<i>Rattus norvegicus</i> Berk.	Norway rat	Крыса серая	Rodentia	common
<i>Mus musculus</i> L.	House mouse	Мышь домовая	Rodentia	common
<i>Micromys minutus</i> Pall.	Harvest mouse	Мышь-малютка	Rodentia	rare
<i>Myopus schisticolor</i> Lillj.	Wood lemming	Лемминг лесной	Rodentia	common
<i>Clethrionomys glareolus</i> Schr.	Bank vole	Рыжая полевка	Rodentia	common
<i>Clethrionomys rutilus</i> Pall.	Northern redback vole	Красная полевка	Rodentia	rare
<i>Clethrionomys rufocanus</i> Sund.	Large-toothed redback vole	Красно-серая полевка	Rodentia	common
<i>Microtus arvalis</i> Pall.	Common vole	Полевка обыкновенная	Rodentia	?
<i>Microtus agrestis</i> L.	Field vole	П. темная	Rodentia	common
<i>Microtus oeconomus</i> Pall.	Tundra (Root) vole	П.-экономка	Rodentia	rare
<i>Arvicola terrestris</i> L.	European water vole	П. водяная	Rodentia	common
<i>Ondatra zibethica</i> L.	Muskrat	Ондатра	Rodentia	common
<i>Canis lupus</i> L.	Wolf	Волк	Carnivora	common
<i>Vulpes vulpes</i> L.	Fox	Лисица обыкновенная	Carnivora	common
<i>Nyctereutes procyonoides</i> Gray.	Raccoon dog	Енотовидная собака	Carnivora	singular
<i>Ursus arctos</i> L.	Brown bear	Медведь бурый	Carnivora	common
<i>Mustela erminea</i> L.	Stoat	Горноста́й	Carnivora	common
<i>Mustela nivalis</i> L.	Weasel	Ласка	Carnivora	common
<i>Mustela putorius</i> L.	Polecat	Хорь черный	Carnivora	very rare
<i>Mustela vison</i> Schreb.	American mink	Норка американская	Carnivora	common
<i>Martes martes</i> L.	Pine marten	Куница лесная	Carnivora	common
<i>Gulo gulo</i> L.	Wolverine	Росомаха	Carnivora	common
<i>Meles meles</i> L.	Badger	Барсук	Carnivora	very rare
<i>Lutra lutra</i> L.	Eurasian otter	Выдра	Carnivora	common
<i>Lynx lynx</i> L.	Northern lynx	Рысь	Carnivora	rare
<i>Sus scrofa</i> L.	Wild boar	Кабан	Artiodactyla	?
<i>Alces alces</i> L.	Elk	Лось	Artiodactyla	common
<i>Rangifer tarandus fennicus</i> Lonnb.	Forest reindeer	Лесной северный олень	Artiodactyla	common

Annex 4

List of bird species

(compiled by S. V. Sazonov)

