Towards sustainable ecological networks of peat bogs in central Russia

Development of Local Environmental Action Program (LEAP) as a practical tool for protection and restoration of peat bogs in Egorievsk sub region

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ABSTRACT

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In central and northern Meshera the habitat for many characteristic peat bog species now show a very fragmented pattern. As a result the potentials for viable populations of characteristic peat bog species have decreased considerably. Peat-mining and other human influences are the most important reasons. To maintain and increase the potentials for viable populations of characteristic species protection and restoration of especially high peat bogs are the most important strategies. Especially mTo bring these strategies forward a Local Environmental Action Program (LEAP) has been developed for peat bogs in Egorievsk sub region. All local stakeholders, such as administration, forestry, peat-mining company and NGOs support the LEAP. At the short term protection of peat bogs seems to be the most realistic strategy.

Keywords: Ecological networks, Local Environmental Action Program (LEAP), Meshera lowland, Peat bogs, Protection, Restoration, Russia

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Contents

Preface

This research has been carried out by the All-Russian Research Institute for Nature Protection (ARRINP, Moscow, Russia) and ALTERRA Green World Research (ALTERRA, Wageningen, The Netherlands). The Dutch Ministry of Agriculture, Nature Conservation and Fisheries and the Dutch Ministry of Foreign Affairs provided financial support (MATRA Fund/Programme International Nature Management).

The project consisted of a study on peat bogs in Egorievsk sub region of Moscow region, numerous discussions with sub regional (rayon), regional (oblast) and federal representatives of governmental and non-governmental organisations and a workshop on peat bog protection held in Egorievsk sub region of Moscow region.

The project has been co-ordinated by R.O.Butovsky (ARRINP, Leading Research Scientist) and R. Reijnen (ALTERRA). For ARRINP contributions to the project have been made by R.O. Butovsky (LEAP development), D.M. Otchagov (birds, peat bog types), E.A.Bondartchuk (LEAP development), G.M. Aleshenko (CD-ROM development, GIS), E.M.Melik-Bagdasarov (anthropogenous influences, GIS), and for ALTERRA by R. Reijnen (LEAP development).

Local administration of Egorievsk sub region (particularly Deputy Head of Administration O.I.Zhukov) provided organisational support during the field survey and hosting the seminar on peat bog conservation in Egorievsk.

Summary

In the Central Russian because of peat mining and transformation of peat bogs into agricultural land after drainage, suitable habitats for many characteristic species now show a very fragmented pattern. Many of the remaining areas might be not large enough or have a too low quality to support sustainable local populations of plant and animal species (e.g. rare and endangered ones).

The results of a first explorative study in Petushinski sub region of Vladimir region in 1998-1999 shows that this problem should be taken seriously (Otchagov et al., 1999). The results of the second project consisted of a study on peat bogs in Petushinski, Sobinski sub regions of Vladimir region and Pavlovo-Posadski, Orekhovo-Zuevski, Egorievsk and Shaturski sub regions of Moscow region thus applying the network approach in central and northern Meshera. The project has contributed to nature conservation plan of Meshera lowland by indicating and identifying peat bog areas where protection is needed and the most effective restoration measures (Butovsky et al., 2001).

In order to bring forward these recommendations Egorievsk sub region (rayon) was selected as a key area for the next step. The report describes the current status of peat bogs and rate of their disturbance in the sub region, the theoretical background of Local Environmental Action Programs (LEAPs) founded on meaningful public input in local governmental decision-making and the logic of environmental decision-making in Russia.

With support from the Dutch Ministry of Agriculture, Nature Management and Fisheries and from the Dutch Ministry of Foreign Affairs (MATRA Fund/Programme International Nature Management) a LEAP for Egorievsk sub region (Moscow region) was developed, discussed with all interested parties (including NGOs, administration, researchers) during numerous meetings and final workshop and some practical activities (raising public awareness, environmental education etc.) on its implementation have been undertaken.

1 Introduction

1.1 Scope and objectives

In the Central Russian landscape peat bogs are one of the most characteristic ecosystems. At the end of the XIX century peat bogs covered 18 % of the study area. Of the total area of 189 000 ha 30% consisted of high and intermediate peat bog (bogs) and 70% of low peat bog (fens). Due to peat-mining and other human activities transformation of peat bogs which is almost irreversible occurred on more than 50% of the total area. Reversible transformation of peat bogs (partly disturbed) took place at about 62 000 ha. About 28 000 ha of peat bogs remained undisturbed (Butovsky et al., 2001).

Because of peat mining and transformation of peat bogs into agricultural land after drainage, suitable habitat for several characteristic species now show a very fragmented pattern. Many of the remaining areas might be not large enough or have a too low quality to support sustainable local populations. Probably, these species will only persist when populations in the individual areas are linked into a network system. Exchange of individuals between these local populations then will prevent that extinction's will occur. The results of a first explorative study in Petushinski sub region of Vladimir region in 1998-1999 and second project implemented in 6 sub regions of Moscow and Vladimir regions showed that this problem should be taken seriously (Otchagov et al. 1999; Butovsky et al., 2001).

For 10 of the 17 indicator species (9 butterflies and 8 birds) current potentials for viable populations are not sufficient. Three butterfly species and two bird species show very low potentials for viable populations (only not viable networks) and four butterfly species and one bird species show medium potentials (one or more key populations in viable networks). For the other seven species viability is ensured under almost all circumstances (one or more key populations in strongly viable networks). The potentials for viable populations per peat bog are presented by the number of species showing 'medium' and 'high' potentials (key populations in viable and strongly viable networks). The total area of peat bogs where species with key populations are present covers 123 000 ha. In only 16 600 ha (13.5%) of peat bogs the number of species with key populations is relatively high (Butovsky et al., 2001).

Up to now the network strategy is not considered in the nature conservation policy of (Central) Russia. Single natural protected areas are existing as nominated by different specialists for urgent conservation of threatened natural sites (species). The development of a scientific and methodological basis for creation of such networks has only started very recently. Furthermore, a serious problem is lack of understanding between legislative and executive bodies at the regional level, and by scientific recommendations and their implementation into practice. The relations between governmental and non-governmental organisations are also underdeveloped to result in weighed and well-thought nature protection decisions.

The short term objectives of this study are:

1. to explore the possible measures to improve ecological networks(especially by restoring disturbed and to agricultural land converted peat bogs and take off the barrier problem) based on former study and development of LEAP in studied sub regions;
2. to start implementation of LEAP by performing a practical activities on peat bog restoration and conservation with support of scientists, administrators and local NGOs in one selected sub region;
3. to contribute to nature conservation plan for Meshera lowland with respect to ecological network functioning;
4. to start up a basis for understanding and implementation of the network approach, for scientists as well as decision makers at different levels (workshop about first three goals, publications, including Web-site, CD-ROM).

For the long term it is aimed that the study will:

1. Stress the importance of ecological networks for a successful nature conservation strategy in Russia;
2. create a basis for understanding the network approach and the implementation into practice (LEAP) , for scientists, decision makers at different levels and NGOs.

1.2 Study area

For practical reasons one pilot sub region (namely Egorievsk) has been chosen for LEAP development assuming that this approach has to be replicated in other sub regions of Meshera lowland (figs. 1.1 and 1.2).

Egorievsk sub region is located 150 km to the south-east of Moscow on an area of 1,740 square km. It has a permanent population of 104 000, of which three-quarters are city residents. In summer this number increases drastically (50%-100% by various estimations) due to Muscovites who come here to live in their dachas. Nearly 52% of the sub region's territory is covered by forests of a south-taiga type; surface water reservoirs occupy 2.6%; peat bogs, including those depleted by economic activities – at least 9.8%; and areas under crops – nearly 12%.

The 27 rivers of this sub region flow in the watersheds of rivers Oka (first category Volga River tributaries) and Moskva and Klyazma rivers (second category Volga River tributaries). The largest of these – the Tsna River – flows into the Oka on the territory of the neighbouring Lukhovitsy sub region. The climate is moderate-continental with an annual precipitation of 550-600 mm, and maximum winter temperature - 44° C (January) and maximum summer temperature + 38° C (July). A stable blanket of snow forms in late November and melts away during the first five days of April. This snow period lasts, on the average, from 132 to 140 days. The number of days with a mean daily temperate of 0° C reaches 212-214. The climate in the southern part of the sub region is warmer and dryer. For example, lime-trees begin to blossom here, on the average, on July 4 which is a day earlier than in the

northern part of the sub region. The surface of most the sub region's territory is wavy with dome-shaped and flat hills. Landscape scientists define this territory as Egorievsk moraine island. It is situated at the low-grade slope of the Ryazansko-Kostromskoi trough. The basement rock - Jurassic clay and cretaceous sands - form a ledge with which the formation of a large elevated moraine outlier is connected. True altitudes of interfluve fluctuate between 130 and 160 m above Kronshtadt tide-gauge level; the maximum elevation - 214 m - is found 7 km Southwest from Egorievsk. River shoreline elevations vary from 129 m in the Northwest (Shuvoika River near Krasny Tkach settlement) to 116 m above sea level in the central part of the sub region (Shalakhovskoye Reservoir).

The extreme southern and south-eastern parts of the sub region are characterised by an almost flat swamped terraced surface with separate moraine outliers and wide, hardly indented, shallow gullies and low sand hills. It is situated on the bottom of the Ryazansko-Kostromskoi trough filled with Mesozoic rock and upper-Jurassic dark grey clay, sands and cretaceous sediment. During the ice age streams of water from melted snow used to flow here, but unlike the remaining part of the sub region, the surface was not covered by the Moscow glacier. The current altitudes of the relief are normally within the 110-120 m level, the maximum elevation – 128 m above sea level – is situated to the east of Letovo settlement on the borderline with Ryazan oblast, while the minimum elevation level – 106 m – is to the south of Nikitkino village. Shoreline elevations vary from 107-108 m (Lakes Bolshoye Mikinino and Shchuchye) to 102 m near Nikitkino village.

1.3 Outline of the study

To maintain and increase potentials for viable populations of characteristic species of peat bogs, protection and restoration are important measures. To identify sites where these measures will be most effective and to develop LEAP for its effective management and protection were the main aims of the study. For this, at first the current situation of peat bogs and the rate of disturbance is described and mapped (chapter 2). Then, the theoretical approaches to LEAP development (classic and targeted models) applicable to Central Russia are described. The discussion pays attention to the identification of the best ways for LEAP implementation in Russian Federation considering the existing structure of decision-making organisations and their responsibilities in nature policy (chapter 3). The results of study should be used as a basis to increase the number of protected peat bogs. Chapter 4 is focused at the selection of solutions and contains the LEAP developed for Egorievsk sub region as related to peat bog conservation. To favour implementation of the LEAP a workshop was held in city Egorievsk. The discussion relates to the current approaches to the peat bog protection (chapter 5).

