Inventory on Area, Situation and Perspectives of Rewetting of Peatlands in Belarus Russia & Ukraine

Manfred-Hermsen-Stiftung
für Natur und Umwelt

INVENTORY ON AREA, SITUATION AND PERSPECTIVES OF REWETTING OF PEATLANDS IN RUSSIA UKRAINE & BELARUS

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Manfred-Hermsen-Stiftung für Natur und Umwelt

RSPB a million voices for nature

BfN Federal Agency for Nature Conservation

Insel Vilm INTERNATIONAL ACADEMY FOR NATURE CONSERVATION

Terms

Peatland – a wetland with a layer of peat (depth is depending on the classification of the country, mostly between 30-50 cm minimum)

Mire - peatland where peat formation is actually taking place

Fen – a peatland situated in a valley, mainly fed by groundwater

Bog – a peatland, mainly fed by precipitation

Transitional peatland – Paludified areas, with mixted supply of water from atmosphe and from groundwater, leading to mesotrophic conditions

Wetland – an area where water is constantly near the surface

Peat extraction site – a peatland where peat was dug by milling or dredging to use it ex situ

Abbreviations

AoS - The National Academy of Science Minsk

APB – BirdLife Belarus, Akhova Ptushak Batskaushchyny

BfN - German Federal Agency for Nature Conservation

CIM – Centre for International Migration and Development

CPI - Corruption Perception Index

EIE - Evaluation of Influence on the Environment

FMENCNS – Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

GEF – Global Environment Facility

GTZ- Deutsche Gesellschaft für Technische Zusammenarbeit GmbH, German Agency for Technical Corporation

INA – International Academy for Nature Conservation

IPIPRE NANB - Institute of Nature Use and Ecology of the National Academy of Sciences

MHF - Michael Hermsen Foundation

MSF – The Michael Succow Foundation

RSPB - The Royal Society for the Protection of Birds

SGP – Small Grant Project

SPNA - Special Protected Nature Areas

UNDP – United Nations Development Program

INTRODUCTION

In November 2008, the German Federal Agency for Nature Conservation (BfN) in cooperation with the University of Greifswald and the Royal Society for the Protection of Birds (RSPB) organised the first major event entitled 'Market-based Instruments for Peatland Conservation' of a workshop series (2008-2010) dealing with **The Future of peatlands in Central and Eastern Europe in the view of climate change**. The target countries are Belarus, Ukraine and European Russia. The first workshop reviewed the current status of peatlands and the political perspectives of restoration activities to develop a climate friendly restoration. The following sessions will further look into the ways by which the policies are implemented (e.g. carbon trading) and also orient towards the negotiations of a Post-Kyoto protocol.

This report seeks to provide an overview on the status of peatland and the knowledge in the three focal countries, as well as the role of governmental instances to forward restoration and conservation issues. It is a policy paper to decide which kind of data is actually needed to be revealed by inland experts. The results of the finalisation discussions on what shall be done in the certain countries is summarised under Action plans for the countries.

The large peatland restoration project started in September 2008: "Restoring Peatlands and applying Concepts for Sustainable Management in Belarus - A Climate Change Mitigation project with Economic and Biodiversity Benefits" is one of the first steps planned in the focal countries coming up in the following years. The project is set up by the Royal Society for the Protection of Birds, UK, the Michael Succow Foundation, Germany, and APB-BirdLife Belarus, and financed by Germany through KfW Entwicklungsbank in the framework of the International Climate Protection Initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). It is carried out with support of the United Nations Development Programme (UNDP) in Belarus and the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus. Thanks to the Michael Hermsen foundation for the support of this report and for the future collaboration in restoration projects.

Content

INVENTORY OVERVIEW OF STATUS OF PEATLANDS IN BELARUS

Yelnia bog complex in the north of Belarus, picture: Sergey Zuyonok

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CONTENT

PICTURES

CONTENT

TABLES

ANNEX

EXECUTIVE SUMMARY

Belarus, situated in the centre of Europe is landlocked and mainly even, with some terminal moraines in the central part of the country. With 14.2% of the territory Belarus has a remarkable amount of peatlands unique for Europe. The country can briefly be divided into three regions. In the north, the boreal part of the country, where rainwater fed peatlands and mires prevail. The central region is covered by fens, transitional peatlands and bogs. In the southern part of the country, huge floodplain fens stretch along the numerous rivers. On watersheds between the rivers, huge bogs like Morochno on the border to Ukraine can be found.

Nearly half of the peatlands in Belarus are damaged through drainage, peat extraction or agriculture. Additionally 30% of the whole peatlands are changed in their hydrological regime. There is a great demand of restoration activities due to the fact that there is no law which forced the extraction companies to take any rewetting activities. The extracted sites were transferred to the forestry fund and in many cases the authorities had problems with fires in the dry summer season. The main part of extracted peatlands stays in a bare, drained condition with very low biodiversity and low ecosystem value. Ongoing peat mineralization, which can account up to 2mm/year leads to substantial emission of CO_2, which usually would be long term sequestered.

The Ministry for Forestry and the Ministry of Natural Resources and Environmental Protection are aware of the problem and are very supportive and active in any rewetting activities. The UNDP in close corporation with the AoS and RSPB set up the first large scale rewetting project in 2005, which prolongs until 2010 and settled the first experiences in rewetting of sites between 280 and 3500 ha. The main goal to be reached was the reduction of fires. The second large scale project (financed by FMENCNS), which started in 2008, aims on setting the first foundation stones for a climate friendly rewetting, whereas the costs can be refinanced via selling the emission reductions. In corporation with UNDP, RSPB, MSF, AoS and APB the way to the first peatland rewetting project dealing with greenhouse gas emission reductions is brought on the way.The practice showed that mainly the extracted peatlands are available for rewetting, whereas the agricultural used fen peatlands would gain more emission reductions and bring a greater win in biodiversity. The governmental decision makers actually focus on food production, which is seen as the most favourable income measure from export. The aims of the in 2008 started FMENCNS-project can be summarised as: peatlands shall function as long term carbon storage, host of biodiversity and if necessary, due to biotope maintenance and energy demands, as production site for alternative energy sources.

GENERAL INFORMATION

Area: 20 760 000 ha (207 600 km^2)

Population: ~10 million (0.48 inhabitants per ha)

Former extent of peatlands: 2 939 000 ha (or 14.2% of the country)

Present area of peatlands: 1 434 000 ha (6.9%)

Area of drained peatlands: 51.2%

Total amount of peatlands– 9 192 sites (according Scheme of usage and protection of peat recourses of Belarus till 2010)

GEOGRAPHY

The Republic of Belarus is situated in the geographical centre of Europe and extends to 207,600 km^2. The relief is mainly even with some terminal moraines in the central part of Belarus, reaching a maximum of 346 m asl. Three natural climatic zones divide the rather small country: Northern or Belorussian Poozerie, Central and Southern or Belorussian Polessie. Each of these natural climatic zones is divided in two subzones depending on the climate-continentality-degree: western, which is the less continental, and eastern - is more continental.

The northern natural climatic zone covers the most of Vitebsk and the northwest part of Minsk administrative regions. The average quantity of precipitation per year is 600 mm, maximum is 650 mm. The humidification coefficient, which is determining as the ratio of fall-out quantity to evaporation amount, is 1.05-1.30 here. (Bambalov et al., 2005).

The character of the Belarus hydrographic network is determined by the watershed between Black and Baltic Sea basins, which divides the whole territory in two regions. The watershed passes through the northwest Polessie, on Kopyl ridge, Minsk and Orsha heights (Bambalov et al., 2005).

Pic. 1: Topographical map of Belarus

Beyond that a geobotanical border is running through the south central part of the country: in the north the boreal zone with the European coniferous forest predominate and in the south the subboreal to meridional broadleaved forest prevail. The physical-geographic conditions of the country enhance a forested territory with wetlands and peat forming regions. The northern part of the country is a huge depression (Poozerie) on which numerous lakes, bogs and rivers settled in the ground moraines can be found. The central part is a dense settled region with hilly moraines bogs, fens and transitional peatlands. The southern part then opens again to a huge depression (Polessie) with large fens and transitional peatlands crossed by undulating rivers and alluvial land such as the Pripyat.

STATE ADMINISTRATION AND LAND OWNERSHIP

Belarus is one of the few state-capitalistic national-economies of the world. Agriculture employs 15 % of the inhabitants. The industry and agriculture lies in the hands of the state. After the crash of SSR huge inefficient estates fell out of the agricultural use. These areas are actually owned by the state. The management of focal sites, e.g. the peatland sites, is organised according to their former or future use (land funds): forestry service, agricultural cooperatives, (reserve land) or the Ministry of Defence or the State Water Authority.

All the peatlands and peat deposits in Belarus are property of the state; for the purpose of their rational use and protection, in 1991 the government approved the 'Scheme of usage and protection of peat recourses of Belarus till 2010'. Depending on the operational purpose, peatlands and peat deposits were divided into several funds (see table 1).

Table 1: Overview of differing fund types in Belarus

Name of Fund	Current area (ha)
Nature Protection Fund	**326 500**
Balance of Developing Fund - areas under peat extraction	**36 800**
Extracted peat deposits including areas used in agriculture, for forestry rehabilitated other	**255,6** 122,2 103 27
Reserve Fund	**30 800**
Land Fund: Agricultural land including Recultivated areas after peat extraction Degraded peat soils Deeply disturbed soils Forest peatlands not effectively drained	 **1 085 200** 122 000 224 000 27 300 **24 000**
Peatlands not included in any Fund (area less than 1 ha)	**523 800**
Peatlands where the use has not yet been defined	**778 500**
Total (area with peat deposits)	**2 939 000**

The peatland areas allocated to the agricultural fund are actually (2009) revised for further intensification. There was a decree from the presidential house that all abandoned fields should be taken under the plough again for food production. This plan will partly be a victim of lacking money but is shows how high the importance of food production is.

The only possibility to take the pressure form this land would be to transfer the areas to the forestry fund. And this is only possible by showing the presidential administratives that alternative utilisation can be possible.

PEATLAND CLASSIFICATION

Peatland classification follows N. N. Bambalov "Role of peatland in Biosphere" (2005).

Belarusian scientists classify peatlands depending on water and nutrient supply conditions, as well as vegetation. In accordance with these criteria, there are three peatland types: fen (eutrophic), transitional (mesotrophic) and bog (oligotrophic).

Fen type peatland appear in conditions of rich nutrient supply by subterranean and river waters as well as atmospheric precipitations (60 to 400 mg/l of dissolved mineral salts). In Western Europe they are named fens.

Transitional type peatland appear in conditions of a mixed water supply by atmospheric, surface-discharge and partly subterranean waters (40 to 80 mg/l of dissolved mineral salts). In Western Europe they are called poor fen, in Belarus transitional peatland.

Bog type peatland appear in supply conditions of mainly atmospheric precipitation, containing less than 50 mg/l of dissolved mineral salts. In Western Europe they are called bogs or raised bogs.

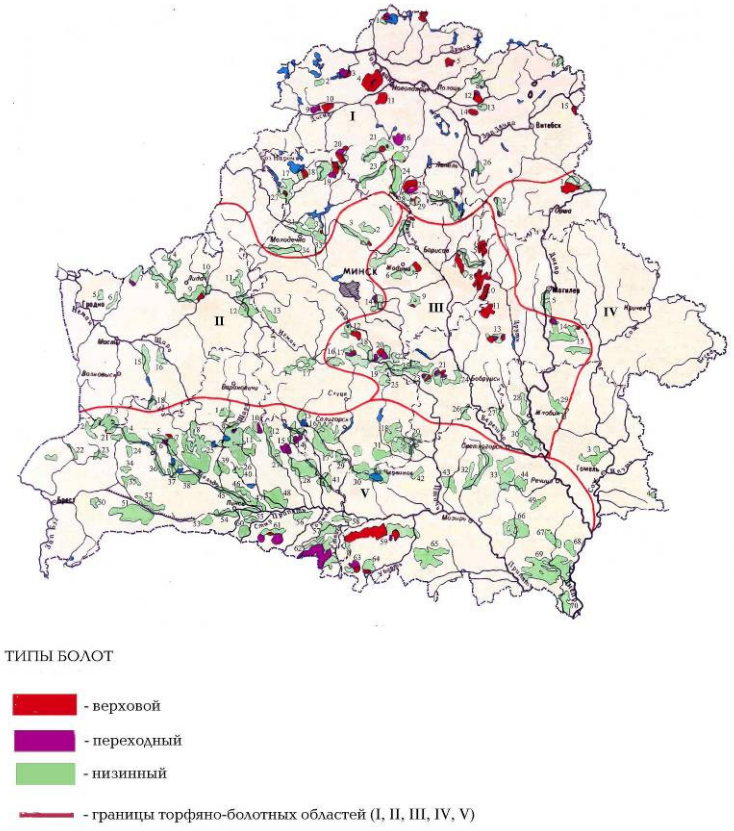


Рис. Распределение наиболее крупных болот и торфяных месторождений по территории Республики Беларусь

Pic. 2: Peatland zones in Belarus and distribution of large peatlands

red: raised bogs, violet: transitional peatlands, green: fens, red line: borders of peatland regions-geomorphological zones, (Bambalov & Rakovich 2003)

Key to geomorphologic zones:

I Hill-lake landscape bog area (Poozerie). Peat deposits often overlie lake deposits. 10.6% of the area is peatland, with an average depth of 2.0 m.

Fen peat 54.5%, transitional 7.3% and raised bog peat 38.2%

II Western end-moraine landscape fen area. Few lakes. 7.7% of the area is peatland, with an average depth of 1.96 m.

Fen peat 94.3%, transitional 3.7% and raised bog peat 2.0%

III Alluvial plain bog and fen area. 15.6% of the area is peatland, with an average depth of 1.93m.

Fen peat 70.3%, transitional 6.2% and raised bog peat 23.5%

IV Small bog and fen area in the loess rocks. Predominantly flat with few lakes. 5.5% of the area is peatland, with an average depth of 1.59 m.

Fen peat 85.5%, transitional 3.6% and raised bog peat 10.9%

V Large Polessie fen area. Sand plain. 18.3% of the area is peatland, with an average depth of 1.55 m. **Fen peat 86.4%, transitional 7.3% and raised bog peat 6.3%**

Each of the three aforementioned peatland types is divided into three subtypes depending on composition of the vegetation cover and moistening level of the root layer: forest (humidity 84–89%), swamp-forest (humidity 89–91%), swamp (humidity 91–94%). Consequently, there are nine peatland subtypes in total.

Depending on predominant vegetation type, peatland subtypes are divided into six groups: Forest, forest-grass, forest-moss, grass, grass-moss and moss. Only one – forest – group corresponds with the forest subtype; the forest-marsh subtype combines two groups - forest-grass, forest-moss, the marsh peatland type includes three vegetation groups: grass, grass-moss and moss.

The lowest taxonomical unit for peatland vegetation is a phytocoenosis characterised by floristic consistency and fixed to particular environmental conditions. For example, alder phytocoenosis grow where the root layer is well aerated and subterranean waters are nutrient rich, while *Sphagnum fuscum*-phytocoenosis grow in the conditions of low water salinity and increased moistening of substratum. There are around 40 peat phytocoenosis found in Belarus, according to Largina (1977).