Latin name	English name	Russian name	Character of stay	Status in local fauna
<i>Gavia stellata</i>	Red-throated Diver	Краснозобая гагара	nt 1	N
<i>G. arctica</i>	Black-throated Diver	Чернозобая гагара	nt 2, 3	N
<i>Ciconia ciconia</i>	White Stork	Белый аист	e 1	M
<i>Cygnus cygnus</i>	Whooper Swan	Лебедь-кликун	nth 3	N
<i>Anser albifrons</i>	White-fronted Goose	Белолобый гусь	t 2	M
<i>A. fabalis</i>	Bean Goose	Гусь-гуменник	nt 3	N
<i>Branta bernicla</i>	Brent Goose	Черная казарка	t 2	M
<i>Anas platyrhynchos</i>	Mallard	Кряква	nt 3	N
<i>A. platyrhynchos</i>		Кряква		
<i>A. crecca</i>	Teal	Чирок-свистунок	nt 3	N
<i>A. penelope</i>	Wigeon	Свиязь	nt 2	N
<i>Aythya ferina</i>	Pochard	Красноголовый нырок	e 1	M
<i>A. fuligula</i>	Tufted Duck	Хохлатая чернеть	nt 2	N
<i>Melanitta nigra</i>	Common Scoter	Синьга	t 2	M
<i>Melanitta fusca</i>	Velvet Scoter	Турпан	t 2	M
<i>Clangula hyemalis</i>	Long-tailed Duck	Морянка	t 3	M
<i>Bucephala clangula</i>	Goldeneye	Гоголь	nt 3	N
<i>M. merganser</i>	Goosander	Большой крохаль	nt 2	N
<i>M. serrator</i>	Red-breasted Merganser	Средний крохаль	nt 2	N
<i>M. merganser</i>		Большой крохаль	nt 2	N
<i>Pernis apivorus</i>	Honey Buzzard	Осоед	nt 2	N
<i>Aquila chrysaetos</i>	Golden Eagle	Беркут	nth 1	N
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Орлан-белохвост	nt 1	N
<i>Buteo buteo</i>	Buzzard	Канюк	nt 3	N
<i>B. lagopus</i>	Rough-legged Buzzard	Зимняк	(n) t 1	(n)
<i>Accipiter gentilis</i>	Levant Sparrowhawk	Ястреб-тетеревятник	nt 2	N
<i>Acc. nisus</i>	Sparrowhawk	Ястреб-перепелятник	nt 3	N
<i>Milvus korshun</i>	Black Kite	Черный коршун	t 1	M
<i>Pandion haliaetus</i>	Osprey	Скопа	nt 3	N
<i>F. columbarius</i>	Merlin	Дербник	nt 1	N
<i>F. subbuteo</i>	Hobby	Чеглок	nt 3	N
<i>Lagopus lagopus</i>	Willow Grouse	Белая куропатка	nth 3	N
<i>L. lagopus</i>		Белая куропатка	nth 2	N
<i>Lyrurus tetrix</i>	Black Grouse	Тетерев	nth 3	N
<i>Tetrao urogallus</i>	Capercaillie	Глухарь	nth 3, 4	N
<i>Tetrastes bonasia</i>	Hazel grouse (hen)	Рябчик	nh 3	N
<i>Grus grus</i>	Common Crane	Серый журавль	nt 3	N
<i>Pluvalis apricaria</i>	Golden Plover	Золотистая ржанка	nt 2	N
<i>Vanellus vanellus</i>	Lapwing	Чибис	nt 1	N
<i>Tringa ochropus</i>	Green Sandpiper	Черныш	nt 3	N
<i>Tr. glareola</i>	Wood Sandpiper	Фифи	nt 3	N
<i>Tr. nebularia</i>	Greenshank	Большой улит	nt 2	N
<i>Tr. nebularia</i>		Большой улит	nt 3	N
<i>Actitis hypoleucos</i>	Common Sandpiper	Перевозчик	nt 3	N
<i>Calidris alpina</i>	Dunlin	Чернозобик	t 2	M
<i>Gallinago gallinago</i>	Snipe	Бекас	nt 2	N
<i>Scolopax rusticola</i>	Woodcock	Вальдшнеп	nt 2, 3	N
<i>Numenius arquata</i>	Curlew	Большой кроншнеп	nt 1	N
<i>N. phaeopus</i>	Whimbrel	Средний кроншнеп	nt 2	N
<i>Larus canus</i>	Common Gull	Сизая чайка	nt 2	N
<i>L. argentatus</i>	Herring Gull	Серебристая чайка	t 1	V
<i>L. fuscus</i>	Lesser Blackback	Клуша	nt 3	N
<i>L. ridibundus</i>	Black-headed Gull	Озерная чайка	t 2	V
<i>Sterna hirundo</i>	Common Tern	Речная крачка	nt 3	N