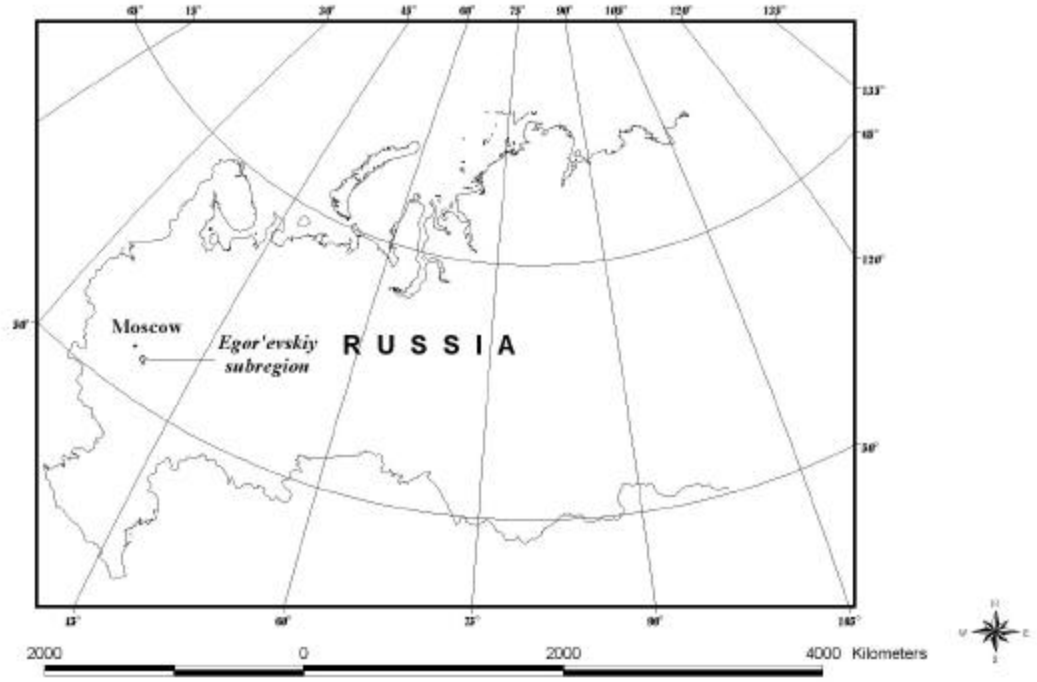


Figure 1.1 Location of study area in Russian Federation

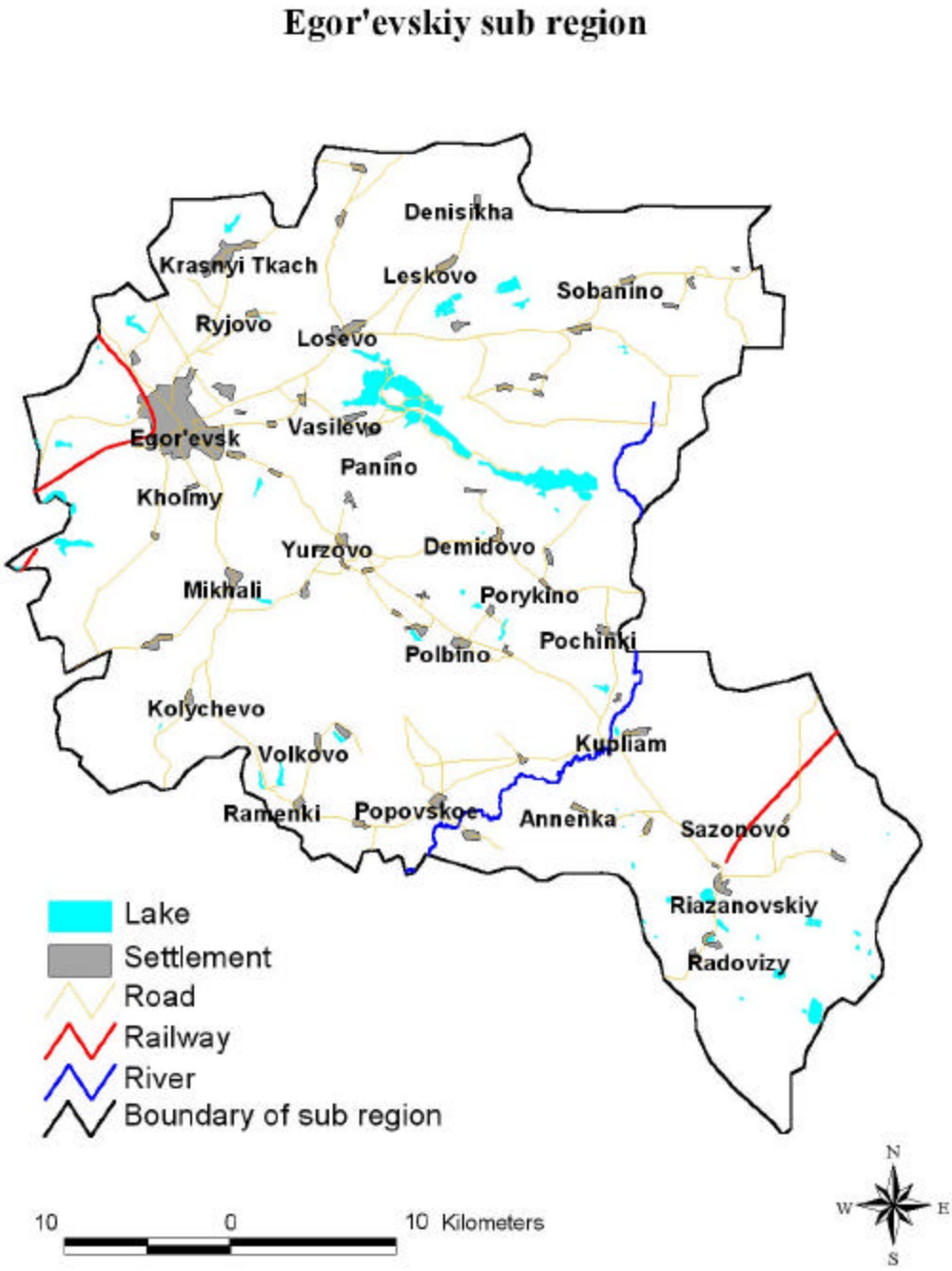


Figure 1.2 Study area

2 Peat bogs and rate of disturbance

2.1 Main peat bog types and distribution in Meshera lowland

According to peculiarities of water- and mineral nutrition the peat bogs are subdivided into (see Otchagov et al., 1995):

- *High peat bogs* are fed by air deposits (fig. 2.1). Such peat bogs are covered mostly by pine-sphagnum phytocenoses. Pines growing on such peat bogs are usually not higher than 4-5 m regardless of their age.. Plant diversity here is quite low. In Egorievsk sub region initially high peat bogs occupied nearly 50% of all peat bogs, or nearly 8300 hectares.
- *Intermediate peat bogs* are fed by atmospheric precipitation and underground water both. Their vegetation usually includes species that are typical of both oligotrophic and eutrophic habitats, depending on the nature of their hydrological sources (fig. 2.2). The woody layer is formed by an approximately equal proportion of pine and birch trees. In Egorievsk sub region the area of such peat bogs was much smaller than that of high peat bogs and amounted to nearly 2.2% of the total peat bog area, or nearly 400 hectares.
- *Low peat bogs* are fed by two or more sources, among which are atmospheric precipitation, groundwater and surface water (fig. 2.3). The share of atmospheric precipitation is quite low. Plant diversity of low peat bogs is higher than that of intermediate peat bogs and much higher than that of high peat bogs. Many of these peat bogs are covered with broad-leaved trees of which birch and aspen are most common. This type of peat bog is most common in Egorievsk sub region. Most of its low peat bogs are situated in river floodplains. In Egorievsk sub region prior to development, this type of peat bog occupied nearly 47% of all peat bogs.

The distribution of peat bogs at Central and Northern Meshera lowland was recently published (Butovsky et al. 2001).

By the end of XIX century peat bogs covered around 18% of the study area. Of the total area of 189 000 ha 30% consisted of high and intermediate peat bog and 70% of low peat bog. Almost all low peat bogs (90%) belong to the ‘watersheded’ type. In Shatura sub region the total area occupied by peat bogs was highest (ca. 98 000 ha) and in Pavlovo-Posad sub region lowest (ca. 10 000 ha).

Figure 2.1 High peat bog

Figure 2.2 Intermediate peat bog

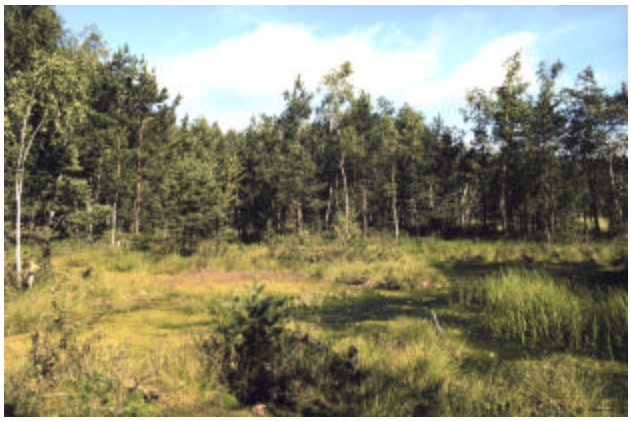


Figure 2.3 Low peat bog

2.2 Disturbance characteristics in Meshera lowland

The first large-scale peat-cutting started at Ozerezko-Nikolski peat bog located nearby Orehovo-Zuevo in 1865 using hand digging. By 1900 the number of processed peat bogs exceeded ten. The first application of machines (elevator method) was done in 1919 when Chistovsko-Belovodskoje peat bog was exploited. Both methods did not allow to dig out peat completely and at the moment these areas are still peat bogs where peat accumulation takes place.
Use of peat as a fuel for obtaining electricity was performed in Orekhovo-Zuevo at the electric plant, constructed under supervision of engineer R.E. Klasson, who was the first in Russia to introduce hydropeat quarries. The total area developed by hydropeat quarries six times exceeded the area processed by digging and excavation methods.
Hydropeat quarries method was intensively used in 1920-1960 especially in Shatura and Orekhovo-Zuevo sub regions.
In 1930 more effective frezer method was introduced and less than in less than 50 years the total area occupied by peat bogs decreased twice. This method was used intensively in 1950-1980 and at the same time peat started to be used in industry as a fuel, raw material in chemistry, medicine and as a fertiliser in agriculture. Frezer method is the most radical as it allows to destroy completely even large peat bogs. Most of such frezer areas are partly flooded (as in Petushinski and Sobinski sub regions), used for summer houses construction or as agricultural fields (as in Orekhovo-Zuevo, Egorievsk and Pavlovo-Posad sub regions).
Use of peat bogs for agriculture purposes has started a long time ago. After melioration peat bogs can be used as a pastures and as agricultural fields. Uncontrolled agricultural use of peat bogs could be as radical as industrial influence although the total area disturbed by this influence is small.
Following our estimations more than 80% of the total area, initially occupied by peat bogs was transformed during peat-excavation, melioration or construction of summer houses. Most of transformed peat bogs are disturbed by frezer method (ca. 65%), melioration or construction without peat excavation accounts for ca. 12% and hydropeat, excavator, digging and elevator-methods for ca 23%.

2.3 Rate of disturbance and potentials for reversibility in Meshera lowland

Three categories of disturbance of peat bogs were distinguished (see Butovsky et al., 2001):
1. undisturbed;
2. partly disturbed, disturbance reversible;
3. (completely) disturbed, disturbance not or almost not reversible.

For each category type of disturbance is briefly described:

Undisturbed

Almost all peat bogs are subjected to anthropogenous impact. The following types of disturbance are considered to cause no significant ecological change:
mushroom and berry collection, fishing;
development of secondary electricity (high-voltage) lines;
development and exploitation of earth roads;
small pastures;
regulated hunting;
old melioration which did not achieve results;
old forest fires;
solitary camp-fires;
solitary car interventions;
solitary cuttings.

Partly disturbed

All peat bogs which are:
developed by frezer method and later flooded;
developed by hydro-peat method;
developed by hand, cutting or elevator methods;
partly dried out without peat excavation and without plough or occupation by buildings;
destroyed by forest fires;
polluted;
disturbed by recreation pressure, noise and air pollution;

Disturbed

All peat bogs which were which were:
developed by frezer method without further flooding;
meliorated or occupied by agriculture and now are used as pasture, grazing or cultivation of agricultural plants;
occupied by summer houses or villages (towns);
destroyed by motorways, electricity lines, pipelines and other communications.

Transformation of peat bogs which is almost not reversible occurred on more than 50 % of the total area (about 100 000 ha). Reversible disturbance of peat bogs (partly disturbed) took place at about 62 000 ha. Almost all these partly disturbed peat bogs (high/intermediate and low) now are facing secondary flooding following the low type. Only a small number of peat bogs with total area of 1000 ha after disturbances taken part at the beginning of XX century now look like intermediate or sometimes high peat bogs. Possibly this area in the nearest 50 years can double when further transformation of peat bogs will be stopped. However, where the process of restoration of low peat bogs is predictable and does not take long time, the rehabilitation of intermediate and high peat bogs takes more time (100-500 years) and depends on many factors.