The main deficiency of the above mentioned classification is the fact that the actual types of vegetation growth do not correspond to the types of peat deposits, if their development had passed from the eutrophic stage to mesotrophic or oligotrophic, because the names of peat deposit types do not take into account the type of top peat layer (less than 0.5 m.), i.e. the genetic essence of evolution of peat deposit and vegetation cover.

Based on stratigraphical research of Belarusian peat deposits, the conclusion has been made about not four, but seven genetic types of peat deposits existing: Fen, fen-transitional, transitional, fen-bog, fen-transitional-bog, transitional-bog and bog. A deposit name always includes the name of top typological peat layer, regardless of its thickness, which has not only genetic, but also practical purpose.

PEATLAND DISTRIBUTION AND DIVERSITY

The overall number of peatlands in Belarus was counted to 9192 single areas.

The total peat area in Belarus before drainage and peat extraction started, had been 2 939 000 ha, or 14.2% of the country.

Against the favourable climate, other factors, geomorphologic and hydrogeological above all else, influence peatland formation and peat accumulation processes. The lowest paludification

is found in the elevated and most partitioned landscape forms - moraine and terminal moraine plains. First, that includes terminal moraines formation system from Moscow stage of Dnepr glaciation, integrated under the single name of Belarusian range. That means Vitebsk, Orsha, Minsk, Novogrudok, Slonim, Volkovysk and Grodno elevations, Kopyl and Oshmyany ranges.

In the north of the country, in the Belarusian Poozerie region, low paludification characterises the region where terminal moraines ranges and elevations included in the Baltic range system, which were formed as a result of the last Valday glaciation. That includes Sventsany, Braslavl, Osvey, Senneny terminal moraines ranges, Nescherdov, Ushach-Lepel, Gorodok and Lukoml elevations.

On the left-bank of the Dnepr basin (Eastern-Belarusian plain region) is low-paludified Regions where blanket cover of loess-like loams, loesses and near-surface chalk rock bedding is widespread, small peatlands were formed in saucer-like potholes of boil and karst genesis.

The most paludified area of Belarus is Polessie lowland and in particular, its central part – Pripyat Polessie. The paludification processes were a result of a favourable mix of non-climatic factors. The large depression, its geological structure and the local hydrological conditions, even considering a certain shortage of atmospheric precipitation during vegetation period, provided possibilities for widespread development of peatlands in Polessie. It is discussed that the paludification processes happened in the recent 5000 years, due to the fact that the land is lowering as reaction of postglacial heaving of the northern part of Belarus.

Other, less vast Belarusian lowlands are Naroch-Vileyka, Verkhnaya Bereza, Chashniki and Polotsk - are also paludified significantly.

For example, average thickness of peat layer in Vitebsk region is 2.5 m, and in Brest region – only 1,4 m, which is a partly result of geomorphologic differences between Belarusian north and south. In Vitebsk and north of Minsk regions the initial peat-forming stage was related mainly to terrestrialisation of lakes, i.e., the deepest hollows, in opposition to Polessie, where among flat and flat-waved landscapes, peatlands expanded mainly in breadth.

The area of fen and transition type peatlands in Belarus amounts to 85% (2 498 000 ha), and bogs– 15.0% (441 000 ha).

Bogs of north and south of the country differ from each other in morphology, as well in floristic composition of the vegetation cover. For example, in north-west, the peatlands have an elevation of up to 5-6 m, string-flark complexes of such peatlands are well developed with flarks being prevalent. Among such peatlands vegetation *Empetrum nigrum, Sph. balticum* are widely spread, *Betula nana, Betula humilis, Sph. lindbergii, Rubus chamaemorus* also occur,

i.e. specimens characteristic for the North-East of Russian Federation and Baltic states. The majority of aforementioned species do not occur to the south of Belarusian range. The border of *Empetrum nigrum* natural habitat distribution lies a slightly south of the Minsk-Mogilev line.

In the southern part of the country bogs are slightly sloped (0.5-1.0 m) with pine stands of greater density and higher growth class. In *Sphagnum* cover, *Sph. magellanicum, Sph. angustifolium, Sph. rubellum* are prevalent; the *Sphagnum* cover components which are widely spread in the north occur rarer in Polessie.

There are still some quite large bogs in the central part of Belarus. However, their slope is lower than in the north (1.5-3.0 m) and string-flark complexes are less developed. Among the bogs of the central part of the country areas can be found, which have distinctive "mosaic" sphagnum cover, where moss species inherent to ranges and to hollows, grow together. It was also noted, that peat deposits in bogs in the south of the country characterized by higher decomposition of peat. We connect all these phenomena to climatic changes from north to south, directed to decrease in moistening.

SITUATION OF PEATLANDS

State officials' and public opinion that peatlands are productive objects, started to change after the Institute of Nature Resources and Ecology of the National Academy of Sciences (IPIPRE NANB) in 1990 developed criteria for creating of long-term funds-in-trust and Scheme of usage and protection of peat recourses of Belarus till 2010, which was approved by the Republic of Belarus Board of Ministers on November 25, 1991. The Scheme included 9192 peat deposits with total area of 2 393 000 ha, and suggested the increase of nature conservation fund from 13% to 29.7 % of the peat territory until 2010.

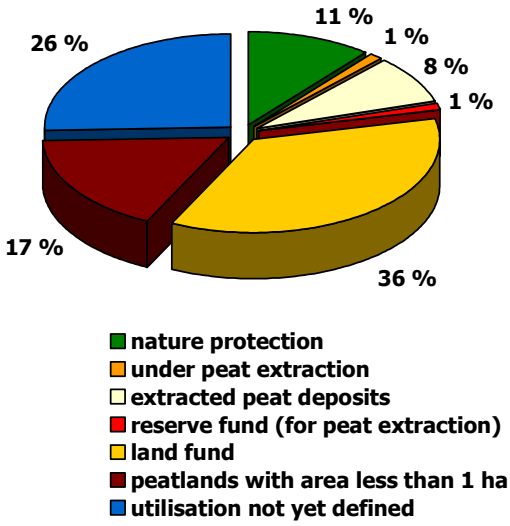
Another program 'Conception of energy security' that deals with supply of warmth and electricity decrees to increase the peat extraction by 1.5 mill. tons, in 2020. This is compared to former activities (see pic. 8) low, due to the fact that the resources are nearly exhausted.

A third program 'Complex program of main industrial fund modernisation till 2011' deals with energy efficiency and independency. The government plans to increase the share of domestic energy to 25% by 2012 from the current 16%. Along with wood biomass, peat is targeted as one of the sources for the planned increase. Toward this end, the government has drafted a state program to increase the efficiency and scopes of complex usage of peat in the energy sector, agriculture and environment in 2008-2010 and up to 2020. The program aims

to use 31 555 hectares of peatlands for peat extraction purposes and there could be potential overlaps with current or planned restoration project activities (UNDP, GEF project report 2007).

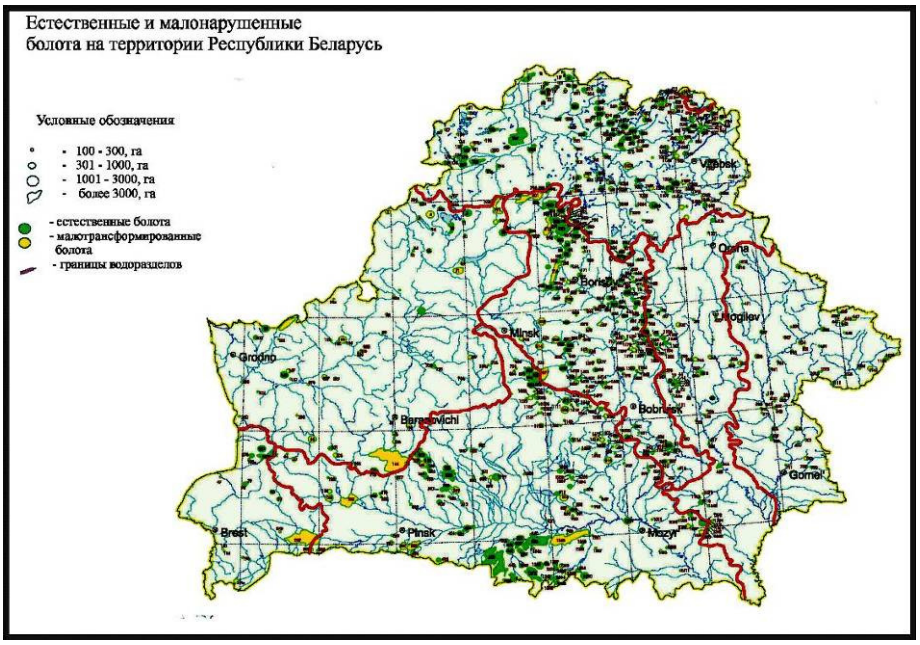
Pic. 3: Typical peatland extracted by milling (Ostrovskoye), photo by A. Kozulin

The Peat program aims to increase efficiency and amount of peat use for energy and agriculture and provides an increase of local fuel types in power production up to 30% in 2020. Accordingly, peat extraction amounts in 2020 will increase up to 7.5 mill. tons, including up to 5.1 mill. t. for energy and up to 2.4 mill. tons for agriculture.



Pic. 4: Allocation of peatlands according to their utilisation, of all 2 939 000 ha of the country,

data: Tanavetskaya, 2008



Pic. 5: Natural and low degraded peatlands in Belarus,

Legend: green: natural peatlands (this status will be analysed in the near future), yellow: low degraded peatlands, red: border of catchment areas

The areas allocated in the forest fund do not function as a food production entity and the danger of fires make the permission process for rewetting easier than in the agricultural fund. The following diagrams give an overview of the type of utilisation generally and in the forest fund.

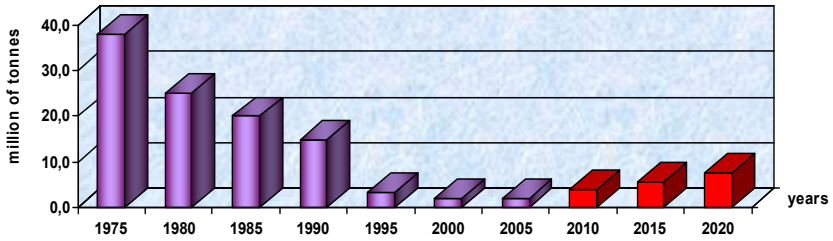
Pic. 6: Use of the drained peatlands (1 505 000 ha) (left), Allocation 383 000 ha drained wetlands included to forest fund (total area of wetlands of forest fund – 1 140 000 ha) (right), source: Tanavetskaya (2008)

Overall 1 140 000 ha of wet land is summarized under the forest fund. This is 14% of the whole territory of the fund. 383 000 ha are drained peatlands, whereas 103 000 ha are extracted peatlands, 208 000 ha drained peatlands and 17 000 ha of agricultural peatland.

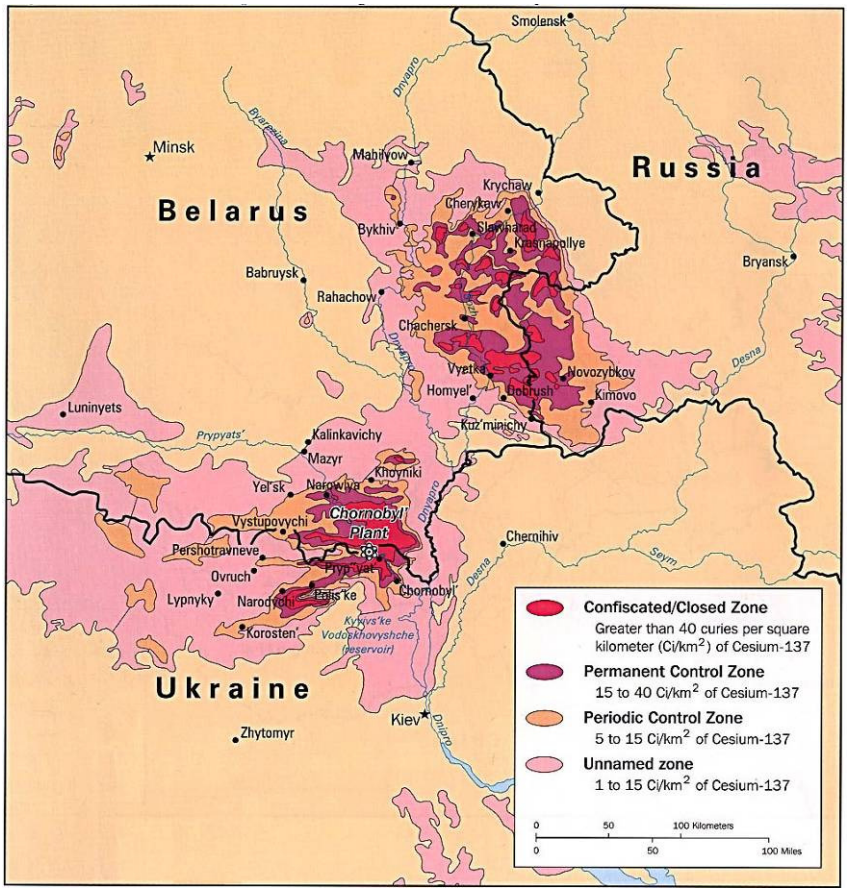
One of the major markets for peat mining is fuel for energy and fertiliser for agricultural soils. Further threats are melioration for agriculture, which goes together with the destruction of the mire ecosystem and a radical transformation of the relief through the construction of channels and other hydro technical provisions (Bambalov et al., 2005).

Pic. 7: Agricultural land with Alder swamps as natural vegetation

Further important threats to peatlands are: road construction, construction of power lines, gas- and oil-pipelines, and other communication systems, the uncontrolled draining of fish ponds, burning in spring, and pollution. Radiation and chemical pollution negatively affect peatland ecosystems. More than 40 000 ha of Belarus are polluted by the radiation emission of the accident of the Chernobyl atomic power plant. Forests, meadows and peatlands constitute 50% of these polluted areas. The vegetation of these forests, meadows, and peatlands stored radioactivity by the adsorption of radioactive particles (Bambalov et al., 2005) (Pict. 9).