Latin name	English name	Russian name	Character of stay	Status in local fauna
<i>Columba livia</i>	Rock Dove	Сизый голубь	t? 1	V
<i>Col. palumbus</i>	Woodpigeon	Вяхирь	nt 2	N
<i>Col. oenas</i>	Stock Dove	Клинтух	e 1	M
<i>Cuculus canorus</i>	Cockoo	Обыкновенная кукушка	nt 3	N
<i>Surnia ulula</i>	Hawk Owl	Ястребиная сова	nth 2	N
<i>Strix nebulosa</i>	Great Gray Owl	Бородатая неясыть	nth 2	N
<i>S. uralensis</i>	Ural Owl	Уральская неясыть	nth 2	N
<i>Aegolius funereus</i>	Tengmalm's Owl	Мохноногий сыч	nth 3	N
<i>Apus apus</i>	Swift	Черный стриж	nt 3	N
<i>Dryocopus martius</i>	Black Woodpecker	Желна	nth 3	N
<i>Dendrocopos major</i>	Great Spotted Woodpecker	Большой пестрый дятел	nth 3	N
<i>Picoides tridactylus</i>	Three-toed Woodpecker	Трехпалый дятел	nth 3	N
<i>Jynx torquilla</i>	Wryneck	Вертишейка	nt 2	N
<i>Alanda arvensis</i>	Skylark	Полевой жаворонок	(n) t 2	(n)
<i>Eremophila alpestris</i>	Shore Lark	Рогатый жаворонок	t 1	M
<i>Riparia riparia</i>	Sand Martin	Ласточка-береговушка	nt 1	N
<i>Hirundo rustica</i>	Swallow	Деревенская ласточка	nt 2	N
<i>Delichon urbica</i>	House Martin	Городская ласточка	nt 2	N
<i>Perisoreus infaustus</i>	Siberian Jay	Кукша	nth 3	N
<i>Garrulus glandarius</i>	Jay	Сойка	nt 1	N
<i>Pica pica</i>	Magpie	Сорока	nt 1	N
<i>Corvus corax</i>	Raven	Ворон	nth 2	N
<i>C. cornix</i>	Hooded Crow	Серая ворона	nt 1	N
<i>P. major</i>	Great Tit	Большая синица	nt 2	N
<i>P. montanus</i>	Willow Tit	Пухляк	nth 3	N
<i>P. cinctus</i>	Siberian Tit	Сероголовая гаечка	(n) th 1	(n)
<i>P. cristatus</i>	Crested Tit	Хохлатая синица	nth 3	N
<i>Certhia familiaris</i>	Treecreeper	Обыкновенная пищуха	nth 3	N
<i>Aegithalos caudatus</i>	Long-tailed Tit	Ополовник	nth	N
<i>Cinclus cinclus</i>	Dipper	Оляпка	th 2	M
<i>Troglodytes troglodytes</i>	Wren	Крапивник	nt 2	N
<i>Muscicapa striata</i>	Spotted Flycatcher	Серая мухоловка	nt 3	N
<i>Ficedula hypoleuca</i>	Pied Flycatcher	Мухоловка-пеструшка	nt 3	N
<i>Saxicola rubetra</i>	Whinchat	Луговой чекан	nt 2	N
<i>Oenanthe oenanthe</i>	Wheatear	Каменка	nt 2	N
<i>Phoenicurus phoenicurus</i>	Redstart	Горихвостка-лысушка	nt 3	N
<i>Erithacus rubecula</i>	Robin	Зарянка	nt 3	N
<i>Turdus viscivorus</i>	Mistle Thrush	Дрозд-деряба	nt 2	N
<i>T. philomelos</i>	Song Thrush	Певчий дрозд	nt 3	N
<i>T. iliacus</i>	Redwing	Дрозд-белобровник	nt 2	N
<i>T. pilaris</i>	Fieldfare	Дрозд-рябинник	nt 2	N
<i>T. merula</i>	Blackbird	Черный дрозд	nt 1	N
<i>Phylloscopus trochilus</i>	Willow	Пеночка-весничка	nt 3	N
<i>Phyll. collybita</i>	Chiffchaff	П.-теньковка	nt 2	N
<i>Phyll. sibilatrix</i>	Wood Warbler	П.-трещотка	nt 1	N
<i>Phyll. borealis</i>	Arctic Warbler	П.-таловка	nt 1	S
<i>Phyll. trochiloides</i>	Green Warbler	Зеленая пеночка	t? 1	V
<i>Hippolais icterina</i>	Icterine Warbler	Пересмешка	nt 1	N
<i>H. icterina</i>		Пересмешка	nt 1	N
<i>Acr. schoenobaenus</i>	Sedge Warbler	Камышовка-барсучок	nt 1	N
<i>Sylvia borin</i>	Garden Warbler	Садовая славка	nt 2	N
<i>S. communis</i>	Whitethroat	Серая славка	nt 1	N
<i>S. curruca</i>	Lesser Whitethroat	Славка-завирушка	nt 2	N
<i>Regulus regulus</i>	Goldcrest	Желтоголовый королек	nth 3	N
<i>Prunella modularis</i>	Dunnock	Лесная завирушка	nt 1	N
<i>Motacilla alba</i>	Pied Wagtail	Белая трясогузка	nt 2,3	N
<i>M. flava</i>	Yellow Wagtail	Желтая трясогузка	nt 3	N
<i>Anthus trivialis</i>	Tree Pipit	Лесной конек	nt 2	N
<i>A. pratensis</i>	Meadow Pipit	Луговой конек	nt 2	N