2.4 Egorievsk sub region peat bogs

Egorievsk sub region is located in proximity to the central part of Meshera lowland, which explains the broad distribution of peat bogs on its territory. Data on the initial area of these peat bogs prior to their utilisation is quite controversial ("Peat Deposits in Moscow Oblast", 1991; Map of the Peat Reserve, 1967; Map of Egorievsk Uyezd, Ryazan Gubernia, approx. 1873; Map of Egorievsk Uyezd, Moscow Gubernia, 1923; Moscow; Economic Schematic Map, 1932). Peat-mining companies provide the most credible data: 76 peat deposits were developed in this region, with the largest of these bordering on other administrative units. Today it is almost impossible to estimate the total pre-utilisation area of peat bogs within the current boundaries of the sub region. Proceeding from available information in literature and cartographic sources of mid-19th century, only the approximate area of peat bogs and wetland can be established. It amounted to nearly 28 000 hectares, covering nearly 16% of the current territory of this sub region (Map of Egorievsk Uyezd, Ryazan Gubernia, approx. 1873) (fig. 2.4). As for the area of peat bogs per se, according to peat-mining companies, it was nearly 17 000 hectares or 9.8%. As compared to other sub regions of Moscow Meshera region, this number (9.8%) is three times less than that it Shatura sub region – the most rich in peat bogs – and half as much than in Orekhovo-Zuyevo sub region ("Peat bogs in Moscow Oblast", 1991; Map of the Peat Reserve, 1967).

All above estimations and other data were adjusted to the *current* borders of Egorievsk sub region. It must be noted that during the past 80 years the borders of the uyezd (*now sub region, or rayon*)(administrative unit of a gubernia, *now region, or oblast*) and then the sub region were changed in many instances. (Smirnov, 1999; Map of Egorievsk Uyezd, Ryazan Gubernia, approx. 1873; Map of Egorievsk Uyezd, Moscow Gubernia, 1923, Moscow; Economic Schematic Map, 1932). When referring below to the peat bogs of Egorievsk sub region and their utilisation during the middle and end of the 19th century or the early 20th century, we will be speaking about changes taking place in this administrative unit within its current boundaries.

Prior to peat utilisation, Radovitsky Mokh was the largest peat bog in Egorievsk sub region. It was situated in the south-eastern part of the sub region and was, predominantly, an open high peat bog occupying an area of 8600 hectares (within the sub region's boundaries). It had the thickest, 7-meter peat layer. It also had a multitude of lakes, most of which have been preserved, but have changed drastically. These are Lakes Shuchye, Udyonoye, Chernenkoye (Chyornoye), Peshkar (Peshkerovskoye), Yamki, Novenkoye, Bolshoye Mikinino, and Maloye Mikinino. Radovitsky Mokh was Meshera's largest high peat bog. Nowadays the absolute majority of high peat bogs is lost.

In the Northwest the Radovitsky Mokh peat bog gradually transformed into a large low forested peat bog (at present it is a depleted deposit called Ryazanovka). Large peat bogs were also located in the north of the sub region, where the Chadlevskoye peat bog (current name - Torfoboloto) formed, together with the Petrovsko-Shaturskoye peat bog, one large peat land. Branched peat bog systems ran along the valley of Tsna and Polikha rivers (in the vicinity of Bormosova village).

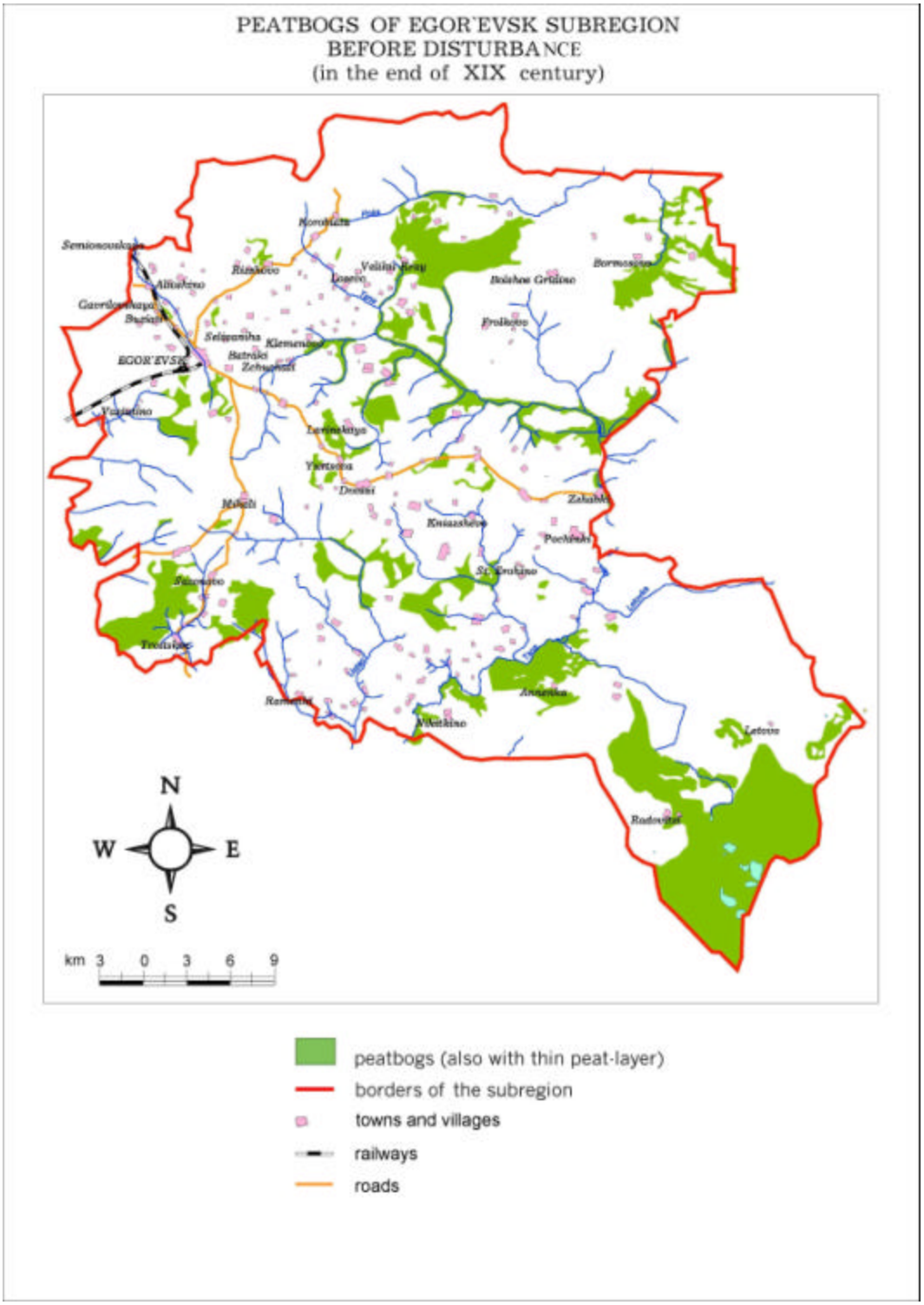


Figure 2.4 Peat bogs of Egorievsk sub region at the end of the XIX century

It is not clear whether there was peat at a number of large wetland areas around Lelecha settlement and Annenka village and in the Southeast of the sub region near Troitskoye settlement. On topographical and thematic maps these areas are shown as “bogged forests”. We can only assume that there were no significant peat reserves on these territories. This is proved by a lack of interest in this land on the part of peat miners and prospectors, as well as by data contained in 1920-1930 maps and schematic maps, and also by our own field research.

At the time when the studied territory started to be developed, high and low peat bogs occupied equal areas. This was a unique situation for Moscow Meshera, where the area of low peat bogs was always much larger than that of high peat bogs. Intermediate peat bogs occupied the smallest area.

In 1973-1998, expeditions headed by I.K.Avgustinovich and I.N.Zhilinsky, carried out research and drainage activities (Tjuremov, 1976). While the drainage activities of these expeditions were quite unsuccessful, they managed to collect data on separate bogs and on their drainage. A large channel in the Southeast of the sub region was named after Zhilinsky.

Large amounts of peat were first mined in Egorievsk uyezd in 1895 at the Chadlevskoye deposit near the villages Chadlivo, Velikii Krai and Kamenskaya by the peat-mining company Shaturskoye (fig. 2.4). Peat was first mined by using the carving method that did not last long. Afterwards peat was mined by using the same method in the Tsna River valley. In 1910 the Ostrovskoye peat bog located along the Tsna River (at the western edged of Shalakhovskoye reservoir) began to be utilised. It was mined for 15 years up to 1925 on an area of almost 100 hectares.

The construction in 1914 of the electric power station Electroperedacha (The History of the Fuel Industry Research Institute) and in 1923 of Hydro-electric power station N5 (Shaturskaya) served as a mighty impetus for the development of the peat-mining industry in Egorievsk uyezd. In 1919, the hydropeat method (the first industrial experience in Russia) was used at the Petrovsko-Shaturskoye deposit, the southern edge of which is located in Egorievsk sub region. During the hydropeat method peat was thinned by pressure water, dried and formed manually into “bricks”.

The exploitation of peat deposits in the far Southeast of the uyezd at Radovitsky Mokh began approximately at the same time. The first information about the scope of mining at this peat bog dates back to 1910 (a certificate for a peat deposit). In 1920-23, following the initiative of the NKVD cartographic department, a map of Egorievsk sub region, Moscow gubernia, was drawn. For the fits time this map reflected the peateries in the south of the Egorievsk part of Radovitsky Mokh, or the co-called Seletsky Bog.

The rapid development of the city of Egorievsk at late 19th - early 20th centuries, when its population doubled every 15-20 years (Smirnov, 1999; “Peoples Encyclopaedia”, 2001) was accompanied by an intensive utilisation of peat bogs.

Thus, from 1901 to 1920, nearly ten middle-size peat bogs at the city's outskirts were drained and cleared for housing construction and agriculture. During the following two decades almost no new peat bogs were exploited with the exception of Chadlevskoye peat bog at which hydropeat extraction was resumed. During World War II and the post-war years, when the need in cheap local fuel grew drastically, peat mining began simultaneously at 17 peat bogs. The largest among these were the Ryazanovskoye, Radovitsky Mokh, Makaryevskoye, Makhrovo-Dubovoye and Bormusovskoye peat bogs. At this period peat began to be mined by the cutting method that was developed in the 1930s, but had not been broadly used until then. During this method a drained multimeter layer of peat is extracted layer-wise from separate pits of 1-2 hectares that are divided inside by narrow ditches every 20-40 m and by wider, ditches, every 500 m. The preparation and mining of the peat bog is carried out by special equipment with a minimum amount of manual labour (see figs. 2.5 and 2.6). This method removes all the peat and the peat bog ceases to exist and has no chance to renew itself during the next one hundred years. The total area of exploited peat bogs at that time exceeded 10 000 hectares. During the 20th century 67% of all developed peat bogs were exhausted by using the cutting method (see also fig. 2.8). The scope of anthropogenous damage caused by this method to Radovitsky Mokh in Egorievsk sub region is clearly visible on a picture taken from space and shown on fig. 2.7. The dark backgrounds are lakes surrounded by peateries. Stumps and industrial debris are piled on their banks. The supply of water to these lakes is seriously impaired and they are becoming shallow. However, we must note that certain efforts to preserve these lakes have been taken by peat miners: in particular, a channel with a regulated reservoir was dug to Lake Udyonoye.

Peat bogs exhausted by the cutting method are often inundated, or dachas are built on them, or they are used in agriculture for tillage or haymaking, or as pastures. More rarely trees are planted on such peat bogs. Part of this land is handed over to the State Land Reserve and is not used for economic purposes.