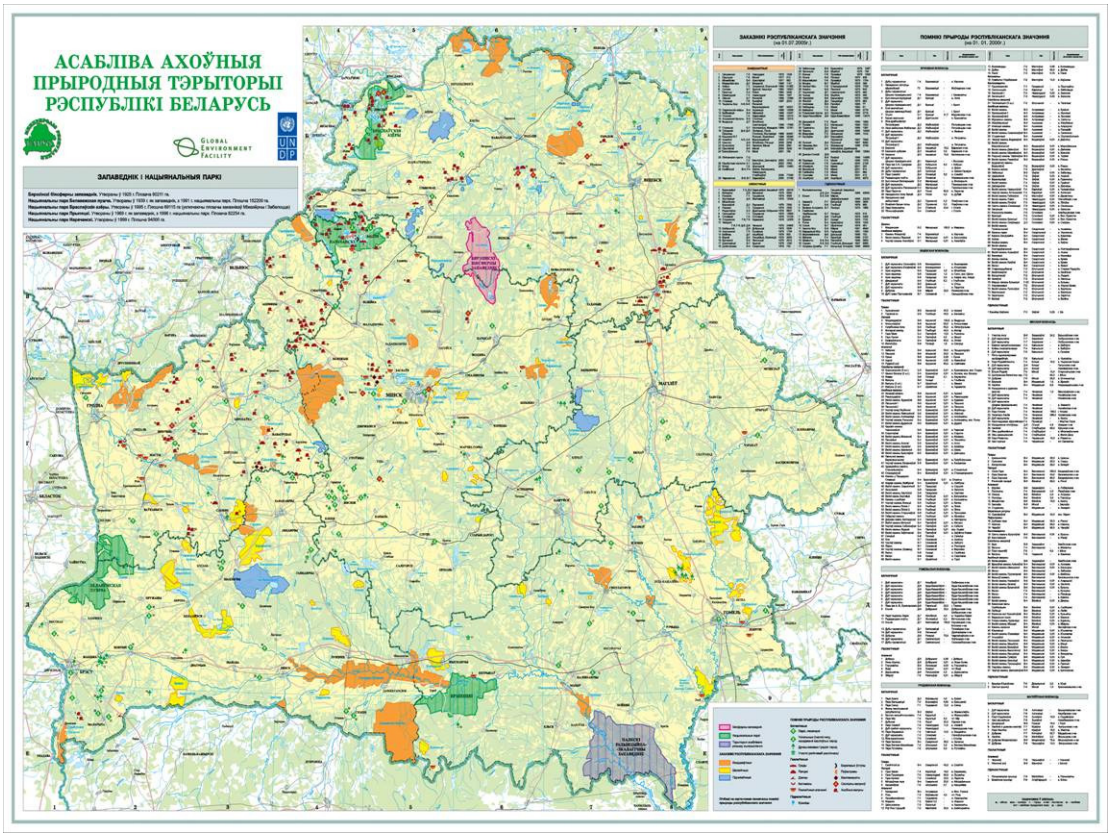
Pic. 8 : Annual quantities of peat extraction in Belarus from 1975 to 2020.



Pic. 9: Radiation hotspots 1996 resulting from the Chernobyl disaster 1986

PROTECTION OF MIRES AND PEATLANDS

Approximately 11% (326 500 ha) of the present peatland area are protected (all levels of protection) as National Parks, Biosphere Reserves, Botanical Zakazniks, Hydrological Zakazniks and Berry Zakazniks. Besides these large protected areas there are many small protected peatlands on the local level. The biogeographical distribution of peatlands is very well reflected in the protected areas, and no specific types are underrepresented. Belarus has one official Ramsar site "Sporovsky" with 18 869 ha peatland. 18 potential Ramsar areas have been identified, and eight of these have significant peatland area. An additional Red List of about 200 potential Ramsar Sites or peatland areas with significant value for biodiversity has been compiled. The sites have been selected according to Ramsar criteria: rare or unique in the bio-geographical region, some are already included in nature reserves, national parks or different zakazniks. For instance flood plain peatlands where it is forbidden to change water regime and peatlands, which are part of lake-mire or flood plain-mire complexes (Bambalov & Rakovich 2003).



Pic. 10: Plan of rational allocation of specially preserved natural areas of state importance (up to January 1, 2015)

EFFECTIVENESS OF PROTECTION

SPNA preservation and operation routines shall be determined by Preserve Provisions, approved by a decision of the Republic of Belarus Board of Ministers, which shall provide for operation routines and various prohibition measures. Drainage works are prohibited in almost all preserves. As a rule, that prohibition is phrased as follows: "within bounds of state biological preserve "Dokudovskoye" reclamation works, as well as works causing alterations in the existing hydrologic regime (except for the work related to restoration thereof), are prohibited But reserves of state importance are monitored sufficiently strictly, particularly when it comes to drainage works; up to the present moment, any instances of violation thereof were not registered. At the same time, that should be possible for preserves of local importance. ". As in case of Dokudovskoye a change in hydrological regime was registered due to adjacent extraction activities.

However, this Reclamation Act covers agricultural reclamation only, because reclamation is defined therein as follows: Reclamation of land: activities aimed for fundamental improvement of land for the purpose of creation and maintenance of the best water, air, heat

and feeding soil conditions, for agricultural plants, forest and other plantations, by the way of reclamation measures. Thus, that law does not cover operation of peat for peat extraction. The regulatory environment, regulating allocation of territories for peat extraction, is poorly developed.

Beside that, the Provision of Evaluation of Influence on the Environment (EIE) states, that when allocating territories of more than 100 ha for peat extraction, the EIE procedure shall be performed. At the present moment, however, when allocating territories for peat extraction, the EIE procedure is being performed perfunctorily, and does not include a fair evaluation of possible effect of peat extraction on the surrounding ecosystems and on necessity of special measures aimed for prevention. However, in the context of performing of the Peat State Program, starting in 2009, a regulatory document "Procedure and Rules of Choosing of Peat Extraction Territories and Performing of EIE During Allocation of Territories for Peat Extraction" has been set up.

The Peat State Program provides for additional allocation of peat deposit plots of 31 500 ha for peat extraction. The program includes names and acreage of specific peat deposits proposed for peat extraction, but not their layout. Therefore, the exact locations of plots proposed for peat extraction are not always easy to determine. However, the program includes two large natural peatlands which have SPNA status – the state preserve "Dokudovskoye" and the local preserve "Zhada" parts of which were planned for peat extraction. In 2008, during a meeting of the Ministry of Environment, where all the stakeholder participated, the possibility of peat extraction in SPNA was discussed and a relevant protocol was drawn up. To exclude the two aforementioned SPNA from the Peat Program an application to the Board of Ministers, authorised to make such decisions, is required. Very close to Dokudovskoye peat extraction takes place and recent restoration activities plan to build a dam, to minimise the drainage effect of the drained extraction site to the conservation site.

TECHNICAL AND POLITICAL PERSPECTIVES FOR REWETTING

On the 3rd International Conference of the Michael Otto Foundation on Wetland Protection and Climate Change in Belarus, the Ministry of Natural Resources and Environmental Protection signed a Resolution about the importance of peatland restoration for biodiversity protection and climate change (Joosten, 2007). The Government of Belarus, specifically the Ministry of Finance, Ministry of Interior, Ministry of Forestry, and Ministry of Environment supports restoration and conservation projects. A number of 260 000 ha is released by the Ministry of Natural Resources and Environmental Protection for immediately rewetting and a

maximum of 500 000 ha are possible to be rewetted in the future (Joosten, 2007; Z. Karpowicz per. comm.).

It is necessary to be mentioned, that when composing and coordinating the Peat Program, the provision "To recommend degraded peatlands (ineffectively used sites) for peat extraction, not natural peatlands, was not fully taken into account. However, the Ministry of Natural Resources and Environmental Protection insisted that the list of peat deposits proposed for peat extraction was presented only as prospective areas, allocation of which will be done in accordance with applicable procedures.

GOVERNMENTAL OR OTHER ACTIVITIES FOR REWETTING OF PEATLANDS

The implementation of the UNDP-GEF's international project, in close corporation with the Ministry of Forestry, aimed for restoration of damaged peatlands, continues. In the context of that project, aside from restoration of damaged peatlands of about 42 000 ha, the regulatory framework needed for preservation and restoration of Belarusian peatlands, was developed.

In that regard, in the context of the UNDP project two Technical Codes of Established Practices were developed and are implemented since January 1, 2009: ‚Rules and procedures for definition and change of directions for use of depleted peat deposits and other damaged mires' and 'Order and rules for implementation of work on environmental rehabilitation of depleted peat deposits and other damaged mires and on prevention of damage of hydrological regime of natural ecosystems during the meliorative activities'. The developed regulation documents are legally binding and regulate the order of choosing of scientifically founded direction of use of depleted peat deposits, procedure of changing of direction of their use, main requirements and rules for conducting of their eco-rehabilitation (peatlands.by).

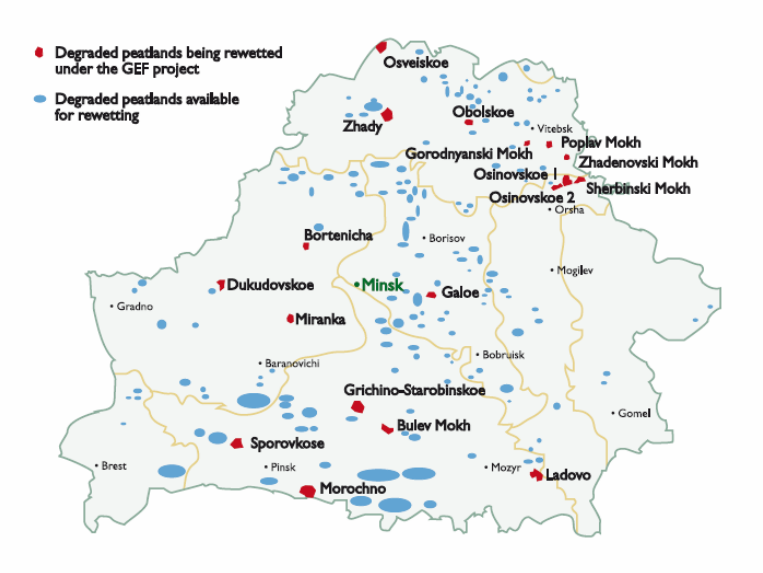
Pic. 11: Restoration site Bartenikha in the northwestern centre of Belarus

Another resolution passed at the Otto conference 2007– "To continue joint work for the purpose of preservation and restoration of peatlands in Republic of Belarus" – is also being performed. For example, at the present moment, in the context of implementation of the GEF Small Grant Program, there are three projects being realised, aimed for restoration of hydrologic conditions of the three largest peatlands of Belarus: Yelnia, Vygonoschansk and Dokudovskoye.

Pic. 12: Restauration site Obolskoye in the north of Belarus

Lately, another international (FMENCNS financed) project, technically transcribed by the United Nations Development Program (UNDP), scientifically accompanied by the Michael Succow Foundation (MSF) and employees of the German Government International Aid (GTZ-CIM), working with RSPB (Royal Society for the Protection of Birds), who are liaising with carbon trading companies, climate change research scientists and trust fund experts. In the first phase of the project 'Restoring Peatlands and applying Concepts for Sustainable Managements in Belarus – Climate Change Mitigation with Economic and Biodiversity Benefits' 15 000 ha of degraded peatlands will be rewetted and monitored according to the win in biodiversity and the reduction of greenhouse gas emissions. The second big goal is to work out the first Carbon credit standard for the restoration of peatlands.

The Government of Belarus agreement under Annex B of the Kyoto Protocol means all income from the sale of carbon credits must be reinvested into further climate gas mitigation. It is envisaged that a trust fund will be created to support a Belarusian Protected Area Agency for long-term site management, while monitoring the biodiversity of this rewetted peatland will be undertaken by APB-BirdLife Belarus and the Academy of Science (Climate Change and Biodiversity, ptushky.org).



Pic. 13: Map of drained and degraded peatlands released by the Ministry for Natural Resources and Natural Recourses and Environmental Protection to be rewetted

ACTION PLAN BELARUS

The following lines are the result of a workgroup composed of Belarusian stakeholders, e.g. members of the Ministry for Natural Resources and Natural Recourses and Environmental Protection, the Academy of Science and the APB, all active in peatland restoration.

In the presentation the **opportunities** for rewetting of peatlands were summarised as follows:

There is capacity and need for restoration.

- 400 000 ha of degraded peatlands which can be rewetted
    - Drained forested peatlands (forest melioration) - 24 000 ha
    - Peat extraction sites – 290 000 ha
    - Peatlands drained for agriculture – 86 000 ha
- 300 000 ha – natural peatlands with affected hydrological regime

Political environment established – several national strategies specifically include peatland restoration

- e.g. National strategy for sustainable development
- e.g. National program on measures on decreasing GHG emissions and other strategies and programs

Legislative base for restoration developed and in place (from January 1st 2009)

- Procedure for selection sites for rewetting
- Procedure for ecological rehabilitation (rewetting) of degraded peatlands

Good experience in practical work (UNDP-GEF Peatlands project)

- Engineering and project development
- Construction
- Restoration in progress or completed on 10 sites

During the discussion the members of the workgroup ask themselves:

Why is it not happening?

For peat extraction sites legislation is in place (from 1.1.2009) for the rewetting after completion of works. But for earlier extracted and abandoned sites no mechanism for allocation of state funds for their restoration is available.

For ineffectively drained agricultural lands there is no mechanism to ensure restoration when they are transferred from agricultural land to reserve land category. The mechanism for transfer of agricultural lands into any other land category (where rewetting is possible) is complicated. Even for areas which are abandoned. Land users (e.g. foresters) do not have the understanding and the capacity to implement rewetting. But, with the new law, they have the capacity and can ensure state funding on the maintenance of rewetting infrastructure.

What is needed?

- inventory of forest drainage systems (old peat extraction sites afterwards transferred to the authority of ministry for forestry)
- inventory of agricultural drainage systems on peat lands
- the inventory of peat extraction sites
- inventory of natural peatlands (mires)

Based on the results of the inventory, include recommendations on the use of degraded peatlands into

- Plans for regional development (agricultural lands)
- And forest management plans (forsted lands)

Run awareness raising campaign about significance of peatlands and the need to rewetting for sustainable development of the country –on local, national authorities and civil society.

Develop practical recommendations on implementation of rewetting with the use of different technological schemes, adapting existing best practice to Belarus condition. Develop and adopt a mechanism for estimating and taking ecosystem services into account during land use planning. Start the process of selling carbon credits from rewetted peatlands.

Increase the area of peatlands under legal protection (e.g. to 50% of natural peatlands). Develop methodology for assessing GHG emissions and sinks from degraded rewetted and natural peatlands.

Create capacity in country for scientific supervision of sustainable use of peatlands

Run pilot “full cycle” (with restoration and sale of carbon) projects in Belarus to demonstrate the possibility and create “case studies”.

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ANNEX

Annex I: Current ownership of peatlands

	Ministry for agriculture	Ministry for forestry	Beltopgaz
Peatlands drainage for agriculture (ha)	**963 000**	**17 000**	-
Extracted peatlands	**122 200**	**103 000**	-
Peatlands drainage for forestry	-	**280 000**	-
Natural peatlands	-	**1 000 000?**	-
Peatlands under peat extraction	-	-	**36800**
Total area			**36800**

Annex II: Current situation of peatlands

	Total area	Degraded peatlands	Under restoration
Peatlands drainage for agriculture (ha)	980 000	251 300	-
Extracted peatlands	255 600	225 200	27 000
Peatlands drainage for forestry	280 000	24 000	2 000
Natural peatlands	1 434 000	300 000 ?	12 000
Peatlands under peat extraction	36800		
All peatlands	2 986 400	?	

Inventory Overview of Status of Peatlands in Russian Federation (European part)

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Data preparation, maps and figures by Ivan Uvarov

Project Coordinator Alexander Mischenko

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CONTENT

FIGURES

EXECUTIVE SUMMARY

General information

The European part of Russian Federation makes is the most populated and land changed part of the country. It has an area of 3.477 million square kilometres or about 20% of the Russia. Population is about 79.5 million people (1.1.2007) or about 56% of whole. Mean population density in the European part of Russia is over 25 persons per square kilometre or twice as much compared with the country as a whole (9 persons per square kilometre). The Urals are usually considered separately from the European part of Russia.