Latin name	English name	Russian name	Character of stay	Status in local fauna
<i>Bombycilla garrulus</i>	Waxwing	Свиристель	nth 2	N
<i>Lanius excubitor</i>	Great Gray Shrike	Серый сорокопут	nt 2	N
<i>L. collurio</i>	Red-backed Shrike	Сорокопут-жулан	nt 1	N
<i>Sturnus vulgaris</i>	Starling	Скворец	(n) t 1	(n)
<i>Emberiza citrinella</i>	Yellowhammer	Обыкновенная овсянка	(n) t 2	(n)
<i>Emb. rustica</i>	Rustic Bunting	Овсянка-ремез	nt 3	N
<i>Emb. Schoeniclus</i>	Reed Bunting	Камышовая овсянка	nt 2	N
<i>Emb. schoeniclus</i>		Камышовая овсянка	nt 3	N
<i>Plectrophenax nivalis</i>	Snow Bunting	Пуночка	t 2	M
<i>Passer domesticus</i>	House Sparrow	Домовый воробей	nt 1	N
<i>Fringilla coelebs</i>	Chaffinch	Зяблик	nt 3, 4	N
<i>Fr. montifringilla</i>	Brambling	Юрок	nt 3	N
<i>Acanthis flammea</i>	Redpoll	Чечетка	nth 2	S
<i>Spinus spinus</i>	Siskin	Чиж	nt 3	N
<i>Loxia leucoptera</i>	Two-barred Crossbill	Белокрылый клест	nth 2	N
<i>L. curvirostra</i>	Crossbill	Клест-еловик	nth 2, 3	N
<i>L. pityopsittacus</i>	Parrot Crossbill	Клест-сосновик	nth 2, 3	N
<i>Carpodacus erythrinus</i>	Common Rosefinch	Чечевица	nt 1	N
<i>C. erythrinus</i>		Чечевица	nt 2	N
<i>Pinicola enucleator</i>	Pine Grosbeak	Щур	th 2	M
<i>Pyrrhula pyrrhula</i>	Bullfinch	Снегирь	nth 3	N

Note. Character of stay: n – nests, (n) – used to nest, t – migratory, h – observed in wintertime, e – occasional, ? – character of stay is unclear. Status in the local fauna, N – permanent resident, M – transit migrant, S – nests occasionally, (n) – use to nest, V – nests in the adjacent areas.

Annex 5

List of fish species of Lake Tuulos

(Kitayev et al., 1998)

Latin name	English name	Russian name	Family
<i>Salmo salar</i> L.	Salmon	Лосось	Salmonidae
<i>Coregonus albula</i> (L.)	Vendace	Ряпушка	Coregonidae
<i>C. lavaretus</i> (L.)	Whitefish	Сиг	Coregonidae
<i>Thymallus thymallus</i> (L.)	Grayling	Хариус	Thymallidae
<i>Esox lucius</i> L.	Pike	Щука	Esocidae
<i>Abramis brama</i> (L.)	Bream	Лещ	Cyprinidae
<i>Alburnus alburnus</i> (L.)	Bleak	Уклейка	Cyprinidae
<i>Leuciscus idus</i> (L.)	Ide	Язь	Cyprinidae
<i>L. leuciscus</i> (L.)	Dace	Елец	Cyprinidae
<i>Rutilus rutilus</i> (L.)	Roach	Плотва	Cyprinidae
<i>Lota lota</i> (L.)	Burbot	Налим	Lotidae
<i>Gymnocephalus cernuus</i> (L.)	Ruff	Ерш	Percidae
<i>Perca fluviatilis</i> (L.)	Perch	Окунь	Percidae
<i>Cottus gobio</i> L.	Sculpin	Подкаменщик	Cottidae

Annex 6
The Items of Equipment and Material handed
over to Tuulos Municipal Entity