All the large peat bogs of Egorievsk sub region were exploited during the 1940s – 1960s. After that peat mining continued on the same deposits. In particular, at Ryazanovskoye peat bog in continued up to the 1990s, while in Radovitsky Mokh it continues up to now. In the 1960s-1980s the remaining small peat bogs were used for agricultural purposes. In most cases peat was not mined, with the peat bogs being drained and ploughed up.

In the 1960s several peat bogs (nearly 200 hectares) situated at the River Tsna floodplain were flooded to create the Tsna Fish Farm and Shalakhovskoye reservoir.

During the same period peat bogs began to be actively used in agriculture. It is noteworthy that large-scale agricultural use is a mighty factor of anthropogenic transformation. Although areas where peat is extracted for agriculture are quite insignificant, on the whole this process strongly affects biodiversity (Otchagov et al., 2000, Butovsky et al., 2001). Agricultural use usually is not connected with peat removal, however, it terminates the functioning of a peat bog as an ecosystem.

Figures 2.5 Equipment used by the cutting method: pneumatic-combine and peat compactor

Figures 2.6 Equipment used by the cutting method: pneumatic-combine and peat compactor

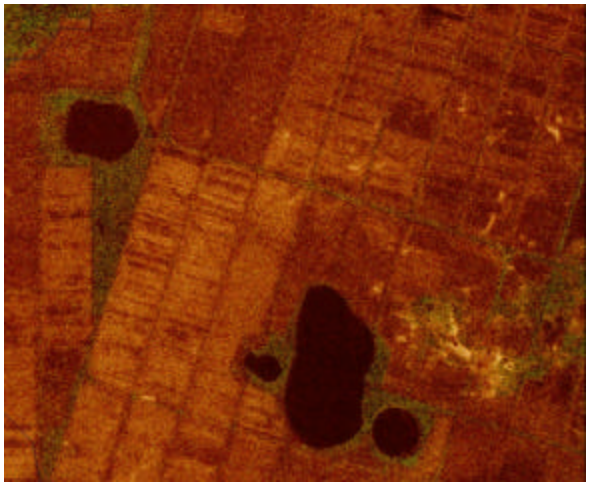


Figure 2.7 The scope of anthropogenous damage caused by the cutting method to Radovitsky Mokh in Egorievsk sub region is clearly visible on a picture taken from space

In Egorievsk sub region the area where the elevator and frezer methods were use is quite considerable, reaching 3400 hectares. By the use of these two methods 22% of the sub region's peat bogs were completely disturbed; by the hydropeat method – nearly 7%; by the excavation method – 4%, and by the cutting method – 67% (fig. 2.8).

The total area of peat bogs where peat was mined amounts to nearly 12 000 hectares or nearly 72% of all peat bogs that ever existed in this sub region. Another 3% of peat land were not mined, but were lost as a result of drainage and economic use. Thus, only 25% of all peat bogs that existed here by the end of the 19th century have retained more or less their natural condition.

High peat bogs are nowadays the most rare type of peat bogs in Central and Northern Meshera. There are only several scattered sections of high peat bogs left of a total area of not more than 400 hectares, the largest of which is located at the far Southeast part of the sub region on the border of 4 sub regions: Shatura, Lukhovitsy, Spas-Klepiki and Egorievsk. From a conservation point of view the preserved intermediate and high peat bogs in upper Tsna and Polya rivers are most important. The area of low peat bogs, that remain in the their natural state, is still quite large.

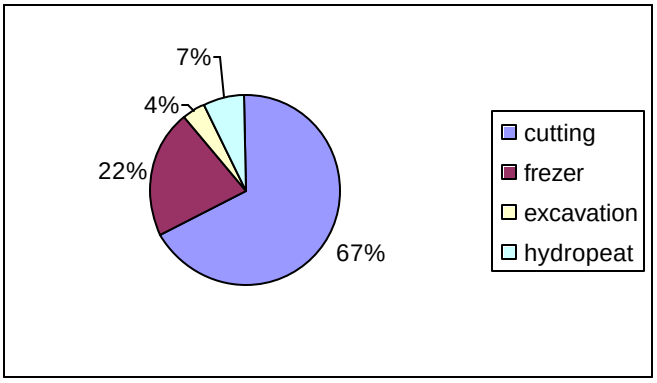


Figure 2.8 Disturbance of peat bogs by different peat mining methods

3 LEAPs as a practical tool

3.1 Theoretical background

In the course of the past decade Local Environmental Action Plans (LEAP) have become an important step in planning nature management activities in many countries (Markowitz, 2000). These plans are worked out within the framework of regional (REAP) and national environmental action plans (NEAP).
A NEAP incorporates a broad range of measures intended for the Central and Eastern Europe. This plan rests on "three whales": environmental policy reform, institutional strengthening, and investment. A NEAP includes a transition to market prices for energy and water resources; strengthening economic instruments and carrying out environmentally sustainable economic activities. NEAP should be directed toward short-term activities, but their outcomes should be of a long-term nature (Markowitz 2000).

The need to develop and implement such an instrument of an environmental policy for Europe was announced in 1993, at a conference of Ministers of the environment and public health. In Russia, as in other countries, NEAP provides for a phased introduction of REAP and LEAP as vital components of an integrated environmental protection system. The first NEAP was adopted in Russia in 1999 (for a period of up to 2001). This plan was preceded by the development and approval of:

1. RF Government Environmental Action Plans for 1994-1995 (GEAP, Government Decision of 05.18.94)
2. NEAP Project for 1999-1997 – (not approved by the RF Government)
3. Alternative Environmental Action Plan for Russia, prepared by NGOs (1996)

The main goal of NEAP is to make the environmental situation in Russia healthier, to reduce its negative impact on the health of the population, to preserve the life-supporting properties of the biosphere, and the effective participation of Russia in international environmental activities.

During the past 10 years the development of targeted program planning is taking place with an account of the need to democratise environmental management and promote citizen participation in environmental decision-making. This, in turn, brings the process of planning any environmental activities to a new level, at which environmental issues are addressed in the context of a region's social and economic development.

The reform of Russia's environmental management agencies and institutional changes that have occurred in other affiliated areas of society's development, have influenced the form and scope of funding intended for environmental activities, including the preservation of wetlands. Thus, the level of funding has decreased and funding sources, among which international non-governmental organisations started

to prevail, became more scarce. These institutions (environmental NGOs) carry out the basic co-ordination functions. This leads to an inadequate consideration of local interests and program duplication and, more importantly, to a disregard of NEAP priorities, Federal Targeted Programs (FTP), and oblast and sub region plans and programs that are incorporated in it. Besides, a certain "sectoral division" of environmental law (i.e., a prevalence of branch approaches to environmental protection and natural resources management) has taken shape in the country quite a long time ago. Such a situation hampers the appearance of mechanisms that encourage Russian investors and donors to take part in nature management (e.g. wetland management).

The continuous reorganisation of government environmental protection bodies during the past 10 years nullifies co-ordination among organisations and regional activities planning. This "planning slot" in local administration activities can be filled with LEAP of a classical type, or targeted or focused, or sectoral. Thus, LEAP can become an instrument of co-ordinating inter-agency programs on a local level.

At the same time, another system of local action planning is now being elaborated in many countries within the sustainable development concept: the so-called 21st Century Local Agendas. After 1992 Local Agendas were worked out in many communities in different countries as a follow-up to the 21-Century Sustainable Development Action Plan, adopted at the UN Environment and Development Conference (Rio-92). LEAPs are closely linked to 21st Century Local Agendas (LA21): both promote the participation of diverse groups, organisations and agencies in the planning process. Both action plans are directed toward identifying local community challenges and toward the development of action plans to resolve them. The basic difference between these two plans is the fact that a Local Agenda encompasses all the components of sustainable development, while LEAP's target is a more narrow scope of environmental issues. That is why a community first starts with LEAP development, which may be considered as the first step in the direction of a Local Agenda. Therefore, LEAP, whose goal is to address environmental problems of a region are, at the same time, components of a community's sustainable development plans. These plans include the efficient management of resources with a consideration of the interests of future generations; an improvement of public health and the quality of life; and pollution prevention and local resources preservation and development with the aim of strengthening the local economy (fig. 3.1).

Several systems of local planning are currently progressing and interacting both in the world and in Russia. The following levels and forms of target program planning can be found in the country:

- NEAP – a programmatic document that will specify the environmental policy in Russia for the next three years and which sets the priorities of the country's environmental policy.
- FTG (Federal Targeted Program) – a programmatic document directed toward the solution of a certain environmental problem of a national scope.

- LEAP – a local community action plan that addresses local environmental priorities
- Management plan – technical guidelines on managing a certain natural resources site (e.g., peat bogs), which combines natural resources conservation and economic activities.