From administrative point of view there are 43 subject of Russian Federation in the European part of Russia, which belongs to 4 Federal Administrative Districts – Central, North-West, South, and Povolzsky.

State administration and land ownership

Peatlands in Russia are traditionally related to different land categories with different legislation status, management and ownership. Peatlands and paludified lands with shallow peat could be within forest (71.9% –01.01.200), agricultural (14.2%), industrial lands (0.3%), within settlements (0.3%), water fund (9.6%), state reserve lands (11.4%), and in specially protected nature areas (1.6%) – SPNAs. State Forest Fund, Water Fund, State Reserve lands and Federal SPNAs belongs to the Russian Federation and governed by different authorities. According to the last Forest Code federal state forest lands are managed by subjects of Russian Federation. Lands of the regional SPNAs belong to them as well. State Reserve lands are under management of regional and local administration.

Industrial lands, as example peat excavation areas, could have different ownership. In many cases they are rented by the companies from the state and thus for this period moved from the other land categories like forest, state reserve or others.

Lands of the settlements are managed by municipal administrations. Agricultural lands were mostly privatized after 1990s and now belong to different owners: companies, farmers etc.

Belonging to different land categories peatlands could have additional state servitudes which significantly modifies their use and managements.

But state administration in Russia in relation to peatlands is not yet fixed. The recently adopted federal acts (Water Code, Forest Code and Land Code) and the other new legislation have resulted in a significantly changed legislation related to peatlands. The new Water Code

of the Russian Federation (2006) regards mires as a special water objects. The Code contains a section concerned exclusively with peatland conservation. Changes concerning peatlands have been traced in the Forest, Land, Town Planning Codes etc. Of particular concern is the division of responsibilities regarding peatland development and conservation planning between federal, provincial and local levels. Within this context there is a strong need to sustain the developed framework provided by the Russian Action Plan for Peatlands (2002) and to increase the capacity for integrated management with the emphasis on promoting and supporting inter-sectoral cooperation and coordination.

Peatlands distribution and diversity

According to State Land Cadastre (Peatlands of Russia …, 2001) mires cover over 8% of the country's area and, together with paludified lands with shallow (<0.3 m) peat, they make up about 370 millions ha or over 20% of the country (Vompersky et al. 1999). Russian standards named peatland areas with peat cover which exceed 30 cm depth. Areas with shallow peat cover belong to paludified shallow-peat lands or forests if the last are treated by forestry and forested areas. Separation between European and Asian parts in Russia is not usually used for statistics, and general data on the peatland area of the European part of Russia at the moment is not available.

Mire distribution is distinctly connected with bioclimatic zones and subzones. Optimum conditions for paludification are reached when there is equilibrium between conditions suitable for high production on one hand (high humidity and temperature), and low destruction on the other (high humidity, but low temperature). This situation is typical for Russia's boreal zone, where, in some regions, mires cover over 50% of the land surface. All possible combinations of geomorphologic, climatic, and paleogeorgaphic factors across the territory of Russia, the world's largest country, result in great variation of mire types.

A national policy for peatland inventory in Russia was created just after the Revolution. The Russian government established the State Peat Committee as early as spring 1918; peatland inventory was launched in Russia; and field surveys of peat deposits in the central part of Russia were carried out. A special decree "On peatlands" (1922) and thus promoted the development of standardized peatlands inventory and monitoring across the country. Since 1940, the peatlands depositary was developing, and in 1980 it was integrated into the geological depositary. Presently, the peat depository is an unique database covering a great majority of peatlands. It includes mire mapping, characteristics of peat deposits, and sketches on their vegetation and hydrology. Regular inventories and publications based on standardized national surveys offered broad possibilities for peatlands studies.

Additionally to geological peatland inventory each sector of economy and related branch of science interested in peatlands, developed each own system of collecting, storing and presenting data on peatlands distribution and diversity. Soil and forest survey have different approach to map peat and shallow-peat areas. Some of this data is integrated in GIS "Peatlands of Russia" developed in the Institute of Forest Science Russian Academy of Sciences (Vompersky et al., 2005).

Russia presents all diversity of peatlands types, characteristic for nature bioclimatic zones from Arctic to subtropics, including semideserts. All possible combinations of geomorphologic, climatic, and paleogeorgaphic factors across the territory of Russia, the world's largest country, result in a great diversity of mire types.

By the same reason as for peatland area the general statistics on peatland diversity is available only for the whole area of the country or for the administrative regions which boundaries do not clearly agree with the geographical divide between European and Asian parts of the country In general over 20% of Russian peatlands are permafrost (polygonal and palsa) – one of the most vulnerable unique peatland types (Vompersky et al., 2005). Oligotrophic (mainly raised bogs), mesotrophic mires, and eutrophic swamps and fens spread over 19, 30 and 18% of the total area of the country's peatlands, respectively. About 13% of Russian peat area is made up ridge-hollow and ridge-pool complexes mostly related to the Asian part of the counry especially to West Siberia. Vulnerable to modern climate change and human impacts forest-steppe and steppe zone peatlands of the southern border of their distribution are found in the European part of Russia. Being not large in size they maintain very significant natural functions, but not enough spotlighted in nature conservation and scientific studies. Large river floodplains often present valley fen and swamps. Natural peatlands in large river valleys remained only in less accessible places – mainly in deltas. In valleys of middle and small rivers most all peatlands except forested mainly black-alder swamps are long time in use and has been nearly totally destroyed.

Mire distribution in European part of Russia is distinctly connected with bioclimatic zonation. From tundra regions, to the southern limit of the taiga, the following mires types give way to each other sequentially: polygonal, palsa, ribbed fens (aapa), and raised bogs. Herbaceous and herbaceous-moss fens occur in all zones and regions. From the north to the south, they differ in their community structure, species composition, and syntaxonomical composition. In boreal and nemoral regions, forest swamps are distributed. In each bioclimatic zone, not one, but rather several, of the aforementioned regional mire types is found, and their distribution ranges are overlapping.

Situation of Peatlands

Peat extraction. In Russian Federation peat is considered as a common mineral resource managed by the authorities of subjects of Federation. Management of peat resources including extraction and conservation is decentralized and depends on the socio-economic demands of the certain areas.

In Soviet period due to centralized planning peat extraction was concentrated in the regions with significant peat resources. Nowadays the peat extraction is ongoing in the areas with existing economic demand. Due to the high transportation prices peat is extracted in the most of cases for local needs: for fuel, agriculture uses (fertilizers, growing media) or chemical processing. In some specific regions with close access to cheap transportation or directly to customer the peat extraction covers external needs (e.g. North-West regions of Russia: Leningrad, Pskov, Novgorod, Kaliningrad oblast). In case of raise of external demands on raw peat or its derivates the peat extraction could become very intensive and causes problems. The total area of mined-out peat deposits over the entire period of exploitation in Russia is estimated to range from 850,000 to 1,500,000 ha. According to the Land Cadastre, the total area of mined-out peatlands in 2000 measured a little over 240,000 ha. The rest of the lands were recultivated and transferred to other land categories (Peatlands of Russia… 2001). According the All-Russian geological depositary data, not covering all extractive activities, the area of extracted peatlands in European part of Russia in 2007 was estimated as 230,850 ha and under development – 529,400 ha.

Drainage of peatlands for agriculture use is traditional for all countries. Mainly those activities are concentrated in fen peatlands in river valleys. Peatlands which were the most suitable for agriculture development were already converted more than 100 years ago and are under traditional use. In Soviet times due to the directives calling for extension of agriculture lands (especially in the forest zone) the vast areas of peatlands were drained for agriculture needs. By the same reason extracted peatlands were also often converted to arable lands.

By 1967, the area of mires in Russia (both Asian and European part) that were drained for agriculture was estimated as 1,600,000 ha, although it reached 5,100,000 ha by 1990 (Peatlands of Russia… 2001).

Peatlands drained for agriculture need permanent investments for their maintenance, especially those with polder systems as in Kalinigrad and other regions. After the political changes followed by the economic transformations the large amount of those agriculture lands on former peatlands became abandoned. They are growing up by shrub and forest vegetation; often get in fire, and in some case the secondary paludification takes place. The agriculture use of large part of those lands has no economic or other rational background. But

some of them could still play some socio-economic role. From the environment security and socio-economic point there is necessary to restore sustainable agriculture activities on such lands – preferably for haying or pasturing. The intensive shrubbery invasion and even formation of tree stands are causing obstacles for such development.

Drainage of peatlands for forestry. Russia has long traditions in peatland forestry. Taking in account the high part of paludified forests in the significant part of Russia, drainage for forestry is mostly cost-effective and have rationale background. In the XIX century and till the 20-th of XX century the most of forest drainage projects had real economic and scientific background and there were a lot of examples of developed high productive forest stands in such areas. In 60-80th the forest drainage had become industrial and got wrong direction. As a result – forest drainage was concentrated in certain regions and most of projects were not effective from economic view and damaging from ecological view.

According to the latest inventory (1999–2000), only about 3 million ha of drained forests were registered in the European part of Russia. In the European part of Russia secondary paludification covers over 750 th ha.

Most of forest lands were not treated adequately after drainage and no required measures (improvement felling, ditch cleaning, etc.) were further applied. The considerable part of drained forest lands are affected by secondary paludification nowadays which is additionally strongly supported by extremely growth of beaver population in many regions of European part of Russia. However on some part of drained forest sites rather productive tree stands was formed and now there are coming to rotation period. A range of forestry, hydrological and ecological questions need to be solved and management and technological decisions need to be worked out and applied.

Indirect Use. One of the primary current threats to mires is related to construction and infrastructure development, including those for oil and gas industry. Especially peatlands become the obstacle for infrastructure development in the high paludified regions. Oil production may cause pollution of the mire surface. Peatland fires are a natural phenomenon in the boreal zone, including Russia, but the main reason for them in modern conditions is managerial faults and could be considered as consequence of indirect use. In many regions close to big cities and settlements natural mires are quickly disappearing being destroyed and build up for different purposes for state, municipal or business projects. Potential economic effect of these projects overcome expenses related to reclamation of such grounds and peatlands are quickly replaced by dumps, industrial buildings, cottages etc. During last two decades most of river valley peatlands near Moscow, Saint-Petersburg and other cities got lost forever. Status as agricultural lands makes them rather vulnerable to transformation to other

land categories and further utilization. Protection of river valley peatlands still left in these regions and which are extremely valuable for water protection and regulation, biodiversity conservation and education is one of the urgent problems in peatland protection nowadays in Russia. The mires in adjacent regions, considered as untouched, are affected by human activity via air pollution and other indirect influences.

Protection of Mires and Peatlands

Mires and peatlands in most regions are not considered as valuable object needed special protection. Mires were protected indirectly, either as parts of specially protected areas or within the framework of the general regulation of nature use (see Peatlands of Russia …, 2001). In Russia, the number of SPNA and the total territory they protect grown steadily in recent years, and now cover over 3% of the country's total area. In the European Russia alone, zapovedniks and national parks include approximately 700,000 ha of mires. Many mires are protected in: Nizhnesvirsky Zapovednik (41%) in Leningrad Oblast (province); Kerzhensky Zapovednik (36%) in Nizhny Novgorod Oblast; Darvinsky Zapovednik (23%) in Yaroslavl Oblast; and in Vodlozersky National Park (42%) on the border of Karelia and the Archangelsk Oblast. The largest intact raised bog massifs in northwestern Russia Polisto-Lovat mire system (96,000 ha) is protected within the two neighboring nature reserves: Polistovsky Zapovednik (mires cover 71% of its area) in Pskov Oblast and Rdeysky Zapovednik (mires cover 92% of its area) in Novgorod Oblast. Although there are no Ramsar sites that were established exclusively for mire protection, over 9% of the existing wetlands of international importance in Russian Federation (or 950,000 ha) are covered with mires (Wetlands in Russia … 1999). According to Russian legislation, lands within the aforementioned SPNA types of federal or regional importance and areas of limited land use (green belts of cities, etc.) are categorized within the Land Code as "nature conservation lands". The area of peatlands within this land category in the European part of Russia according All-Russian geological depositary is estimated as 4,200,000 ha.

The legal base regarding mires has gradually been brought to rights. It previously had a lot of contradictions and discrepancies which reflected the traditional sectoral approach to mires and their resources (Peatlands of Russia … 2001). According to current legislation, mires are water bodies with resultant consequences, such as the establishment of protective shoreline bands and water protection zones. Forests that grow on mires are regulated by the forest legislation, while peat extraction is regulated by legislation on the earth's interior. Furthermore, many federal legal acts on land, nature conservation, etc. also directly affect mires.

With its traditional sectoral economic and scientific attitudes regarding mires, Russia needs an integrated approach to, and broad inter-sectoral collaboration in, planning mire

conservation and wise use. An important step towards in this direction was made through the adoption of the inter-sectoral framework document, "Action Plan for Peatland Conservation and Wise Use in Russia." This document was developed as part of the implementation of decisions of the Ramsar Convention at the national level regarding the wise use of peatlands (Resolution VIII.17). To fulfill some of the major activity directions, which were adopted, a long-term project on peatland conservation was launched within the framework of the Wetlands International – Russia Programme (http://www.peatlands.ru)

Effectiveness of Protection

Mires are actively protected in administration regions where they cover large areas, play major roles in the social and economic life, and are often important research subjects. These regions are northwestern European Russia (Botch & Smagin 1993), Western Siberia, and the Russian Far East. The portion of protected mires is small in regions where mires naturally cover only small areas which also have been reduced due to human impacts. This applies to central European Russia, including Moscow Oblast; most steppe and forest steppe regions of southern European Russia, the upland and mountainous regions of the Caucasus.

The diversity of protected peatlands types and the coverage of the peatlands typical for all variety of landscape types and climate zones in protected areas are not relevant.

The high priority measures for the direct protection of specific peatlands are: at their distribution ranges (the Arctic, steppe and forest-steppe zones) in the conditions of climate change and human pressure; typical and representative peatland in the regions of their regular distribution and all remain peatlands in the urban and economically developed regions.

The actions needed to initiate conservative measures are following: the inventory of status of peatlands in listed regions/landscape types; the threat analyses; direct list of peatlands to be protected; public awareness including work with administration; development of local and federal legislation to ensure protection of peatlands of certain type.

The restoration activities related to protected peatlands should be aimed following objects:

Drained and extracted peatlands within existing protected areas,

Abandoned drained and extracted peatlands in urban areas

Abandoned extracted peatlands bordering with the natural peatland landscapes which could be considered as source of potential fires, dusty storms and suitable habitats for primary introduction of the invasive species

Technical and political perspectives for rewetting

After the peat production declined in the early 1990s, many half-depleted peatlands were abandoned. These are the most fire hazardous sites concentrated in certain regions, which is a matter of prime concern. One way of solving the problem would be an uplift of peat industry and reintroduction of the standardized process flow from extraction to recultivation, but shifting priority to secondary paludification. Since 2003 the peat production in certain regions started to grow. Preliminary evaluation of the area of extracted peatlands and peatlands under development as for 2007 in different regions demonstrate concentration of those sites in the densely settled areas and tendency to growth of the areas of peatlands under development. The main motivation behind peatland restoration in Russia is fire control, while nature and recreational importance of peatlands might only be mentioned as an additional argument.