№	Description of Item	Number of Individual Items	Cost (E)	
			Unit	Total
1	Computer	1	1722,25	1722,25
2	Fax machine	1	300,00	300,00
3	Copying machine (park offices)	1	1240,00	1240,00
4	Furniture, park offices	1	983,00	983,00
5	Vehicle, Niva (diesel)	1	13000,00	13000,00
6	Supplementary vehicle equipment	1	1850,00	1850,00
7	Inflatable boat (5-6 seats)	1	2050,00	2050,00
8	Inflatable boat (8 seats)	1	1980,00	1980,00
9	Canoes	3	600,00	1800,00
10	Snow mobiles, Taiga	1	4345,00	4345,00
11	Snow mobiles, Buran	1	2475,00	2475,00
12	Sledges	2	566,00	1132,00
13	Snow plane	1	339,00	339,00
14	Trailer	1	1359,00	1359,00
15	Digital maps (set)	1	2012,40	2012,40
16	Satelite images (set)	1	581,00	581,00
17	Satelite images (set#2)	1	415,26	415,26
18	Tools and elecric instruments (set)	1	4355,00	4355,00
	Petrol operated chain saw 2,7 horse powers	1		
	Chains	5		
	Hand electric circular saw 1000 Watt	1		
	Electric compressor for tire inflating 12 Volt	1		
	Electric bush-cutter 1,5 horse powers	1		
	Electric drill (perforator) 500 Watt	1		
	Electric portable cutting-off machine 115-125 mm. 800 Watt	1		
	Electric plane 500 Watt 82 mm.	1		
	Electric tool-grinding machine 650 Watt 76 x 457 mm.	1		
	Electric polishing machine with uninterrupted belt 600 Watt	1		
	Set of carpenter hand tools	1		
	Set of bench tools (insulated hafts)	1		
	Set of spanners	1		
	Set of drills for metal	1		
	Set of drills for wood	1		
	Industrial safety outfit (helmet, eye-protecting spectacles, sound-proof ear-protection, voltage indicator)	5		
	Barking knife	2		
	Log pinsers	3		
	Scribe	2		
	Level	2		
	Tape-line	1		
19	Tuorist equipment (set)	1	5140,00	5140,00
	Tent Orion 2l	3		
	Tent Zima U	2		
	Sleeping bag Goby	10		
	Backpack Canyon 85k	10		
	Life jacket	10		
	Accumulator torch	3		

№	Description of Item	Number of Individual Items	Cost (E)	
			Unit	Total
	Tourist rug	10		
	Stainless pot, 8l	5		
	Safety helmet for snowmobiles	3		
	Raincape	2		
	First-aid box	3		
	Grand Total			47078,91

Annex 7.

Provisional Investment PPlan for first ten years of Park's operations

No	Investment line	Total capacity (persons)	Number of facilities	Length/area (km/m ²)	Cost, thous. RUR (km/m ²)	Total cost, thous. RUR
I	LENDERY settlement					
1	Administrative building	20-30	1	400		
2	Visitor centre		1	150	5	750
3	Hotel	25-30	1	300?		
4	Parking lot		1	400	0,1	40
5	Garage and warehouse		1	100		
II	Camping in the former Vostoch settlement					
6	Guest lodges with fireplaces	40	5	60x5	2	600
7	House for the staff	10	1	150	2	300
8	Service centre		1	60	4	240
9	Teepee	30	1	50		
10	Sauna		2	24	1,5	72
11	Toilet	1	4		2	8
12	Boat station, pier		1			100
13	Hangar for motor-boats equipment warehouse		1	100	1,5	150
14	Tent site	40	1	800	0,05	40
15	Planning of the territory			10000	0,01	100
16	Information boards		3		1	3
III	Camping in the former Luzhma settlement					
17	Guest lodges with fireplaces	16	2	60x2	2	240
	Roofed shelter by the fire	16	2		5	10
18	Sauna		1	24	1,5	36
19	Toilet		2		2	4
20	Boat station, pier		1			50
21	Repair of the observation tower (25m)		1			30
22	Warehouse		1	20	1,5	30
23	Information boards		2		1	2
IV	2 campings on the Lenderka River					
24	Roofed shelter by a fire	16x2	2		5	10
25	Toilet		2		2	4
26	Pier		2		20	40
27	Information boards		2		1	2
V	Camping in the Linovelakshi Bay (western shore of Lake Tuulos)					
28	Roofed shelter by a fire	16	2		5	10
29	Toilet		1		2	2
30	Pier		1		20	20
31	Information boards		1		1	1
VI	Camping in the Suopogoja Bay (northwestern shore of Lake Tuulos)					
32	Roofed shelter by a fire	16	2		5	10
33	Toilet		1		2	2
34	Pier				20	20
35	Information boards		1		1	1
VII	2 campings on islands of Lake Tuulos (without overnight stay)					
36	Fire places and benches		2		1	2
37	Toilet		2		2	4
38	Pier		2		20	40
39	Information board		2		1	2
VIII	Lendery gate					
40	Decorative gate, welcome sign		1		20	20
41	Information board		2		1	2
IX	Reboly gate (on the shore of Lake Koroppi)					
42	Gate, welcome sign		1		20	20
43	Toilet		1		2	2
44	Information board		2		1	2