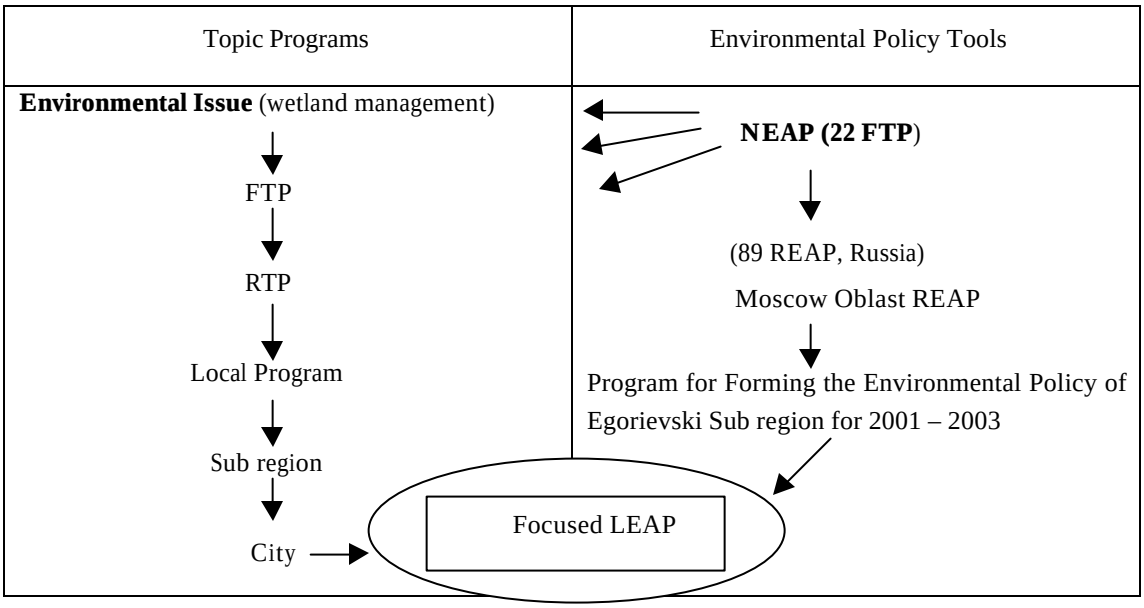


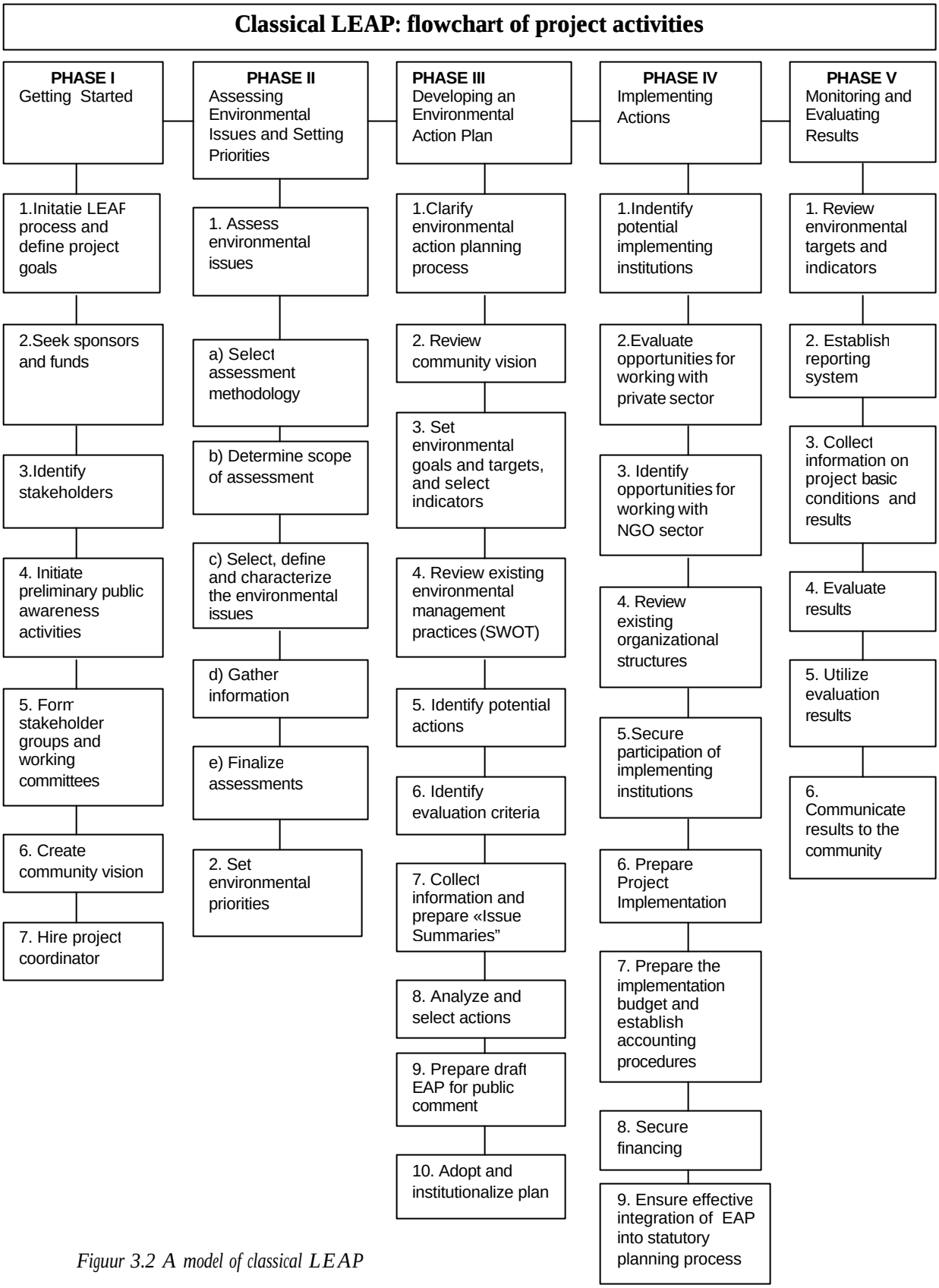
Figure 3.1 Interaction of different program levels

LEAPs on a sub regional (rayon) level can be divided into classical and targeted.

A *classical LEAP* model is an environmental program directed toward solving local problems with public participation. This model also includes the setting of environmental priorities and a choice of relevant environmental activities that address these priorities; and a co-ordination of programs and activities of diverse institutions, organisations and individuals based on the principles of the European Environmental Action Plan.

The objectives of the classical LEAP model are:
- Improvement of the environmental situation
- Public participation in environmental decision-making
- Strengthening the role of local administrations and NGOs
- Identifying, assessing and setting environmental priorities
- Improving local environmental legislation

A classical LEAP model (fig. 3.2) designed by the Institute for Sustainable Communities (ISC Vermont, USA) and tested during the implementation of environmental projects in Eastern Europe and Russia in 1995-2001(Markowitz, 2000).



Figuur 3.2 A model of classical LEAP

Targeted LEAP
Flowchart of Ecological Networks and Wetland Preservation Activities

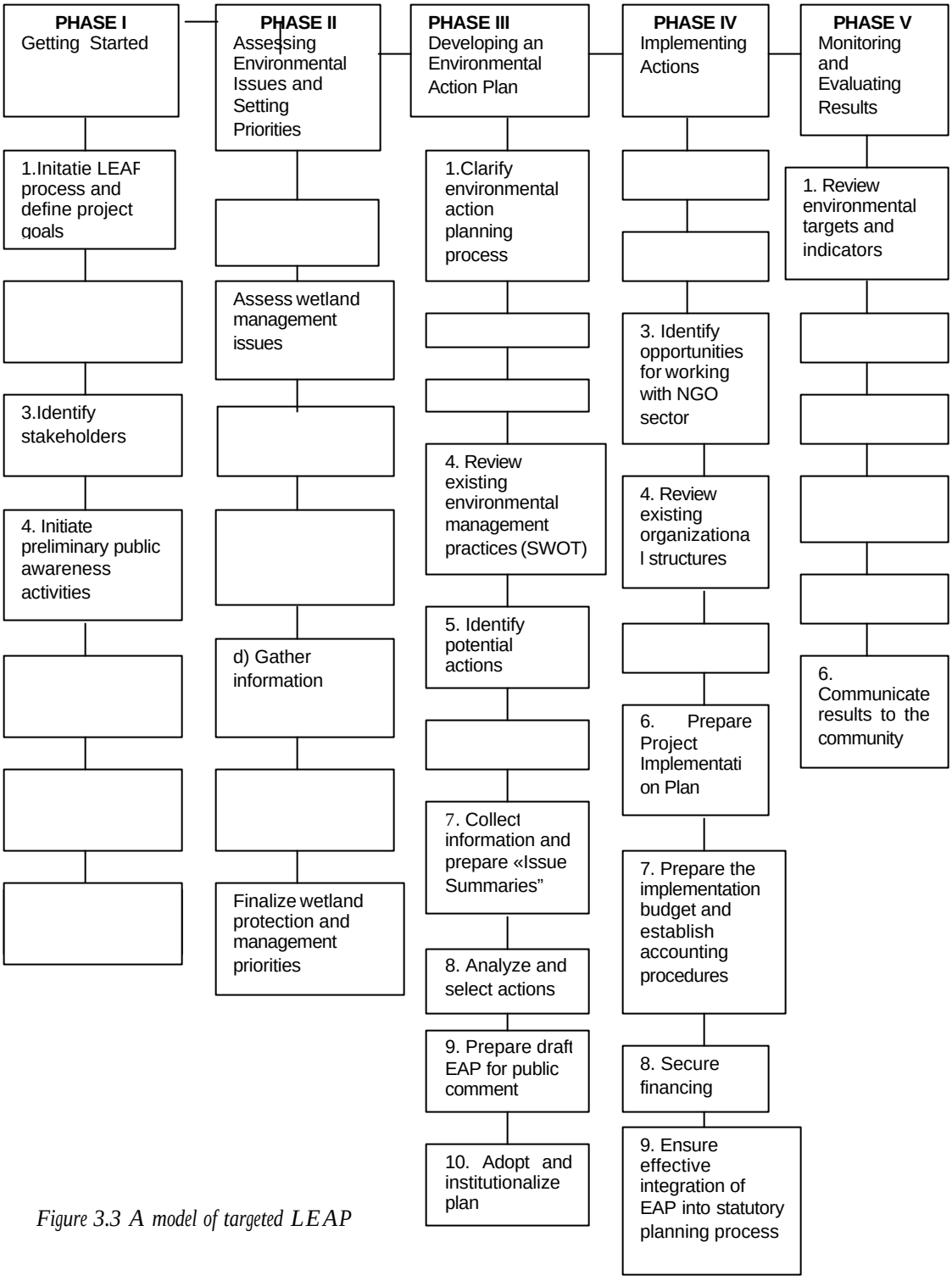


Figure 3.3 A model of targeted LEAP

Targeted LEAP is a process of developing a topic local program with the use of "classical LEAP" methods, i.e., involving stakeholder groups and the local community in designing and carrying the plan (fig. 3.3).
It is a complex of linked activities that take into account the interests of all nature users, both stakeholder groups and agencies, and the population and NGOs.
It is a program for planning organisational, administrative, technical and educational activities directed toward reaching the set target and based on the "from the bottom to the top" approaches to management. These approaches include co-ordination of administrative plans in this area, setting environmental priorities, environmental education, and specific measures aimed at addressing environmental problem on a local level.

The objectives of a targeted LEAP for managing wetland (in accordance with the Ramsar Convention) are to:

- Support to the ecological properties of the wetland ecosystems;
- Manage efficiently wetland ecosystems;
- Establish protected areas on wetland.

Therefore, since the goals and tasks of a targeted LEAP have partially been set and formulated within other management instruments, not all stages of a classical LEAP shall be used for reaching the established tasks.
The priorities and guidelines for peat bog conservation in Central and Eastern Meshera were set as a result of research activities (Otchagov et al., 1999; Butovsky et al., 2001).

The main peculiarity of classical and targeted LEAP both is the involvement of all interested counterparts in the discussion of the Plan, a co-ordination of current programs and plans of various agencies and organisations participating in efficient nature management and environmental protection processes.
Thus, the difference between the classical and targeted LEAP may be expressed as follows:.

- Classical LEAP = Key local environmental, economic and social equity issues + management plan
- Targeted LEAP = Local environmental problem + management plan

A targeted LEAP cannot be carried out in isolation from national and international legislative and normative standards that regulate the activities of environmental agencies in the sphere of protecting and managing wetlands, such as the Ramsar Convention, the Pan-European Ecological Network (PEEN), the Convention on Biodiversity etc.

Thus, a targeted LEAP for protecting the peat bogs of Egorievski sub region should consider a whole range of programs and regulating documents of different levels in the area of wetland management, as well as current local environmental protection and nature management programs. This should be done with the aim of promoting inter-department and inter-sector co-ordination in providing communications

support to decision-making in this sphere, which helps avoid duplication of programs and funding.

To ensure proper co-ordination of programs carried out by various organisations in Egorievski sub region, an inventory of all stakeholder nature management groups and agencies was performed. As a result, a list of main organisations regulating the conservation of wetlands was compiled. It includes organisations that are interested in this area from the point of economic activity and those that are interested in it from the point of wildlife protection. These include: the Ministry for Natural Resources, the forest management department, the State Committee for Hydrometeorology, the Land Committee, agricultural enterprises, the fire department, hunting associations, the sub region administration, enterprises and other owners.

It is expected that the program "Protection of Peat Bog Ecosystems in Egorievski Sub region (2001-2002)" for which the Land Use and Ecology Department of Egorievski Administration will be responsible, will be included into the program "Development of Egorievski Sub region Environmental Policy for 2001-2003", section "Biodiversity Conservation".

3.2 Nature policy in Russian Federation and Meshera Lowland

3.2.1 Nature policy in Russian Federation

Nature protection policy in Russia is based on federal and regional legislation, which regulates a whole range of issues related to the utilisation and protection of peat bogs. Provisions on peat bogs are included in legislation's on land, water, forest, mineral resources, wildlife management and protection, and environmental protection.

The Ramsar Convention (Ramsar, February 2, 1971) is the fundamental document stating that peat bogs, which carry out important ecological functions, regulate the hydrological conditions and habitats of specific flora and fauna, and are a resource that is of much economic, cultural and recreational significance the loss of which may be unrecoverable. In 1994, the RF Government fulfilled its obligations under this Convention and approved a list of peat bogs of international importance, since biodiversity conservation is integral part of the conservation of rare species of plants and animals, inhabiting wetlands. Peat bogs were also included in the Convention on Biodiversity (Rio de Janeiro, June 5, 1992), that was ratified by the Russian Parliament in 1995 (Federal law N 16-F3 of 02.17.95).

The RF Constitution (1993) establishes the legal responsibility of citizens, legal entities and communities to preserve nature and manage natural resources properly (Article 58).

The responsibility to preserve nature has both a moral and legal aspect. The constitutional norm, which is formulated as a moral concept, not only regulates the relevant relations of the indicated entities, but is also an enforcement norm (Commentaries to the RF Constitution, Edited by Y.V.Kudryavtseva, 1996). The legal responsibility to preserve nature and the environment is in line with the right of all citizens to a favourable environment (nature), as well as the right of the state to apply sanctions when the nature protection legislation is violated.