Governmental or other initiatives for rewetting of peatlands

The recultivation procedures of extracted peatland is an obligatory part of the project documentation for peatland development and areas of reclaimed lands are reported back to the national statistics on the industrial lands turnover. According to standards reflected in engineering-technological schemes and state standards (State standard of the USSR, 1983), cutover peat deposits should been recultivated and prepared for afteruse in agriculture, forestry, individual gardening, fish farms etc. or for secondary paludification (since 1998). But because of subjective politically driven reasons priority was given to the expansion of agricultural lands as demonstrated for Moscow region. Secondary paludification started to be applied in 1998 after adoption of related instruction "The instruction for reclamation of peatlands after peat extraction" (endorsed 31.03.1998 г. Ministry of Natural Resources, RF).

Periodic "spontaneous" financing of rewetting in some territories of drained peatlands takes place at the regional level. For example, after strong peat fires in the abnormally dry 2002, resulted in ignition of settlements, farmlands and cars, several subjects of Federation had funded from the regional budget rewetting activities in the extracted peatlands. The peat industry enterprises also undertake restoration measures to decrease peat fires in the owned areas.

The successful restoration projects undertaken in the Meschera National Park in Vladimir region. The Meschera example could be considered as successful due to the unique form of land management in national parks in Russian Federation. The lands are under use of different stakeholders, but managed by National Park administration.

Purposeful activity on restoration of reclaimed peatlands takes place in Taldom district of the Moscow region since 2000 under the initiative of Taldom Administration of Specially

Protected Nature Areas ("Crane Motherland"). The set of successful restoration projects in agricultural lands are implemented till now. The forest drainage systems manipulation lead to forests degradation and results should be considered by special study.

In some areas of other subjects of the Russian Federation (Moscow, Ryazan and Vladimir regions) blocking of drainage ditches on the drained peatlands by dams is made by local societies of hunters and fishers, under their own initiative. The main purposes of this activity are:

The NGO projects have been implemented in different regions of the European Russia mainly with financial support of foreign nature protection foundations. The results of these projects were different by gave valuable experience in peat restoration activities both for NGOs, local communities and stakeholders. They included blocking of ditches both in forest (Novgorod, Taldom) drainage ditches as well as rewetting of the extracted peatlands (Nizhny Novgorod).

Lessons learned. The project implementation analyses demonstrates, that there is urgent need of development regular procedures for extracted peatlands rewetting integrated with legislation, land use management and development plans.

The most irregular and "illegal" activities are undertaken by local stakeholders' voluntary associations and NGOs. The small projects funded by voluntary investments or foreign funds have no capacity to develop project documentation, undertake EIA or technical expertise, provide monitoring and maintenance of the constructed facilities. Among NGO projects there are ecologically unsound and legally disputed examples of dam construction on drained forest lands.

The projects undertaken by peat industry enterprises sound as the most perspective. Anyway in this case the state has to act not only as supervisor for regulations implementation, but also to develop the economical incentives for peat industry.

The problem requires much more attention from all stakeholders, from the federal government to private businesses. Moreover, there is a need of restoration and conservation of lowland floodplain peatlands in industrial regions, where they have been disappearing under industrial and residential buildings.

Future action plans of government or others are reflected in the following initiatives:

Russian Peatland Action Plan refers to the needs of peatlands restoration;the special study demonstrate the readiness of population for realizing of peatland restoration projects; on the local level the increase of the activity is expected on rewetting of drained peatlands with the purpose of prevention of fires and improvement of habitats for game birds and a fish; the

possible incentives for peatlands rewetting based on the international obligations to UNFCCC should be build upon the increase of Federal responsibility.

The further actions to be undertaken on national level to promote and implement peatland restoration:

- The analysis of legislation background for peatlands inventory and restoration in Russian Federation.
- The inventory of degraded peatlands in the European Russia.
- The development of the economic incentives for peatland restoration for administration and private sector.
- To avoid involvement of extracted drained peatlands in biofuel production.
- Raising awareness on peatlands restoration.
- Development of the methodological background for peatland restoration.
- Stimulation of environment consultancy involvement in peatland restoration.

GENERAL INFORMATION

The European part of Russian Federation makes is the most populated and land changed part of the country. It has an area of 3.477 million square kilometres or about 20% of the Russia. Population is about 79.5 million people (1.1.2007) or about 56% of whole. Mean population density in the European part of Russia is over 25 persons per square kilometre or twice as much compared with the country as a whole (9 persons per square kilometre). The Urals are usually considered separately from the European part of Russia.

Fig. 1: European part of Russian Federation.

From administrative point of view there are 43 subject of Russian Federation (Territories or krais, Regions or oblast and Autonomous areas or okrugs) in the European part of Russia, which belongs to 4 Federal Administrative Districts – Central, North-West, South, and Povolzsky.

STATE ADMINISTRATION AND LAND OWNERSHIP

Peatlands in Russia are traditionally related to different land categories with different legislation status, management and ownership. Peatlands and paludified lands with shallow peat could be within forest, agricultural, industrial lands, within settlements, water fund, state reserve lands, and in specially protected nature areas – SPNAs (Figure 2.1.). State Forest Fund, Water Fund, State Reserve lands and Federal SPNAs belongs to the Russian Federation and

governed by different authorities. According to the last Forest Code federal state forest lands are managed by subjects of Russian Federation. Lands of the regional SPNAs belong to them as well. State Reserve lands are under management of regional and local administration.

Industrial lands, as example peat excavation areas, could have different ownership. In many cases they are rented by the companies from the state and thus for this period moved from the other land categories like forest, state reserve or others.

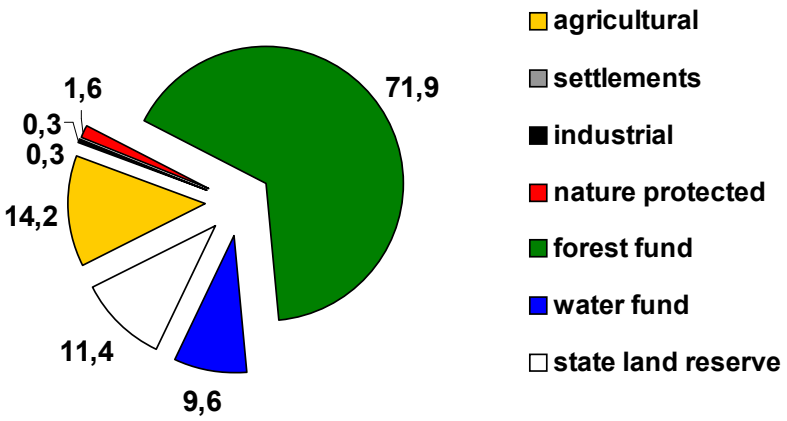

Fig. 2: Relation of peatlands in Russia to different land categories (State Land Cadastre, 01.01.2000), % (Peatlands of Russia …, 2001).

Lands of the settlements are managed by municipal administrations. Agricultural lands were mostly privatized after 1990s and now belong to different owners: companies, farmers etc.

Belonging to different land categories peatlands could have additional state servitudes which significantly modifies their use and managements.

But state administration in Russia in relation to peatlands is not yet fixed. The recently adopted federal acts (Water Code, Forest Code and Land Code) and the other new legislation have resulted in a significantly changed legislation related to peatlands. The new Water Code of the Russian Federation (2006) regards mires as a special water objects. The Code contains a section concerned exclusively with peatland conservation. Changes concerning peatlands have been traced in the Forest, Land, Town Planning Codes etc. Of particular concern is the division of responsibilities regarding peatland development and conservation planning between federal, provincial and local levels. Within this context there is a strong need to sustain the developed framework provided by the Russian Action Plan for Peatlands (2002) and to increase the capacity for integrated management with the emphasis on promoting and supporting intersectoral cooperation and coordination.

PEATLANDS DISTRIBUTION AND DIVERSITY

According to State Land Cadastre (Peatlands of Russia …, 2001) mires cover over 8% of the country's area and, together with paludified lands with shallow (<0.3 m) peat, they make up about 370 millions ha or over 20% of the country (Vompersky et al. 1999). Russian standards named peatland areas with peat cover which exceed 30 cm depth. Areas with shallow peat cover belong to paludified shallow-peat lands or forests if the last are treated by forestry and forested areas. Separation between European and Asian parts in Russia is not usually used for statistics, and general data on the peatland area of the European part of Russia at the moment is not available.

Mire distribution is distinctly connected with bioclimatic zones and subzones. Optimum conditions for paludification are reached when there is equilibrium between conditions suitable for high production on one hand (high humidity and temperature), and low destruction on the other (high humidity, but low temperature). This situation is typical for Russia's boreal zone, where, in some regions, mires cover over 50% of the land surface (Figure 3.1). All possible combinations of geomorphologic, climatic, and paleogeorgaphic factors across the territory of Russia, the world's largest country, result in great variation of mire types.

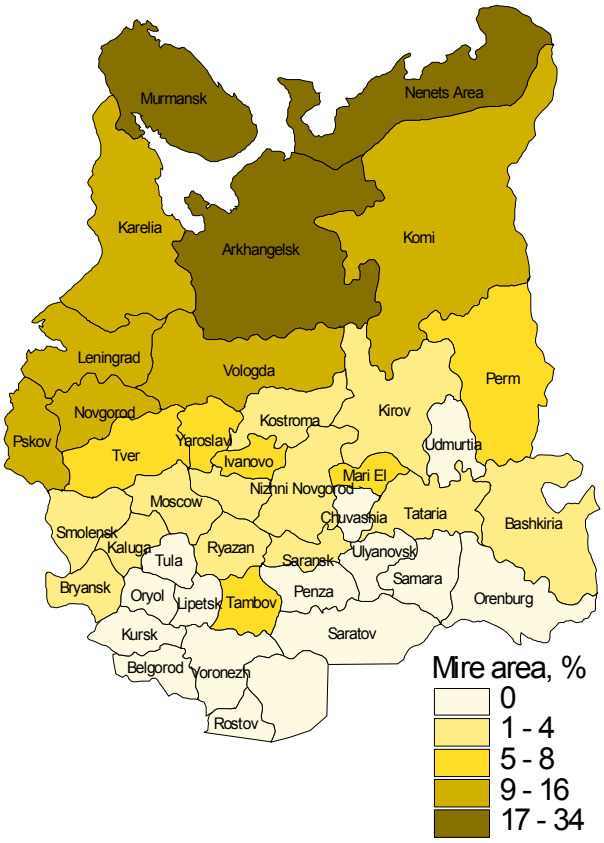

Fig. 3: Peatland area within administrative regions of the European part of Russia (© Project on peatland conservation in Russia).

A national policy for peatland inventory in Russia was created just after the Revolution. The Russian government established the State Peat Committee as early as spring 1918; peatland inventory was launched in Russia; and field surveys of peat deposits in the central part of Russia were carried out. A special decree “On peatlands” (1922) and thus promoted the development of standardized peatlands inventory and monitoring across the country. Since 1940, the peatlands depositary was developing, and in 1980 it was integrated into the geological depositary. Presently, the peat depository is an unique database covering a great majority of peatlands. It includes mire mapping, characteristics of peat deposits, and sketches on their vegetation and hydrology. Regular inventories and publications based on standardized national surveys offered broad possibilities for peatlands studies.

Additionally to geological peatland inventory each sector of economy and related branch of science interested in peatlands, developed each own system of collecting, storing and presenting data on peatlands distribution and diversity. Soil and forest survey have different approach to map peat and shallow-peat areas. Some of this data is integrated in GIS "Peatlands of Russia" developed in the Institute of Forest Science Russian Academy of Sciences (Vompersky et al., 2005).

Russia presents all diversity of peatlands types, characteristic for nature bioclimatic zones from Arctic to subtropics, including semideserts. All possible combinations of

geomorphologic, climatic, and paleogeorgaphic factors across the territory of Russia, the world's largest country, result in a great diversity of mire types (Figure 3.2).

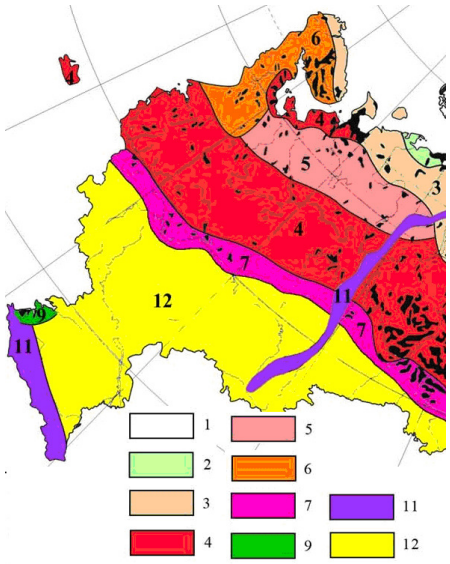

Fig. 4: Mire Distribution in European part of Russia (after Yurkovskaya, 2005).

Legend: 1 – herbaceous-moss fens; 2 – polygonal mires and herbaceous-moss fens; 3 – palsa mires with participation of ribbed fens and unpatterned fens; raised bogs (4), with participation (5), prevailing (6) of ribbed fens and fens (7); 9 – reed fens; 11 – mires in highlands; 12 – occasional presence of mires.

By the same reason as for peatland area the general statistics on peatland diversity is available only for the whole area of the country or for the administrative regions which boundaries do not clearly agree with the geographical divide between European and Asian parts of the country In general over 20% of Russian peatlands are permafrost (polygonal and palsa) – one of the most vulnerable unique peatland types (Vompersky et al., 2005). Oligotrophic (mainly raised bogs), mesotrophic mires, and eutrophic swamps and fens spread over 19, 30 and 18% of the total area of the country's peatlands, respectively. About 13% of Russian peat area is made up ridge-hollow and ridge-pool complexes mostly related to the Asian part of the counry especially to West Siberia. Vulnerable to modern climate change and human impacts forest-steppe and steppe zone peatlands of the southern border of their distribution are found in the European part of Russia. Being not large in size they maintain very significant natural functions, but not enough spotlighted in nature conservation and scientific studies. Large river floodplains often present valley fen and swamps. Natural peatlands in large river valleys remained only in less accessible places – mainly in deltas. In valleys of middle and small rivers most all peatlands except forested mainly black-alder swamps are long time in use and has been nearly totally destroyed.

Mire distribution in European part of Russia is distinctly connected with bioclimatic zonation

(Figure 3.3). From tundra regions, to the southern limit of the taiga, the following mires types give way to each other sequentially: polygonal, palsa, ribbed fens (aapa), and raised bogs. Herbaceous and herbaceous-moss fens occur in all zones and regions. From the north to the south, they differ in their community structure, species composition, and syntaxonomical composition. In boreal and nemoral regions, forest swamps are distributed. In each bioclimatic zone, not one, but rather several, of the aforementioned regional mire types is found, and their distribution ranges are overlapping.