№	Investment line	Total capacity (persons)	Number of facilities	Length/ area (km/m²)	Cost, thous. RUR (km/m²)	Total cost, thous. RUR
X	Road works					
45	Lendery - Vostochny settlement		1	30	150	4500
46	Vostochny settlement- Tuulos settlement		1	25	150	3750
47	Tuulos settlement- Luzhma settlement		1	20	150	3000
XI	Bridge repairs on the Tuulos-Luzhma road					
48	Bridge		2	15 and 25 m long		200
XII	Sign-posts on hiking and waterway routes				0,5x100	50
	Purchase of basic tourism equipment					
1	Bus	30	1			
2	Motorlaunches	10x2	2			
3	Motorboats	5x5	5			
4	Canoes, kayaks		20			
5	YA3 car		1			
6	Snowmobiles		10			
7	Lifebelts, helmets		150			

Annex 8

Environmental and quality principles for the Green Belt national parks

1. Sustainability must govern

All the actions of the park shall base on sustainable use of resources. Some examples:

Tourism should be adjusted to natural limits, i.e. what nature and culture can tolerate

Wearing of nature should be followed all the time

Facilities should be allocated so, that the harm for nature can be minimised

Waste disposal should work effectively

2. Conservation of natural and cultural heritage is the main task

When planning activities, knowledge of natural and cultural values of the park should get priority. Tourism is subordinated to the main task. This principle should be followed for example in following cases:

“Don’t sell their lives!” Rare and timid animals can suffer from tourists who want to come to close.

Park should prepare information of nature and nature conservation

Co-operation with scientists is important in increasing knowledge of nature

3. Tourism should benefit local people and local economy of the region

The national park should be open for co-operation with the neighboring communities. This would maximize the benefits for both parts. For example:

Park relies on accommodation, transport and other services of the villages nearby

Park recruits workers from the region

Tourism is developed in co-operation with local administration

Park has well functioning liaison with local entrepreneurs

4. Quality in planning and construction of the park

When the national park is developed, it is important to use professional planners, preferably such who know the area and culture there.

All facilities should be carefully planned in advance and the plans followed

Local style in constructions gives a catchy memory in visitors’ minds

Roads and trails, cabins and campsites should be well adapted in the landscape

Broken constructions should be repaired immediately

5. Highly qualified guides are needed in every park

Guides meet visitors and guests of the park. Their work has an essential role in building up the image of the park. Some principles to be followed:

Local guides have many advantages, train their skills in client oriented service

Use also expertise of scientists working in the park to train the guides

Adopt a positive attitude to visitors

6. Tour programs should respect local traditions and environment

Both programs of the park and the tour operators should have connection to the local history and traditions. These are also interesting hear about for the visitors.

Well planned tour programs promote nature conservation, at least in increasing the knowledge of the visitors

Find out old stories, interview old people, use local guides

The park should make written contracts – with instructions about following these principles - with tour operators

7. Punctuality and reliability is appreciated

In the long run, only punctual and reliable actors can survive in tourism business. In national parks this is referring for example to following issues:

Quick and prompt answers to questions

Reservations and prices always hold.

Guides and transports are punctual

8. Always guarantee the safety of visitors

Visitors are expecting that they can trust the arrangements and be sure about their personal safety. It is important that:

No risks are taken in wilderness, on water or road

There is always a reserve plan for bad weather or unexpected incidents

Visitors and their property is always in safe and they know it

9. Supervision is attending on everybody

Effective supervision is needed in every national park, but it must be carried out on a discreet way. Some hints:

Information about the park regulation should be available in advance and on the spot

Functional zoning should be available for visitors

Guiding and discussing attitude of the rangers leads to best result

10. Ask for response and comments from visitors

Comments from visitors are essential in developing the park and its services. It can be done many ways:

Regular inquiries at the park gate should be carried out every year

Guest books in cottages and www page can discover many important things

Be susceptible to the response, that is the best way to develop the park

Jouko Högmander