According to the Charter of Moscow Region (Oblast), its environmental policy is based on " the rational use of natural resources and provision of government support to public environmental education" (chapter 7.2 article 101, clause "f"). The government policy in this area "is directed toward preventing fatal man-caused consequences for the natural environment and human health, and compensating damage caused to the natural environment (chapter 7.2, article 101, clauses "n" and "o").

In the RSFSR (former Russian Federation in the USSR) Land Code (1991) all wetlands, except tundra and forest-tundra areas, were defined as land of the water reserve (article 95). According to the RF Water Code (article 11) wetlands are included in the category of water sites among other surface water reservoirs, such as lakes, ponds, etc. At the same time, the RF Forest Code (1997) stipulates that wetlands may be part of forestland in the category of non-forest land (article 8) or land not suitable for use. The RF Water Code establishes the order of wetland management and protection: as other water sites, they may be used for such purposes as agricultural development, recreation, construction, fish production, hunting, and extraction of mineral resources, peat and sapropel. In Moscow oblast peat cutting is the most serious factor affecting local nature complexes. Peat and sapropel are extracted from wetlands in compliance with both the RF Water Code and the RF Mineral Resources Legislation and on the basis of a license for water use and the right to extract mineral resources (these documents are issued in the established order).

Mining mineral resources, peat and sapropel from the bottom of water sites or the erection of structures standing on the bottom should not affect surface waters, banks or water bioresources (article 99 of the RF Water Code).

Article 118 of the RF Water Code provides a list of protected water sites (PWS) which include natural water ecosystems of special environmental, scientific, cultural, aesthetic and recreational value. Such sites are fully or partially, permanently or temporarily, excluded from economic use, which is done on the basis of a directive of relevant executive bodies that is initiated by a specially authorised government agency for the water reserve protection and management and by environmental protection agencies. PWS may be of a federal, territorial (regional) and local level. A PWS may also be either a part of a protected nature area (PNA), or a separate PNA. PWS categories we are most interested in from the point of view of wetland protection may be: 1) peat bogs; 2) a protected source or mouth of a water site; and 3) other categories of water sites that are viewed as inseparable from forests, fauna

and other nature resources that are subject to special protection. The RF legislation may also provide for other categories of PWS. The protection of PWS is carried out in accordance with the RF legislation on PNA.

The RF legislation on PNA is based on the Federal Law "On protected nature areas" (N 33-F3 of March 14, 1995), Presidential Decree "On protected nature areas" (N 1155 of December 2, 1992), and the RSFSR Law "On natural environment protection" (N 2060-1 of December 19, 1991). In the Moscow Oblast legislation the protection of peat bogs is covered by the law "On Nature Parks" of 03.04.1997 N 12/97-03, the Directive of the Moscow Oblast Duma "On the establishment of the 'Order of designating state nature reserves of local (oblast) level' and the 'Order of designating nature monuments of a local (oblast) level in Moscow Oblast'" of 03.02.1994 N 5/9. According to Moscow Oblast Charter of 12.11.1996, the status of oblast nature reserves, wildlife sanctuaries, parks and nature monuments, as well as the procedure of protecting rare and endangered flora and fauna species and habitats, is established by legislative acts of the Russian Federation and Moscow Oblast laws (chapter 7.2, article 106).

The regulation "On water protection areas of water sites and their riverside protection zones" approved by RF Government Directive N 1404 of 11.23.1996, specifies that the borders of peat bog protection areas are established starting from their borders (zero thickness of the peat-bed). For wetland located at riverheads and other types of wetland that forms drainage in basins, water protection areas are established at adjacent areas. The width of water protection areas for wetlands that form permanent currents is established by following the same principles as for lakes and water reservoirs: 300 m if their area is under 2 square km, and 500 m if their area is over 2 square km. The approval of water protection area projects in Moscow Oblast lays within the competence of the Moscow Oblast Ministry for Ecology and Nature Management.

In accordance with the RF Law "On mineral resources" of 02.10.1999, government supervision over geological studies, protection and the rational use of mineral resources is within the joint competence of RF government agencies and Moscow Oblast agencies concerned with the regulation of mineral resources management in Moscow Oblast. The Moscow Oblast Law "On mineral resources and mineral resources management" of 02.02.1999 N 2/99-O3 establishes that one of the principles of mineral resources management in Moscow Oblast is the rational and integrated use of mineral resources, the protection of the natural environment and the restoration of the ecological balance that has been disturbed during mineral resources extraction.

When using wetlands for agricultural or forestry needs, citizens and legal entities must take measures to reduce losses and water discharge from land-reclamation networks, to prevent fish from entering land-reclamation networks and take, if necessary, measures to prevent the pollution of subterranean waters and the increase of their level. Drainage and other land-reclamation activities must be carried out in

conjunction with environmental protection measures that protect wetlands and their catchment areas (Art.138 of the RF Water Code).

The Moscow Oblast law of January 9, 1997 N 4/97-O3 "On the organisation and functional zoning of the territory of Moscow Oblast" has introduced the concept of the ecological network of Moscow Oblast which includes the most valuable components of Moscow Oblast's nature system: rivers and their valleys, protected nature areas, wildlife sanctuaries, nature reserves, water protection forests, 1st category forests, historical and natural heritage complexes and monuments and their buffer zones, green areas in cities, forest parks and other protected nature territories, and agricultural land - all of which contribute to the maintenance of an ecological balance on the territory of Moscow Oblast. For some reason, wetlands were not included in this ecological network.

The following legal normative documents regulate certain types of anthropogenic impacts on wetlands: the Moscow Government and Moscow Oblast Governor directive of 05.261992 N 323-128 "On the concept and plan of individual housing construction in Moscow region"; Moscow Oblast law of 03.29.1996 "Rules for developing cities, towns and rural populated centres and other settlements and recreation complexes in Moscow Oblast"; Moscow Oblast law of 07.12.2000 N 43/2000-O3 "On hunting and hunting grounds"; Moscow Oblast law of 02.17.1999 N 5/99-O3 "On limiting visitor's presence in forests on the territory of Moscow Oblast"; and the Moscow Oblast law of 08.04.1999 N 57/99-O3 "On rates of payments for the use of surface water in Moscow Oblast".

The financial aspect of peat bog use and protection is determined, first and foremost, by the Moscow Oblast law of 12.26.2000 N 105/2000-O3 "On the 2001 Oblast Budget". It establishes that of the 24.4 billion rubles of budget spending, 34.9 million rubles (1.2 million US dollars) are allocated for the protection of the natural environment and natural resources and for carrying out hydrometeorologic, cartographic and land surveying activities. Another 100.1 million rubles (3.4 million US dollars) is added to this amount by the Moscow Oblast Ecological Fund. Thus, in 2001 the total amount of funds channelled for environmental protection is 135 million rubles (4.6 million US dollars), or 0.6% of the oblast budget.

Measures that indirectly concern peat bog preservation are specified in the Moscow Oblast Law of December 2000 N 115/2000-O3 "On Moscow Oblast Integrated Socio-Economic Development Program for 2001" passed on the basis of the "Moscow Oblast Socio-Economic Development Concept for 1997-2005", the socio-economic development forecast for 2001, and oblast targeted programs. One of the programs of this law is devoted to the geological study of mineral resources and the recovery of the Moscow oblast mineral resources and raw material reserve for 2001-2005. This law also includes such activities as special economic assessments of the expediency of developing explored deposits of non-metallic resources proceeding from the ecological conditions of the natural environment of each sub region in Moscow oblast.

In this short review we did not mention directives and decisions of the RSFSR Council of Ministers regulating peat-mining companies' access to explored deposits, or the numerous departmental normative acts issued by the former RSFCR and USSR ministries of agriculture, geology, and water resources. These documents may be the subject of a separate serious study of the history of peat bog utilisation.

The environmental decision-making in Russia now could be represented as shown in fig. 3.4.

3.2.2 Nature policy and peat bog protection

Till 1992 one federal zapovednik ("Okski") existed in Meshera region (category IA, IUCN). In 1992 two federal strictly protected natural areas (SPNA) - national parks "Meshora" (Vladimirskaya region) and "Mesherski" (Rjazanskaya region) (category II, IUCN) covering 222 000 ha were organised as a result of activities of various specialists, also members of the target group. In 1994 national park "Mesherski" was nominated as wetland area of international importance. Besides there are about 30 SPNA at regional level (nature monuments and zakazniks) (categories III-IV, IUCN).

Protected nature areas of Egorievsk sub region include nearly 1400 hectares of peat bogs (Fig 3.5), most of which are located at the Torfoboloto and Tsna reserves (The status of the natural environment, 2000; Regulation on the state nature reserve Torfoboloto, 1986; Regulation on the state nature reserve Tsna, 1988). High peat bogs that were depleted by mining and have turned into intermediate peat bogs with open pits are primarily protected at the Torfoboloto reserve. The very few remaining undisturbed or slightly disturbed high peat bogs are not protected in this sub region. The following high peat bogs may be recommended for protection: located at the watershed of Klyazma and Oka river basins – at the sources of rivers Polya and Tsna, and at the junction of four sub regions and two oblasts – the Dalnee peat bog. Intermediate areas and pits of Makaryevskoye peat bog located near a village of the same name, and also a network of high and intermediate peat bogs located to the east of Letovo village at the Vostochnoye forestry are quite interesting for preservation. The largest non-depleted low peat bog Ostrozhki, that occupies 400 hectares and is located to the west of Letovo village, deserves to be protected.

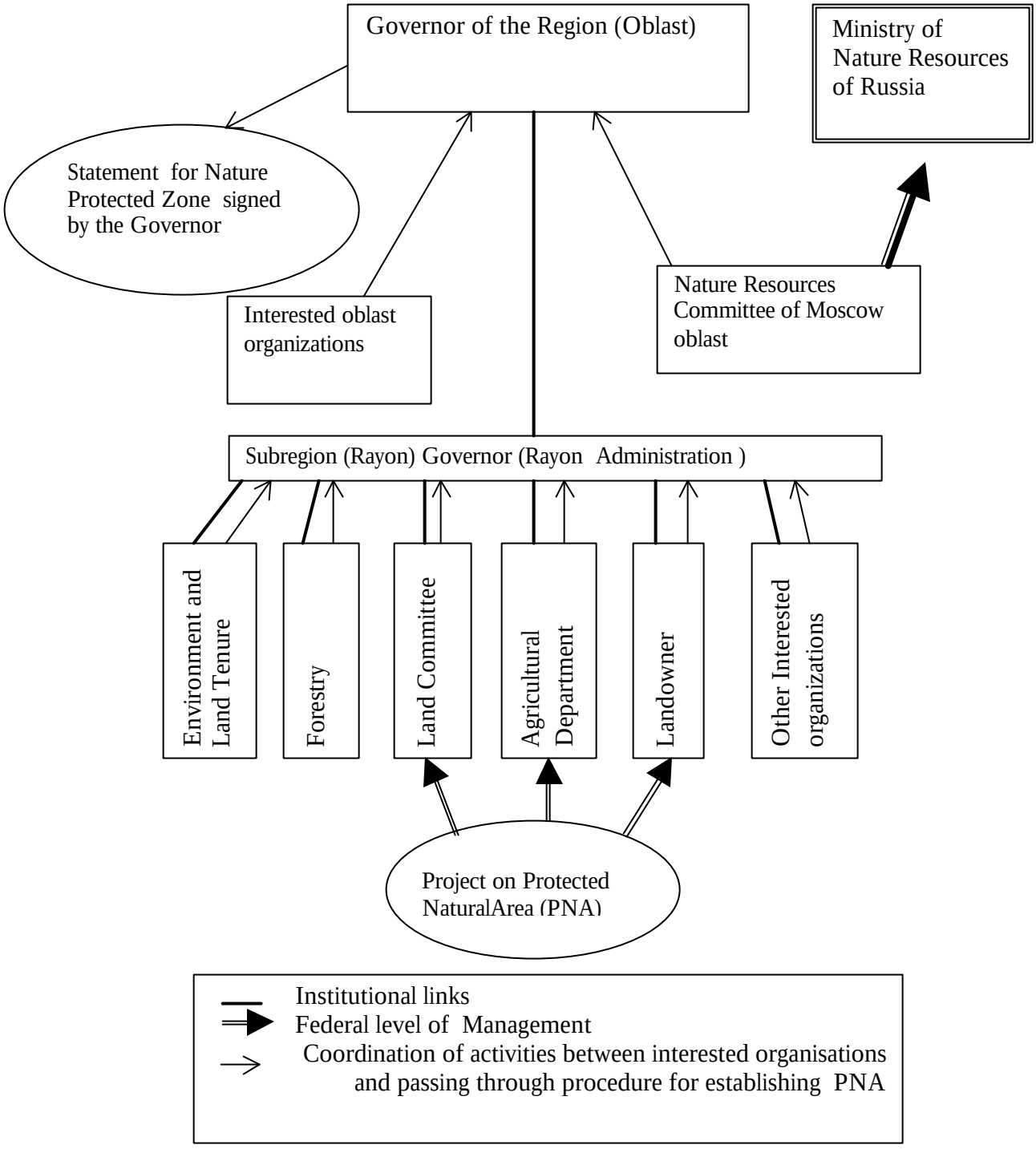


Fig. 3.4 Decision making Chart for Protected Natural Area (PNA) at the regional level in Russia (Moscow oblast)