SITUATION OF PEATLANDS

Utilisation and current degradation status of peatlands

Traditionally in Russia mires are, on one hand, a source of various resources (peat, timber, medicinal plants, wild berries, mushrooms, etc.) and an important, though sometimes ambiguous, regulator of natural processes (river runoff, ground waters, microclimate, etc.). On the other hand, they limit tree growth, impede agricultural development in the area, and obstruct the establishment of transportation and other infrastructure. The history of man-mire interactions in Russia can be seen in the current status of mires across the country's vast territory. Let us trace how these interactions have changed throughout the country's history to the present.

Harvesting Biological Resources

Mires have always been used locally for their biological resources (berries, mushrooms, game species, medicinal plants, raw materials), with varying intensity, depending on the region and time. Cartularies from the fourteenth century show that sphagnum mosses were used in construction, as cattle bedding and even fodder. They also offer evidence that bog berries played a significant role in the monastic diet. Special sociological studies showed that people still regard mires as sources of vital biological resources. Picking cranberries, hunting moorfowl, and collecting moss for construction purposes remain essential parts of village lifestyles, even in industrially developed regions. In many highly paludified northern and eastern regions, humans are even more closely connected to mires. Mires cover parts of indigenous peoples' tribal lands. There, they practice traditional nature use, which is sometimes very intensive.

The potential of biological resources is often immense. Annual production of sphagnum may reach 20–30 centers/hectare. Berry yields may reach 300 kilograms/hectare for cloudberries, 1,000 kilograms/hectare for cranberries, up to 1,200 kilograms/hectare for blueberries, and up to 1,500 kilograms/ha for red lingberries (Peatlands of Russia … 2001).

Difficult economic conditions in Russia during the last two decades have resulted in enormous pressure by berry pickers, especially near small towns in provinces where unemployment is quite high. Often, berry picking on mires is a very important, if not only, income of entire families. Consumer demand for medicinal plants has grown in recent years. The overuse of mire vegetative resources is becoming a problem in some cases.

Mires have long been regarded as special hunting grounds. Many game species are characteristic for mires in the forest zone: the capercaillie, black grouse, and willow grouse, some species of ducks, geese, and waders. Mires serve as a seasonal foraging base for mammals, especially ungulates, bears, and hares. Other species permanently settle in mire habitats, such as the beaver, two species of mink, and the otter. Often, mires, as less frequented areas, become refuges for animals (including game species) that move there from neighboring areas, which are intensively used by man. For example, mires and old peat extraction sites are actively colonized by typical meadow species, such as the grey partridge, quake, and corncrake. The fowl are followed by hunters, which cannot but cause concern. However, it is only in Siberia that hunting on mires has a large-scale character. Various traps and other hunting methods are used there, including shooting from helicopters. As a result, the local indigenous population, together with workers from oil and gas fields and inhabitants of industrial towns, pose a certain threat to species diversity on mires.

Peat Extraction

The practice of cutting peat for fuel has long been known, but it increases significantly in critical economic situations, when the country is oriented on local fuel types. Based on his experience in Holland, Peter the Great organized the first peat-burning factory in southern Russia, which was fixed in his decree from 1697. In 1766, I.G. Leman published recommendations for using peat as fuel. The first scientific study on peat in Russia was conducted by Mikhail Lomonosov (1784), who described the macrofossil structure of peat and its characteristics as a fuel. N.P. Sokolov (1798) developed the first detailed scheme of mire. During the same period, peat was already used as a fertilizer and a growing medium (Fomin 1790). In the early nineteenth century, peat was widely used as a fuel, especially on railways, and as a soil improver.

During the civil war of 1917–1923, and during the period of foreign intervention against the young Soviet state, peat became a strategic fuel for the country, as access to coal and oil fields was closed. Peat fuel was a key starting point for the ambitious project to electrify Soviet Russia, which was developed by Vladimir Lenin. It was the only opportunity to promote the country's rapid development during those unstable times. Peat extraction steadily increased since that time until the mid 1980s, when it reached 140 million tons per year. Peat winning

methods have gradually changed: manual and partly mechanical peat-cut gave way to hydro peat production and, later, to milled one. In addition to the industrial peat winning for fuel and further processing, large-scale extraction for fertilizing was maintained by agricultural enterprises. They usually worked small fens often located in river valleys.

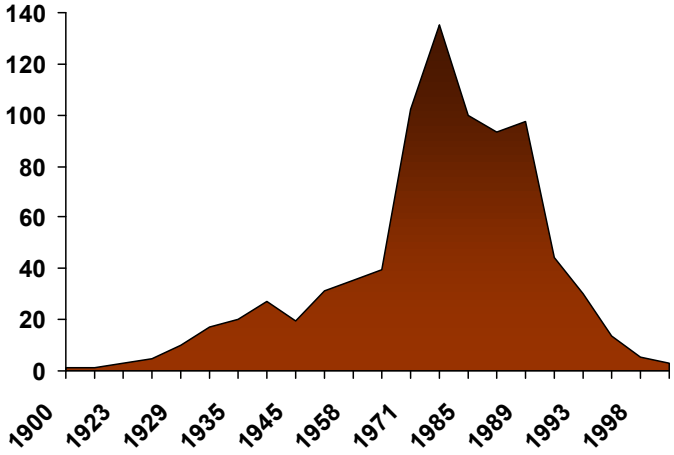

Fig. 5: Dynamics of Peat extraction in Russia, million tonnes (Peatlands of Russia …, 2001).

The increase in peat extraction promoted the development of the peat industry and studies on peat resources, structure, and deposits. Since the 1960s, research on, and inventory of, peat deposits became a part of the geological branch. This helped to standardize the collection, analysis, and storage of data on the exploration, mapping, and investigation of peat deposits; it also made the data more easily available for users and publications (see Minayeva & Sirin, 2005).

The total area of mined-out peat deposits over the entire period of exploitation in Russia is estimated to range from 850,000 to 1,500,000 ha. According to the Land Cadastre, the total area of mined-out peatlands in 2000 measured a little over 240,000 ha. The rest of the lands were recultivated and transferred to other land categories (Peatlands of Russia… 2001).

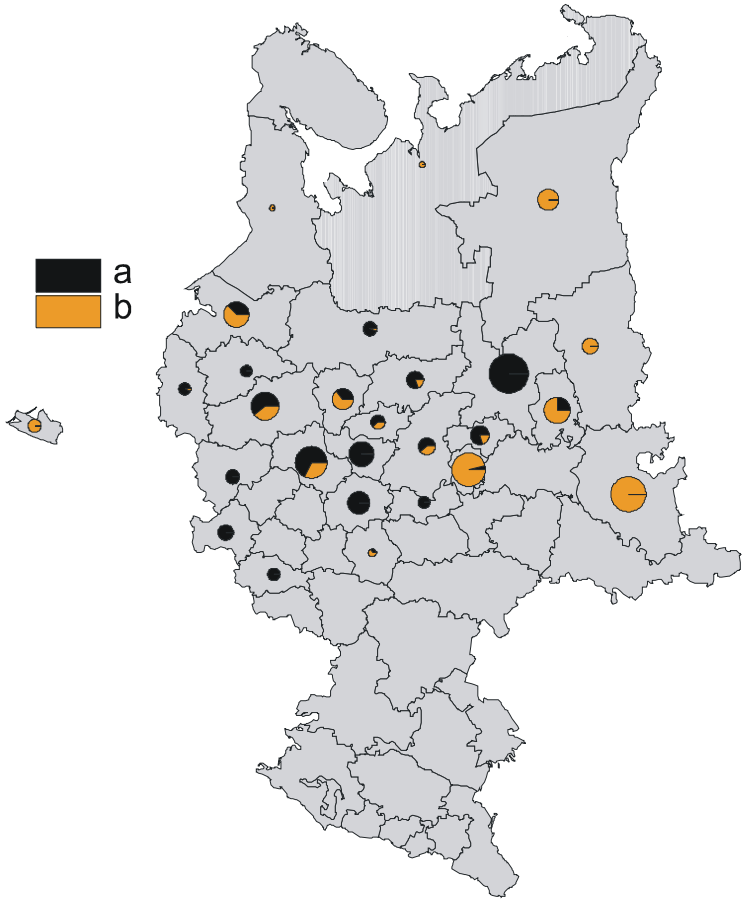

Fig. 6: Peat Extraction in European Russia for: a – energy, b – agriculture and horticulture (Peatlands of Russia …, 2001).

Mined-out stretches of peatland deposits were to be recultivated for further agricultural use, afforestation, establishment of fishing ponds, or simply watering. However, the then existing political stance towards the expansion of agricultural lands led to the dominance of this recultivation direction, which was often unreasonable from an economic and ecological points of view. At the same time, watering of worked-out peat deposits leads to the gradual, but slow, restoration of wetlands. Economic changes during the 1990s brought about a crisis in the peat industry. As a result, large areas of partly worked-out and non-recultivated peatlands were transferred to the so-called reserve lands, and thus became a constant source of potential fires.

In recent years, the attention to peat extraction has begun to increase again. In addition to the constant interest in peat as a fertilizer and raw material for further processing, there is a rapidly growing demand for peat as a fuel, primarily for local needs. Using peat for heating purposes has a number of positive ecological arguments in modern Russia. First of all, peat can be used instead of brown coal; the latter being is definitely a non-renewable fuel source, and much more harmful as far as air pollution is concerned. Secondly, in most cases, building

up industrial peat extraction for fuel does not mean exploration of new peat deposits, and a renewal of work on abandoned peat plants would certainly decrease the danger of peatland fires.

Peatland Drainage and Use for Agriculture

Using peatlands as agricultural lands is typical for the central and southern regions of European Russia, southern Siberia, and the Russian Far East. Floodplain grass and black-alder mires and peatlands in forest steppe/steppe hollows and valleys have mostly been destructed or transformed. The process of agricultural development of peatlands began in the late eighteenth century. Peat as a fertilizer was first mentioned in a Russian text in 1790. In the late nineteenth century, several plants, which manufactured peat bedding and fertilizers, were built in the Moscow Province. However, despite the considerable total volumes of annual peat production on the national scale, peat cut for agricultural purposes was, and has remained, a local-scale occupation, with simple equipment and low production rates.

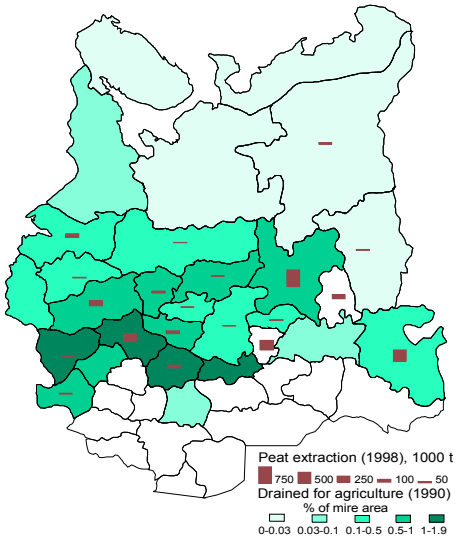

Fig. 7: Drainage of peatlands for Agriculture and peat extraction for Agriculture and Horticulture in European part of Russia, mln tonnes (Peatlands of Russia …, 2001).

Large-scale mire improvement to establish arable lands and hayfields began in the 1880s–1890s, under the authority of two well-known national expeditions. The western expedition was headed by General I.I. Zhilinsky and the northern one by I.K. Avgustinovich. After the expeditions were closed, provincial departments of agriculture and state assets carried out their tasks. All in all, by 1917 amelioration work had been carried out on at least 3,000,000 ha of mires, the large part of which was meant for agricultural use.

Agricultural use of peatlands had a considerable positive impact on the development of peat science. Databases grew, research institutes were established, and journals were published. For the first thirty years, the inventory of peat resources in Soviet Russia was carried out by agricultural institutions.

Drained stretches on large peatlands were used as hayfields, pastures, and arable lands. In the 1970s, peatlands were used for small garden plots. This process was large scale in some regions, especially those close to large cities in European Russia (Figure 4.3). Fully or partially worked-out small peatlands were often used for this purpose. The floodplain mires, which were most valuable as far as their hydrology and biological diversity, were concerned, sustained great damage during that period.

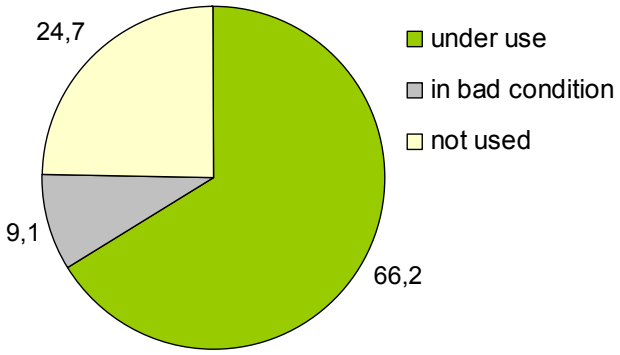

Fig. 8: Modern condition of lands (peat covered, paludified shallow-peat and mineral water-logged together) drained for Agriculture, % (Peatlands of Russia…., 2001).

By 1967, the area of mires in Russia that were drained for agriculture measured 1,600,000 ha, although it reached 5,100,000 ha by 1990 (Peatlands of Russia… 2001). Currently, most of them are inefficiently used or abandoned (Figure 4.4). In contrast to drained for forestry, secondary paludification seldom occurs there. The drained peat bed undergoes mineralization and combusts sporadically.

Peatland Drainage and Use for Forestry

Drainage for forestry is concentrated mainly in north-western and central European Russia; in the eastern Polessye at the border with Ukraine and Byelarus; in Karelia; and, to a lesser extent, in the Volga region and Cisuralia. Forest drainage has also been carried out in south-western Siberia.

Drainage for forestry was first mentioned in official documents in 1820, in the report of landowner Ivan Piskarev to the "Forestry Promotion Society". That report stated that near St. Petersburg, Piskarev had drained around 340 ha of peatland covered by dwarf pine and birch trees. More than 65 kilometers of shallow ditches were cut, which resulted in the rapid height increment of trees by more than threefold. In 1844, the first documentation of a mire drainage

project was prepared; the project was implemented on an area about 2,200 ha, also near St. Petersburg. In 1853, the government endorsed the practice of draining forested peatlands.

In the late nineteenth century, forests were actively drained together with agricultural lands and during road construction during the two aforementioned expeditions. The expeditions were conducted over a period of more than 20 years and covered the majority of the European part of Russia. Among other lands, drainage activity included 615 thousands ha of forested peatlands. The income from forest melioration was estimated to be 1.06 million rubles. It was decided to develop further this activity. As a result, before World War I, over 850,000 ha was drained for forestry: Fifty thousand ha had been drained before 1870, while 800,000 ha had been drained during the period, 1870–1915 (Konstantinov 1999 – see Peatlands of Russia …, 2001).

The next period is characterized by the rapid development of the forest melioration theory. A number of background investigations and practical recommendations were developed (Dubah 1945). Numerous scientific studies were carried out in connection to forest drainage and focusing on biological background (Vompersky 1968), hydrology, changes in biodiversity, and primary production, etc. The discussion on the influence of forest drainage on the mire regulation functions was resulted in a number of publications and in 1980th it was resumed that the drainage has positive impact on the catchment hydrology (see Peatlands of Russia …, 2001).