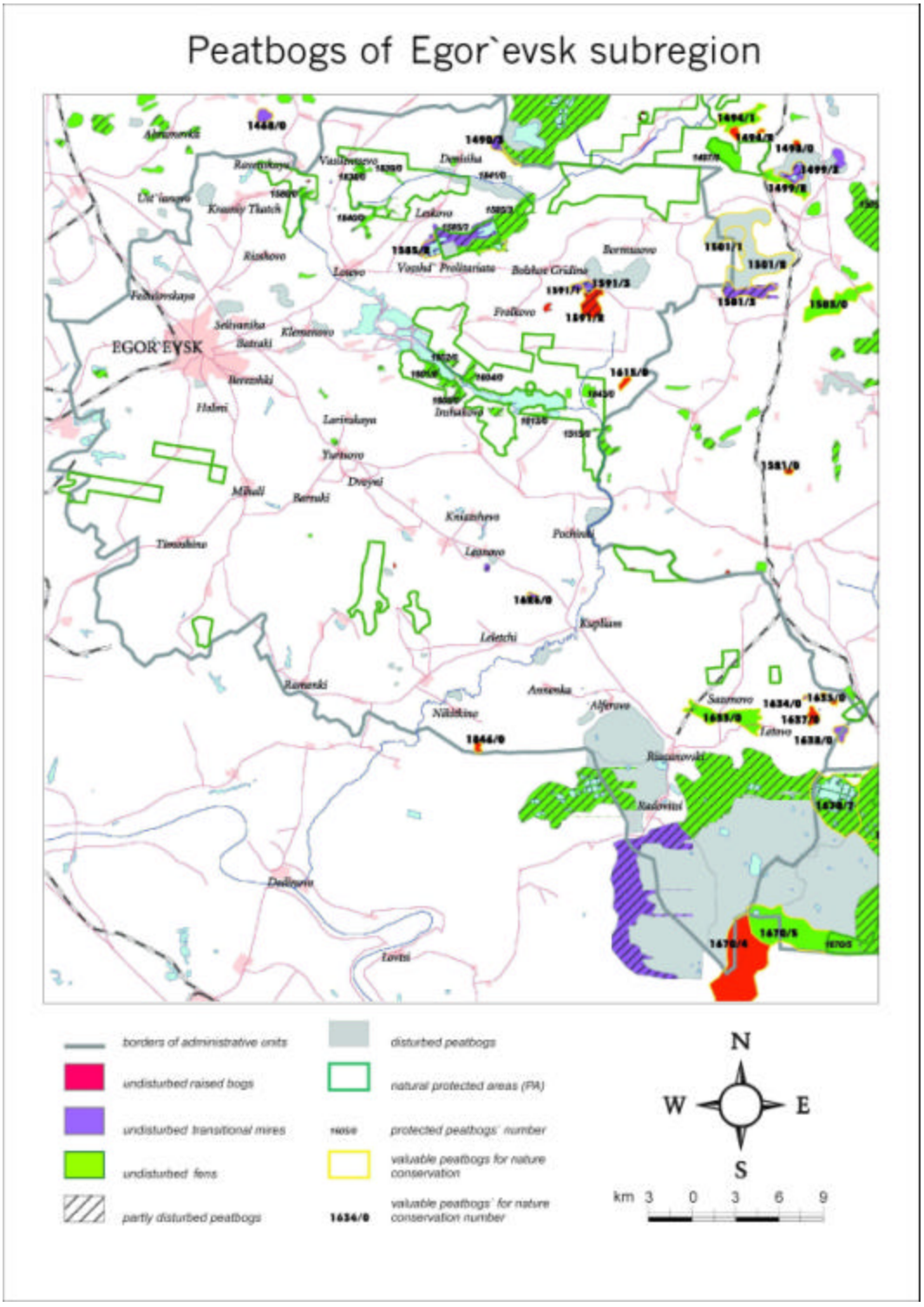


Figure 3.5 Peat bogs of Egorievsk sub region

4 LEAP for peat bog conservation in Egorievski sub region

4.1 Presentation of LEAP

The LEAP was designed as part of the officially approved Egorievski Sub region Environmental Policy Program for 2001-2003 in the "Biodiversity conservation" category and following the requirements of international documents on peat bog management (Ramsar Convention and PEEN). It is directed toward augmenting the effectiveness of Moscow region (oblast) peat bog ecological networks which are understood as a network of areas with ecosystems of various stages of disturbances and various natural resources management approaches in previously developed regions. This network includes 4 structural elements: core areas, nature development areas, ecological corridors, buffer zones (van Opstal., 2000).

According to the Egorievski sub region Environmental Policy Program, "up to now peat bogs were not regarded as objects of conservation, although they play an important role in maintaining an ecological balance and preserving biodiversity not only in this particular sub region, but in Moscow. They could be considered as indicator of Moscow region (oblast) ecological well-being and also as criteria in the process of identifying points of stabilisation while developing ecological networks in Moscow region (oblast).

In the process of development of the Plan, the following sub region and oblast level documents, as well as guidelines provided by Meshera peat bog research projects, were used:

- Egorievski Sub region Environmental Policy Program for 2001-2003
- Recommendations on the development of an ecological framework of Moscow oblast.
- Guidelines resulted from the two PIN-MATRA projects: "Ecological networks and biodiversity in central Russia: a case study for peat bogs in Petushinski sub region" (Otchagov et al., 1999) and Ecological networks and nature policy in central Russia. Peat bogs in central and northern Meshera (Butovsky et al., 2001) implemented in 1998-2000.
- The development of basic approaches to the optimisation measures directed toward preserving natural resources in Egorievski sub region, Moscow oblast. Final report by A.Blagovidov, RF SCEP Department for Nature Reserves, Moscow, 2000
- Draft REGULATION on reserve protected zones in Egoryevsky sub region, Moscow oblast, Russian Federation
- Draft REGULATION on protected river systems in Egorievski sub region, Moscow oblast
- Draft REGULATION on ecological corridor zones in Egorievski sub region, Moscow oblast, Russian Federation

- Guide to Implementing Local Environmental Action Programs in Central and Eastern Europe (ISC, REC, and February 2000).

Egorievski sub region peat bog conservation LEAP is presented below (Table 4.1.). It consists of 5 components: research, economy, education, legislation, and co-ordination with other programs.

Table 4.1 Egorievski sub region peat bog conservation LEAP 2001-2002

Activity	**Responsible entity**	**Tentative funding source**	**Time**
Research and methodological component			
Clarify peat bog monitoring goals		Oblast Ministry for Nature Resources (MNR) Dept., international grants	2001
Continue maintaining a peat bog cadaster in the sub region	Land Use and Ecology Dept., specialists		2001-2002
Develop a list of peat bog areas for substantiating peat bog core areas for the sub region's ecological network	Land Use and Ecology Dept., specialists	Oblast MNR Dept., international grants	2001
Continue to examine protected zones networks for peat bog purposes	Land Use and Ecology Dept., specialists	Oblast MNR Dept., international grants	2001- 2002
Economy component			
Plan a monetary appraisal of the sub region's peat bogs as a follow-up of the "Monetary appraisal of Moscow oblast natural resources project" (Bobylyov, Medvedeva, et. Al., 1999)	Land Use and Ecology Dept.	Oblast funds, businesses (sub region consumer society?), international grants	2002
Define economic mechanisms of introducing resource-saving management practices at peat bogs (tax breaks, penalties, in-kind payments, income distribution, low-interest loans, etc.)	"	"	2002

Table 4.1 Egorievski sub region peat bog conservation LEAP 2001-2002 (continued)

Activity	Responsible entity	Tentative funding source	Time
Environmental education and public awareness component			
Develop a sub region public education program devoted to peat bogs for diverse audiences: managers, students, schoolchildren and public (proceeding from such materials as reports, brochures, CD-ROM, practical courses, environmental camp programs, including those from ROLL)	Land Use and Ecology Dept., Education Dept., universities and schools	Oblast Ministry of Education, MNR, international grants	2001-2002
Establish children's and youth organisations "Peat Bog Protectors" ("Merman")	Education Dept., Land Use and Ecology Dept., schools, vocational schools	Sub region departments of the Ministry of Education	2001-2002
Run a column in the local newspaper or organise the publication of a newsletter (jointly with a number of sub regions in Moscow and Vladimir oblasts) on the basis of information from PIN-MATRA and ROLL projects)	Land Use and Ecology Dept. And other natural resources users	Sub region funds, businesses and enterprises	2002
Develop and implement a program of ecological routes at peat bogs (with the help of ROLL materials)	Land Use and Ecology Dept., Land Use Committee, Education Dept., universities, Hunters Society, forestry's	Local sub region funds	2001- 2002

Table 4.1 Egorievski sub region peat bog conservation LEAP 2001-2002 (continued)

Activity	Responsible entity	Tentative funding source	Time
Legislative component (as part of the sub region's activities to "create a pilot program for setting up the ecological framework of Egorievsky sub region")			
Prepare a set of documents to establish: A list of prospective protected zones (of an official and non-official status)	Land Use and Ecology Dept., Oblast MNR Committee, specialists	Oblast and sub region funds (ecofund, etc.), international grants (civil law)	2001-2002 2001
Substantiate the ecological network core areas in Egorievski sub region (for peat bogs)	Land Use and Ecology Dept., specialists	Oblast and sub region funds (ecofund..), international grants	2002
Development of territorial forms of nature protection. Develop the format of "public agreements" with local village councils "On the protection and rational inexhaustible use of peat bogs" (following the example of dacha partnerships – village partnerships for managing peat bogs) (around peat bogs in accordance with a list offered for the creation of new protected zones) – which will encourage local residents to take part in decision-making regarding peat bogs.	Land Use and Ecology Dept., sub region administration, oblast MNR departments, NGOs, environmental layers (*Ecojuris*)	oblast and sub region funds (ecofund..), international grants	2001-2002
Establish an order of licensing all types of natural resources use at peat bogs in Egorievski sub region (as a follow-up to the decision of the Council of Deputees "On natural resources user categories in Egorievski sub region)	Sub region division of the Department for Nature Resources	Department for Natural Resources	2002
Develop and conclude and Agreement on Cupertino within LEAP between peat extraction companies and the local administration	Land Use and Ecology Dept., sub region administration	Ryazanovskoye peat company,	2001

Table 4.1 Egorievski sub region peat bog conservation LEAP 2001-2002 (continued)

Activity	Responsible entity	Tentative funding source	Time
Organisational and administrative component (co-ordination with local environmental programs)			
Develop supplements to the "Regulation on the protection of plants in Egorievski sub region" referring to buffer zones around peat bogs.	All natural resources users in the sub region	Local sub region funds, oblast MNR departments	2001-2002
Establish a working group on peat bogs for co-ordination of the Plan's activities and fundraising activities for the Plan's implementation	All natural resources users in the sub region	Local sub region funds, oblast MNR departments	2001
Technical activities			
Develop a management plan for restoring 1 – 2 peat bogs in the sub region	Land Use and Ecology Dept., peat extraction companies	Oblast MNR Dept., Land Use Committee, Ryazanovskoye peat extraction company, the forestry, international grants	2002

4.2 Towards implementation of LEAP

In line with the project objectives the research team performed (1) thorough field research on the former and current location of the peat bogs in Egorievski sub region and on the rate of their disturbance , (2) thorough study of recent Russian legislation on the wetlands (peat bogs) protection; (3) study of LEAP approach; (4) numerous discussions with decision-makers in Egorievski sub region (namely Head of Administration Mr. Lavrov; Head of Ecological Department Mr. Zhukov) and Central Federal District (Head of Ecological Department Mr. Ishkov and Head of Department of International Co-operation Mr. Platonov) on the necessity of protection and restoration of peat bogs on the sub region. All counterparts were interested in continuation of the research and raising public awareness on the nature (e.g. peat bog) conservation. Minister of Education of Moscow region was interested in the results of the former projects supported by PIN-MATRA and was ready to incorporate into school curricula. Besides we contacted with local NGOs and provided local schools of six sub regions (Egorievski, Shaturski, Pavlovo-Posadski, Sobinski, Petushinski, Orekhovo-Zuevski) with information on the peat bog importance and LEAP approach.

On July 24 2001 a workshop was organised devoted to the problems of peat bog conservation in Egorievski sub region of Moscow oblast (the main administration building) and to discuss the first draft of the LEAP. The workshop was held in the main administrative building of the city of Egoriesk and attended by nearly 60

participants, including local decision-makers from sub region and federal levels and NGO representatives from territories covered by the project (see Annex 1).
Head of Administration of Egorievski sub region Mr. Lavrov welcomed the participants and stated the peat bogs are one of the most common types of landscapes of the sub region and that they have to be protected.

Dr. Butovsky R.O. - co-ordinator from the Russian side - briefly stated the objective and goals of the seminar as being the acquaintance of decision-makers with the results of scientific project "Ecological networks and nature policy in central Russia" completed in 2001. This project provided the necessary ecological background for decision-making which could lead to different ways of peat bog management, including peat bog protection and restoration. He presented the report recently published in Russian (Butovsky et al. 2001) and also the booklet with the map of peat bog protection of the region (Butovsky et al. 2001). He explained the goals and objectives of the current project and stated that the support from local administrations and NGO is vitally important for it's implementation.

Dr. Otchagov clarified the importance of peat bogs for wildlife conservation and as related to global climate change issue and Mr. Melik-Bagdasarov described the main threats to the peat bogs caused by anthropogenous impact.

Mr. Sviridov (director of Egorievski forestry) stated the importance of peat bog conservation stressing the fact that it is important to protect only several swampy areas and excavate peat from the others. In Egorievsk it was counted 3559 ha of peat bogs located mainly in the forests.

Mr. Il'in – director of the largest peat mining enterprise, located in Shatura, indicated that the LEAP should consider the economical necessity for the sub region to mine peat and to employee the workers. The methods of mining should be safe for peat bogs and permit the restoration process to happen soon after digging.

Dr. Bondartchuk presented modern approaches to development of local environmental action plans which could be useful in planning of time and resources for concrete nature protection actions and the LEAP for Egorievski sub region. LEAP was discussed by participants and several comments were considered.

During the workshop better relations were established between project team and administrators of various sub regions of Vladimirskaya and Moscow oblasts, Ecological Department of Central Federal Okrug and Moscow administration. It gives a solid foundation for successful development and implementation of LEAPs in the territory of both oblasts and dissemination of LARCH approach to the territory of Central Federal Okrug.

The results of the workshop were also brought forward by mass media (local television and federal newspaper).

The resolution of the workshop was accepted by all participants of the workshop.

RESOLUTION Meshera Peat Bog Conservation Workshop
(Egorievsk, Moscow region, July 24, 2001)

Upon discussing the presented reports, as well as the Egorievsky sub region peat bog conservation LEAP, and in view of the timely nature of this issue, the participants in the workshop voice their concerns over the peat bog conservation problems and believe it is necessary to:

- Continue work in this direction with the aim of wildlife conservation in Central Russia and fulfilling Russia's obligations under international agreements;

- Approve, on the whole, the study of Meshera wildlife in 6 sub regions of Moscow oblast (Egoryevsky, Shatursky, Pavlovo-Posadsky, and Orekhovo-Zuyevsky) and Vladimir oblast (Petushinsky and Sobinsky);

- Approve, on the whole and with a consideration of the expressed remarks and proposals, the Egoryevsky sub region LEAP;

- Disseminate the presented peat bog research activities to other sub regions of the Meshera plain;

- Recommend the administration of Egoryevsky sub region to further elaborate the peat bog LEAP for this sub region jointly with project participants, stakeholders, departments and organisations and take practical measures to implement it;

- Recommend project participants, jointly with the administrations of Shatursky, Pavlovo-Posadsky, Orekhovo-Zuyevsky, Petushinsky and Sobinsky sub regions and other interested organisations, to develop LEAPs for these sub regions;

- Recommend project participants, sub region administrations and interested organisations and departments to raise funds to continue wildlife conservation activities at Meshera peat bogs;

- Upon the completion of activities recommend the decision-makers of Moscow and Vladimir regions to prepare the draft of the Statement on peat bog conservation as strictly protected natural areas (SPNA) in line with the adopted procedures.

5 Conclusions

To maintain and increase potentials for viable populations of characteristic species of peat bogs protection and restoration are important measures. The research studies have indicated which peat bogs needed protection to obtain sustainable ecological networks of peat bogs(Otchagov et al., 1999; Butovsky et al., 2001). For this, Local Environmental Action Programs (LEAPs) hold enormous promise (Markowitz 2000). LEAPs are founded on meaningful public input in local governmental decision-making. With support from the Dutch Ministry of Agriculture, Nature Management and Fisheries and from the Dutch Ministry of Foreign Affairs (MATRA Fund/Programme International Nature Management) a LEAP is now being developed for part of the study area.

The study has also raised attention at a higher governmental level. The Department of Natural Resources for Central Federal District (CFD) of the Russian Federation Ministry of Natural Resources and Ministry of Education of Moscow region show much interest to use the approach of the study for setting-up ecological networks over the territory of CFD, which includes 17 regions of the Russian Federation and Moscow City and use of the results of the study in school curricula related to environmental protection..

The main results and conclusions are:

- In central and northern Meshera the habitat for many characteristic peat bog species now show a very fragmented pattern. As a result the potentials for viable populations of characteristic peat bog species have decreased considerably.
- Peat-mining and other human influences are the most important reasons. During the XX century 75% of peat bogs in Egorievski sub region were lost (especially high and intermediate peat bogs).
- The best-preserved peat bogs are located in the upper reaches and in the valley of Tsna River. Probably the largest high undisturbed peat bog (Dalnee) is located at the far south-east of Egorievsk sub region at the Radovitsky Mokh deposit
- High peat bogs are preserved at small scattered areas and require urgent measures for their protection
- The area of low peat bogs is still quite large. The largest of these, such as Ostrozhki peat bog near Letovo village, should be protected.
- Protection and restoration of peat bogs both are very important strategies, although assuming (1) lack of environmental protection funding in Russian Federation during the transition period; (2) relatively high cost of restoration activities; (3) lack of private land the protection strategy seems to be more realistic now.
- LEAP could be considered as a new democratic tool for decision-making with involvement of all interested counterparts including NGOs, administration, public and researchers. LEAPs could be developed only in close Cupertino with

decision-makers at all administrative levels: sub region (rayon), region (oblast) and federal.

- The original scheme of environmental decision-making in Russian Federation (chapter 3) could be used in further projects related to the development of new PNA.

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Appendix 1 List of participants of workshop on peat bog conservation, Egorievsk, Moscow oblast, July 24, 2001

Name	Position
Moscow, Central Federal District, Federal structures	
Alechenko Gleb	Leading researcher, Faculty of Geography Moscow State University
Bondarchuk Elena	Environmental Project Co-ordinator, Institute for Sustainable Communities
Butovsky Ruslan	Leading researcher, ARRINP
Butovskaya Marina	Leading researcher, Institute of Ethnology and Anthropology
Essenova Inna	Head of sector of State Biological Museum named after K.V.Timiryasev
Lebedeva Natalia	Main specialist of Dept. for natural resources in Central region
Meznev Anton	Senior researcher, State Centre of Hunting Control
Melik-Bagdasarov Eugeny	Faculty of Geography, MSU
Otchagov Dmitri	Head of laboratory for zapovedniks, ARRINP
Sivtsova Natalia	Secretary of the seminar
Moscow region	
Ministry of Ecology and use of natural resources of the Moscow region government	
Khoroshev Pavel	Consultant, Ministry of ecology and nature protection Moscow region.
Orekhovo-Zuevo sub region	
Baranov Nikolai	Head of Dept. of landuse and ecology
Shedrin Alexei	Orekhovo-Zuevski rajon Department, Ministry for Natural Resources
Egorievsk sub region	
Lavrov Michail	Head of administration
Zhuravlev Juri	Head of agricultural department, Deputy Head
Andreeva Nina	Deputy Director of Egorievsk Technological Institute named after Bardygin, department of Moscow State Technological University «STANKIN»
Arinosova Irina	Dept. for land use and ecology of agricultural management, Administration
Gladun Victor	Director of Egorievsk Technological Institute named after Bardygin, department of Moscow State Technological University «STANKIN»
Glintsov Vjacheslav	Deputy Director Company «Rus» Ltd.
Egorov Pavel	Chief Engineer – MPTI «Land and real property»
Erjaev Fedor	Main forestman Egorievsk leskhoz
Zhukov Oleg	Head of Dept. for land use, Administration
Zaplitny Roman	Director of Municipal enterprise «Eco-service»
Ilyin Vladimir	Director of Ryazan peat enterprise, branch of OAO «Shaturpeat»
Kaverin Alexander	Director of Radovitsk enterprise of industrial railway transport branch of «Shaturpeat»
Kazyrova Nuriya	Correspondent of TRK «Region»
Konkov Alexander	Director of Egorievsk fish industrial complex «Tsna»
Makarina Elena	Foreign correspondent of the newspaper «Znamya truda»
Markov Alexei	Tourist department of administration on youth and tourism management of Egorievsk region Administration
Melehina Larisa	Tutor «STANKIN»
Nazarov Gennady	Chairman of hunter and fisherman association of Egorievsk sub region
Nilova Natalaya	Leading specialist of Dept. for land use and ecology of agricultural management, Administration
Ochakova Valentina	Engineer of Egorievsk OGPS
Petrova Nadezhda	Chairman of Egorievsk branch of Moscow department All -Russia nature conservation society
Pozshivalova Marina	Deputy dean TO ETI MGTU «STANKIN»
Svetlov Igor	Representative DPR of Central Region on Egorievsk sub region
Sviridov Vladimir	Director of Egorievsk forestry

Tagin Evgeny	Fighter for nature - public figure
Shevelkov Vladimir	Head of detachment of public anti-fire service
Shoncha Ogari	Deputy Director OAO «Rus - 2»
Yurin Dmitry	Chairman of Egorievsk public committee
Shaturski sub region	
Krilov Nikolai	Chief Director of OAO «Shaturpeat»
Sobinski sub region	
Fedotova Tatiana	Head of Dept. for land uses, Administration
Petushinski sub region	
Volkov Michael	Deputy Head of Dept. For land uses, Administration
Sevastianova Nadezhda	Leading specialist on ecology
city Ivanovo	
Shilov Mikhail	Assistant Professor, Ivanovo Pedagogical University
The Netherlands	
Rien Reijnen	Senior researcher, ALTERRA