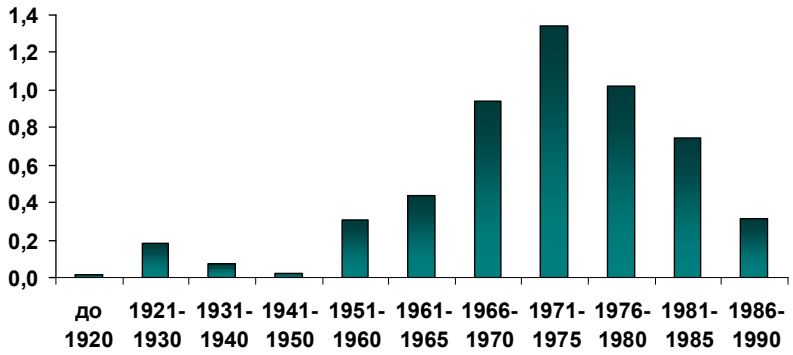

Fig. 9: Forest drainage in Russia, million ha (Peatlands of Russia …, 2001).

Forest drainage work was at its peak during the period 1966–1990. The area of drained forests exceeded 4 million ha mainly in northwestern, western, and central European Russia. It was achieved through establishing special ameliorative plants that were economically interested in increasing work loads and decreasing expenses, including transportation costs. This did not promote selective drainage and resulted in concentrations of drained mires in distinct areas, often accompanied by a low efficiency of forestry. In general, however, this work helped to improve the forest management of the territories, to increase fire protection (due to the

fragmentation of the area and building fire protection ponds), and to increase the accessibility of the territories for vehicles.

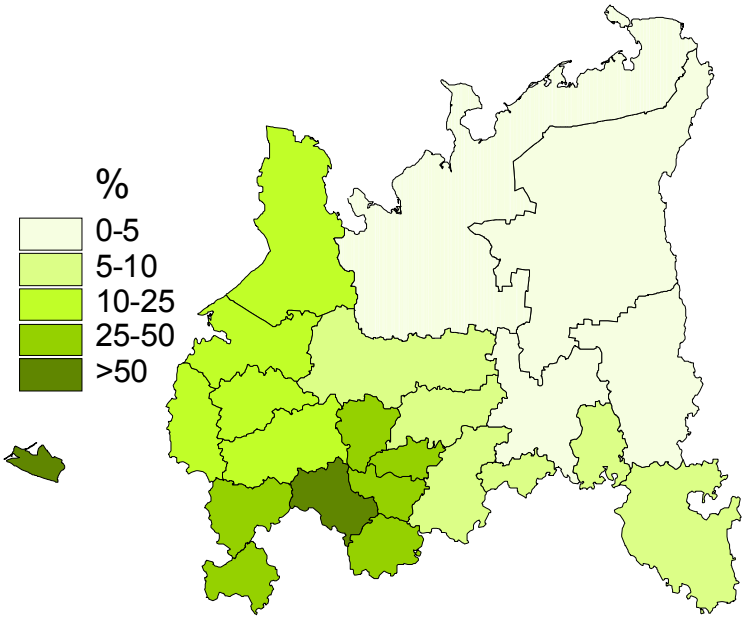

Fig. 10 Drained part of peatlands and paludified lands recommended for forest drainage within State Forest Fund (Peatlands of Russia …, 2001).

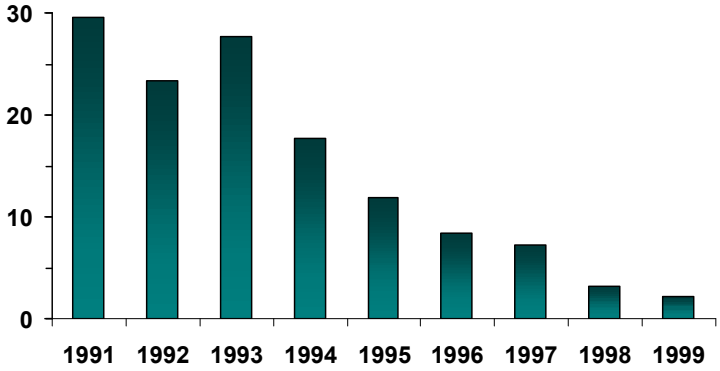

Fig. 11: Rebuilding of forest drainage network in Russia, th ha (Peatlands of Russia …, 2001).

Unfortunately, at many reclaimed sites, no necessary forest-management activities were carried out, and therefore no economic effects were received. Drainage networks gradually deteriorated without maintenance work. This outcome was also promoted by the economic changes during the 1990s. According to the latest inventory (1999–2000), only about 3 million ha of drained forests were registered in the European part of Russia. In the European part of Russia secondary paludification covers over 750 th ha. Most of the drained areas have undergone secondary paludification, often with the active assistance of beavers, the population of which has grown rapidly in recent years. This may even be positive from an

ecological point of view; however, some drained forest areas, especially those with ripe spruce that have already begun to fall down, require the implementation of urgent forest-management measures.´

Indirect Use

When mires are all around, one has to explore, use, and transform them in order to eke out some living space. In highly paludified regions, most human impacts on mires can be attributed to so-called indirect use. An example of this use is the construction of transportation and other industrial infrastructure. In Russia, it is difficult (and in many regions impossible) to find a road that does not cross a mire. Standards imply building spillway facilities, but they do not support the natural flow of mire water, and an artificial concentration of it in the upper water by digging drains usually does not meet with the approval of engineering and environmental agencies. As a result, stretches of flooded and disturbed mires can be seen along most roads in Russia's forest zone. Drained stretches on the other side of roads are often less evident, but also present.

Similar impacts are caused by oil and gas pipelines that are laid not only in producing, but in other regions of the country. Unfortunately, the impacts of the oil and gas complex on mire ecosystems are not restricted to this and have many other manifestations. During the construction of drilling rigs, the mire surface is damaged physically and can hardly be recultivated. Adjacent sites degrade and lose their productivity and natural functions.

Oil production may cause pollution of the mire surface. Drilling oil wells usually involves the preservation of wastes in slime chambers, which are vessels of natural ground and plastic. If broken, they become massive sources of surface pollution by oil and related substances. Another pollution type results from spills of underground water rich in mineral salts that destroy all vegetation cover and promote the rapid degradation of the peat bed. Oil spills from broken pipelines are another pollution source. In addition to impact pollution, there is also carpet pollution that is spread by surface runoff or falling precipitation. This may lead to a change in the trophic level of the mire, mineralization of peat, degradation of vegetation communities, and a decrease in the biological diversity (see Minayeva & Sirin, 2005).

Unlike some European countries, Russia does not widely develop and build up mires for national and municipal needs; this can be explained by the lower consumer value of paludified lands and by the presence of fewer land owners. These lands are often owned by the state and are therefore easier to alienate. However, in densely populated regions close to large cities, mires are more often build up, and their territories are converted to damping sites for solid municipal wastes and wastewater.

Incorrect mire use planning can have serious ecological consequences. Economic changes have a negative effect as well. In the early 1990s, large areas of partly worked-out and non-recultivated peatlands were abandoned in Russia. Many peatlands reclaimed for agriculture were no longer used. These lands became regular sources of fire danger. In recent years, methods of secondary watering of peat deposits have been actively applied to abandoned lands in order to trigger natural paludification.

However, the systemic and normative base of this work has not yet been developed. Watering is carried out, with varying success, by stakeholder institutions that use their own techniques and do not have any projects. Fire prevention is the greatest stimulus for their work. However, fires can also affect natural mires, due to the high visitor load during berry picking and hunting seasons. Peatland fires are a natural phenomenon in the boreal zone, including Russia, but the main reason for them in modern conditions is managerial faults.

Many mires in Russia remain nearly unaffected by economic activities. Such mires can be observed in Siberia, in the Russian Far East, and even in the European part of the country. Vast areas of mire ecosystems are not used directly. Some of them are protected. Nevertheless, many mires in those regions have be affected by human activity – via air pollution and other indirect influences.

PROTECTION OF MIRES AND PEATLANDS

In Russia, mires and paludified lands were rarely mentioned as individual objects for conservation before the 1960s. With few exceptions (Dokturovski 1925, Katz 1928), the issue of mire conservation was not even raised in mire science literature. At the same time, authors often cited mire's negative functions and advocated the necessity of large-scale mire reclamation and transformation (Olenin & Markov 1983). Mires were protected indirectly, either as parts of specially protected areas or within the framework of the general regulation of nature use (see Peatlands of Russia …, 2001).

Specially Protected Nature Areas (SPNA)

Due to the vastness of Russia's territory, the landscape approach has always dominated nature conservation planning (Borodin 1913), and is reflected in historic conservation forms such as sacred grounds (groves), hunting reserves (menageries, etc.), as well as in current SPNA types, such as strict nature reserves (zapovedniks), national parks, and nature monuments. Mires and paludified lands were topologically included in these specially protected areas. Interestingly, one third of the Belovezhskaya Pushcha Nature Reserve, which was established in the thirteenth century by Prince Vladimir of Volyn, is covered by mires.

Scientific foundations of territorial conservation of mire ecosystems began to develop in the 1970s and 1980s. Criteria for identifying mires for conservation were developed (Tanovitsky 1980), including those based on analyses of threats and positive functions (Botch & Masing 1979). Principles of complex resource utilization (Peatland resources…1989) were applied, including through prospective planning of the use and restoration of resources within every sector of economy (Kuzmin 1993), as well as by means of spatial planning (Minayeva 1996). Masing (1979) regarded mires as habitats of rare species, while Antipin & Tokarev (1991) presented the case for establishing specially protected mire areas (see Peatlands of Russia …, 2001).

Generally, territorial nature conservation in Russia implies establishing certain SPNA types listed in the Federal Law on Specially Protected Areas and in regional legislative acts that exist in some administrative regions of the Russian Federation. The Russian SPNA types partly correspond to IUCN classifications: zapovedniks are equivalent to the IUCN category Ia; national parks fall into the IUCN category II; biosphere reserves and landscape zakazniks are equivalent to IUCN category V, etc.

In Russia, the number of SPNA and the total territory they protect grown steadily in recent years, and now cover over 3% of the country's total area. Mire ecosystems have been protected within their boundaries, as have other landscape types (Minayeva & Sirin 2000). In European Russia alone, zapovedniks and national parks include approximately 700,000 ha of mires, while federal SPNA in Siberia comprise as much as 3.5 million ha of mires.

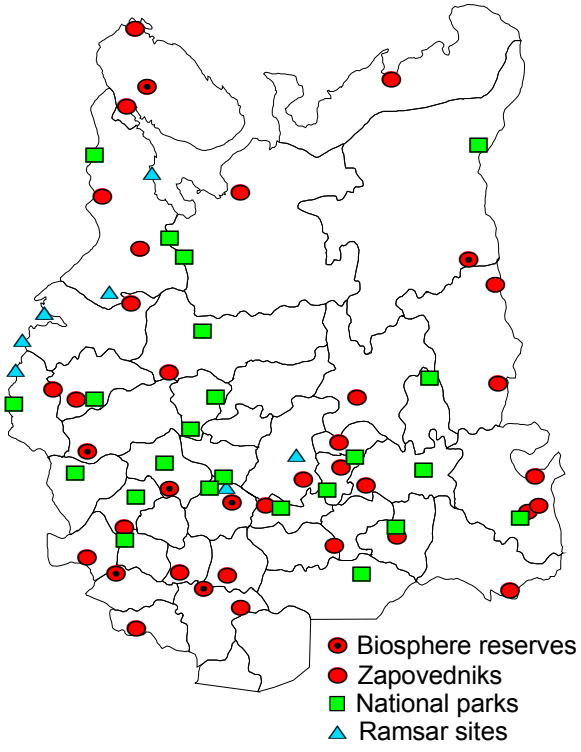

Fig. 12: Specially Protected Nature Areas (SPNA) with peatlands (© Project on peatland conservation in Russia)

Many mires are protected in: Nizhnesvirsky Zapovednik (41%) in Leningrad Oblast (province); Kerzhensky Zapovednik (36%) in Nizhny Novgorod Oblast; Darvinsky Zapovednik (23%) in Yaroslavl Oblast; and in Vodlozersky National Park (42%) on the border of Karelia and the Archangelsk Oblast. However, these SPNA's were not exclusively established for mire conservation. At the same time, a number of nature reserves were established primarily for the conservation of mire ecosystems and corresponding plant and animal species.

To protect one of the largest intact raised bog massifs in northwestern Russia, two neighboring nature reserves were established in Polisto-Lovat mire system: Polistovsky Zapovednik (mires cover 71% of its area) in Pskov Oblast and Rdeysky Zapovednik (mires cover 92% of its area) in Novgorod Oblast.

A similar situation can be observed at sites having international protection status. Of the 35 Ramsar sites designated in Russia, none were established for the protection of mire ecosystems only (Wetlands in Russia … 1999). Although, considering the special importance of these ecosystems for Russia, a shadow list of important peatlands was compiled (Wetlands in Russia … 2000 a). The list was coordinated on the regional administration level, which demonstrates the special position mires have in conservation planning in Russia's administrative regions. The fact that, although there are no Ramsar sites that were established exclusively for mire protection, over 9% of the existing wetlands of international importance (or 950,000 ha) are covered with mires and waterlogged lands (Wetlands in Russia … 1999), offers evidence of mires' great importance. The large portion of peatlands presents in the Ramsar "Shadow List" of Russian Federation (Wetlands in Russia … 2000b).

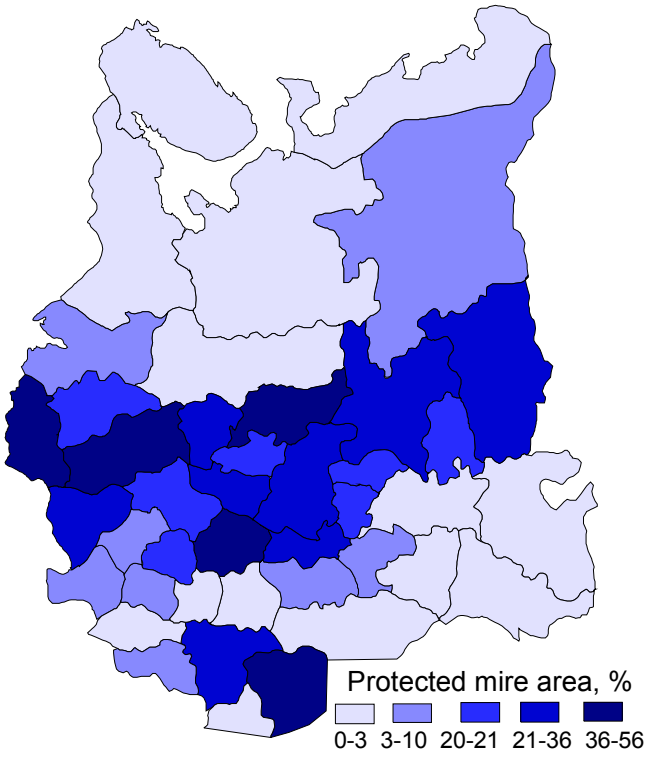

Fig. 13: Protected by SPNA mire area (right) in European part of Russia (© Project on peatland conservation in Russia)

A certain portion of mires and waterlogged lands is protected within SPNA's of local importance: nature parks, zakazniks, and nature monuments. Many mires in various administrative regions of the Russian Federation have nature monument status. There is no special SPNA category for mire protection at the federal level, but in the 1980s, the administrations of some regions in European Russia introduced the "protected natural mire" SPNA type in order to implement sectoral resource conservation programs. The protected natural mires remained open for land use, but were excluded from timber felling and peat extraction for certain periods, according to business orders issued by the enterprises. However, this category did not receive further legal support. Many mires and waterlogged lands are located within game reserves (zakazniks). Their borders may be changed depending on the reproduction needs of the local game fauna. Game reserves regimes imply habitat conservation and therefore positively affect the status of the mires.

According to Russian legislation, lands within the aforementioned SPNA types of federal or regional importance and areas of limited land use (green belts of cities, etc.) are categorized within the Land Code as "nature conservation lands". The diagram shows proportions of nature conservation lands occupied by mires in different administrative regions of the country.

Mires are actively protected in administration regions where they cover large areas, play major roles in the social and economic life, and are often important research subjects. The latter promotes a further growth of (already relatively high) awareness of the local population, authorities, and other stakeholders regarding peatland management and conservation. These regions are northwestern European Russia (Botch & Smagin 1993), Western Siberia, and the Russian Far East.

At the same time, proportions of protected mires are modest in regions where mires naturally cover only small areas and have further contracted due to human impacts. This applies to central European Russia, including Moscow Oblast; most steppe and forest steppe regions of southern European Russia, the upland and mountainous regions of the Caucasus.

There is a certain subjectivism in the selection of mire ecosystems for conservation purposes. Traditionally, the greatest selection preference has been given to watershed raised bogs; spatial analyses of the inclusion of various mire types in SPNA's, which were carried out in European Russia offer evidence of this (Minayeva 1996, Preobrazhensky 2001). This can be attributed primarily to the long-standing delusion – and not only in Russia – about the especially important hydrological role of raised bogs, as riverheads etc. Scientific research has already proven the falseness of this selective assessment, but it remains deeply seated in the public consciousness. At the same time, fens (including floodplain mires) are still considered wastelands, regardless of their environmental role in regulating river discharge and protecting it from pollution, as well as of their importance in supporting floral and faunal biodiversity (see Peatlands of Russia …, 2001).

The "inequality" of different mire types in terms of their conservation can also be explained by their being belonging to different categories and having different statuses. The overwhelming majority of raised bogs are located on state-owned forest lands, which can be alienated or transferred to different land categories (e.g. those that allow more intensive use) only after numerous conditions, including ecological ones, are met. On the other hand, many fens, including floodplain mires, belong to agricultural lands that can be used or built upon with much fewer limitations. As a result, the very few floodplain mires remaining in natural condition have decreased and continue to decrease due to the construction of private homes and maintaining and other buildings. The possible way to overcome those contradictions is to integrate mire conservation concept into a perspective spatial land use planning process (Minayeva 2004).

Land Use Regulation

Foundations for regulating mire use were established in Russian practice from times

immemorial. The protection of certain mire types was facilitated through traditionally quite strict nature management regulations that existed in pre-revolutionary Russia and in the Soviet Union, and which exist now. Back in the eleventh century, Yaroslav the Wise, the Grand Prince of Kiev, enacted the protection of forests and habitats of game animals, which are often associated with mires. Peter I issued royal enactments to establish water protection zones along rivers and floodplain conservation (Grave 1993, Reimers & Shtilmark 1978).

As it did in previous periods of history, national legislation is improving control over mire use, as well as providing for their conservation of mires within specially protected areas. Priorities in the field of mire conservation are gradually changing for the better, although perhaps too slowly. The legal base regarding mires has gradually been brought to rights. It previously had a lot of contradictions and discrepancies which reflected the traditional sectoral approach to mires and their resources (Peatlands of Russia … 2001). According to current legislation, mires are water bodies with resultant consequences, such as the establishment of protective shoreline bands and water protection zones. Forests that grow on mires are regulated by the forest legislation, while peat extraction is regulated by legislation on the earth's interior. Furthermore, many federal legal acts on land, nature conservation, etc. also directly affect mires.

In the Soviet period, legal discrepancies concerning mires were partially leveled by the dominating state ownership of natural resources and lands. Nowadays, such legal discrepancies impede the regulation of economic relations on some mires, including their protection, and generate variant readings and errors in legal practice. For example, because of varying interpretations of water legislation, certain types of mires are not regarded as water bodies. In some areas of Western Siberia, all watershed mires are considered water bodies, while "sogra" mires (forest fens having high species diversity and unquestionable importance for water protection and regulation) are not. "Sogra" mires, therefore, lack the economic regulations provided by the water legislation. There is hope, however, that these discrepancies and errors will be gradually eliminated.

Despite the traditional presence in Russia of different sectoral views on mires, all of them accepted, to one extent or another, took into account the necessity of using mires wisely, including mire conservation. Since the 1960s, the intensive utilization of natural resources associated with mire ecosystems and the general national support of the wise use ideology have promoted work to provide for the restoration of mire resources (Pyavchenko 1985b, Peatland resources … 1989) as well as the importance of conservation of mire ecosystem diversity (Nitsenko 1962, Botch & Nitsenko 1971).

Since the 1970s, all legal acts and programs on mire improvement have examined approaches for the wise use of peatland resources. The Torfgeologia Industrial Geological Association,

which is in charge of exploration for peat resources, assessed the conservation importance of peat deposits in European Russia (Kuzmin 1993). Botanical studies were carried out by the mire science section of the Botanical Society and by the Telma Group. By identifying mires for protection, the State Forest Service pursued a pragmatic purpose: to exclude low productive plantations from the total felling area. However, it is precisely these plantations that comprise the foundation of the modern network of protected mires.

With its traditional sectoral economic and scientific attitudes regarding mires, Russia needs an integrated approach to, and broad inter-sectoral collaboration in, planning mire conservation and wise use. An important step towards in this direction was made through the adoption of the inter-sectoral framework document, "Action Plan for Peatland Conservation and Wise Use in Russia." This document was developed as part of the implementation of decisions of the Ramsar Convention at the national level regarding the wise use of peatlands (Resolution VIII.17). To fulfill some of the major activity directions, which were adopted, a long-term project on peatland conservation was launched within the framework of the Wetlands International – Russia Programme. This project includes issues of national policy and legislation; international cooperation; methodic and informational support of mire conservation and wise use; information exchange; awareness raising; model field projects based on innovative and methodic studies; resolving 'burning' issues, etc. (http://www.peatlands.ru).

EFFECTIVENESS OF PROTECTION

Nevertheless that very few Special Protected Nature Areas have been developed for the specific goal of peatland conservation, the total acreage of protected peatlands is relatively large. At the same time the diversity of protected peatlands types and the coverage of the peatlands typical for all variety of landscape types and climate zones in protected areas are not relevant.

The high priority measures for the direct protection of specific peatlands are: at their distribution ranges (the Arctic, steppe and forest-steppe zones) in the conditions of climate change and human pressure; typical and representative peatland in the regions of their regular distribution and all remaining peatlands in the urban and economically developed regions

Protection of those listed peatlands does not need significant changes in land use but will have really strong effect on the overall environment.

The Arctic peatlands mainly should be protected from the surface disturbance to prevent permafrost melting, which is expected to have catastrophic consequences of local, regional

and global scale. This needs some simple legal measures. But to persuade authorities to undertake those measures we need clear description of the processes which are going on after peat disturbance, as well as good inventory of peatland distribution and habitat inventory, to estimate the consequences for biodiversity. For example it was demonstrated that flooding of interlake depressions in Yakutia leads to losses of the nesting habitats of Siberian crane and hence decrease in nesting pares numerousity.

The steppe, forest steppe and urban peatlands are the last remaining patches that do not cover significant areas and do not define economy of the region. They could be excluded without any serious socio-economic consequences from use if it is done in a proper way. But this should be political decision. Nowadays peatlands still are used for very local needs with benefit to narrow range of people and could be covered from other sources. But only in case there is clear political will to protect peatlands. As we had found out it is extremely low public awareness and insufficient knowledge on peatlands in southern regions of Russia and in administrations of the regions around large megapolises (especially Moscow). Authorities very often have strong negative attitude to those ecosystems, while land is so expensive, that peatland conversion to the lands for construction takes place very fast. At the same time, the total exclusion of those peatlands from use will bring significant conservation result, especially as habitats, stepping stones and migrating routs.

The peatlands, representing the regions of their regular distribution (temperate forest zone etc.) could be lost very easily. The cause is that they are too usual and hence nobody evaluates them very high. And step by step we can result in Finnish situation. There is plenty of peatlands in Finland but no one is in natural status. That is why the preventive measures of protection can help much to conserve them in advance. It is necessary to make inventory of peatlands under protection and change if all types are covered.

The actions needed to initiate conservative measures are following: the inventory of status of peatlands in listed regions/landscape types; the threat analyses; direct list of peatlands to be protected; public awareness including work with administration; development of local and federal legislation to ensure protection of peatlands of certain type.

The restoration activities related to protected peatlands should be aimed following objects:

Drained and extracted peatlands within existing protected areas,

Abandoned drained and extracted peatlands in urban areas with further protection

Abandoned extracted peatlands bordering with the natural peatland landscapes which could be considered as source of potential fires, dusty storms and suitable habitats for primary introduction of the invasive species

TECHNICAL AND POLITICAL PERSPECTIVES FOR REWETTING

Background for peatland restoration

Specific features of peatland restoration in Russia are directly connected with their use. The proportion of peatland area under different direct use in Russia does not deviate much from general trends observed in the boreal zone. Most peatlands were drained for agriculture, less for forestry, and the smallest part for peat extraction.

A distinction of Russia's peatlands drained for agriculture and forestry is considerable areas of inefficiently used or unused mires. Some of them are at various stages of secondary paludification. These resulted from mistakes in choosing objects and drainage methods, lack of maintenance of drainage networks, and a general social and economic decline of agriculture and forestry in some regions with extensive managed peatlands. Restoration of these lands is so far irrelevant, with a few exceptional reasons, such as fire control, incorporation into specially protected area etc.

The need to restore peatlands is mostly connected with peat extraction. There is no general restoration strategy for cutover peatlands in Russia, which is probably connected with undervaluation of the area of such lands and subsequent threats. Estimates of cutover peatland could differ by orders. In Soviet times, depleted peat deposits were recultivated and allotted to other land uses (agricultural, forests, reserve, human settlements, industry, water fund), which makes it difficult to trace the history of a site. It is also difficult to count small peat extraction sites used by local companies predominantly for agricultural purposes.

Anyway, even preliminary evaluation of the area of extracted peatlands and peatlands under development as for 2007 demonstrate concentration of those sites in the densely settled areas and tendency to growth of the areas of peatlands under development.

After the peat production declined in the early 1990s, many half-depleted peatlands were abandoned. These are the most fire hazardous sites concentrated in certain regions, which is a matter of prime concern. Since 2003 the peat production in certain regions start to grow. One way of solving the problem would be an uplift of peat industry and reintroduction of the standardized process flow from extraction to recultivation, but shifting priority to secondary paludification. The main motivation behind peatland restoration in Russia is fire control, while nature and recreational importance of peatlands might only be mentioned as an additional argument.

GOVERNMENTAL AND OTHER INITIATIVES FOR REWETTING OF PEATLANDS

Restoration standards reflected in engineering-technological schemes in the USSR and today

Before 1950s and 1960s, most peat was won by open-pit operation (excavation, hydropeat etc.), without extensive disturbances of peatlands and considerable alterations of their hydrology. Currently, most of these areas are at various stages of natural rehabilitation, in most cases already forming seminatural mire communities. In the latest decades, peat has been only extracted as a milled one, with severe changes of local hydrology. The milled peat workings are considered as industrial lands and should be reclaimed after use according the land use legislation. According to standards reflected in engineering-technological schemes and state standards (State standard of the USSR, 1983), cutover peat deposits should been recultivated and prepared for afteruse in agriculture, forestry, individual gardening, fish farms etc. or for secondary paludification (since 1998). But because of subjective politically driven reasons priority was given to the expansion of agricultural lands as demonstrated for Moscow region. Secondary paludification started to be applied in 1998 after adoption of related instruction "The instruction for reclamation of peatlands after peat extraction" (endorsed 31.03.1998 г. Ministry of Natural Resources, RF).

The recultivation procedures of extracted peatland are an obligatory part of the project documentation for peatland development and areas of reclaimed lands are reported back to the national statistics on the industrial lands turnover (Figure 5.4).

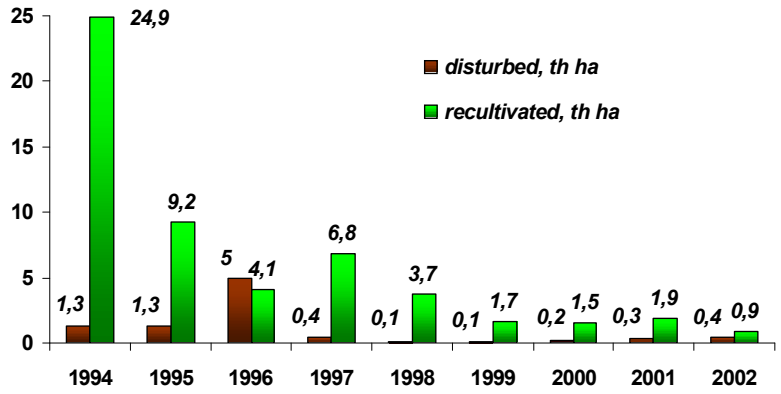

Fig. 14: Dynamics in peatland preparation for extraction (new sites) and recultivation of excavated lands in Russia during transition period based on the national Land statistics (©Project on peatland conservation in Russia)

Fig. 15: Rehabilitation of mire vegetation after rewetting (left) and restored (right) industrial peat excavated area (Photo V. Panov (left) and A. Sirin (right))

Rewetting activities undertaken by regional governments and peat enterprises

Periodic "spontaneous" financing of rewetting in some territories of drained peatlands takes place at the regional level. For example, after strong peat fires in the abnormally dry 2002, resulted in ignition of settlements, farmlands and cars, several subjects of Federation had funded from the regional budget rewetting activities in the extracted peatlands.

On the means of the government of the Yaroslavl region, has been rewetted about 15,000 ha of the partly extracted peatlands. The government of the Moscow region in 2002 had been planned to rewet 12,000 ha the most fire-dangerous sites of the drained peatlands in the east districts of the region, but only part of this territory have been rewetted till now. Activity in this direction does not bear character of planned rewetting, restoration and sustainable management of the drained peatlands. It is directed on the reduction of risk of peat fire occurrence.

The peat industry enterprises are also interested to decrease peat fires in their areas. The eldest peat enterprise in the Moscow region – "Shaturatorf" had realized the project on the spatial planning of the areas of extracted peatlands and peatlands under development (Gurko, 2005). The planning had aimed to decrease the threat of fires by alternation of the narrow fields of peat extraction with fish ponds and rewetted areas.

Kostromaregiontorf had introduced the methodology of phased rewetting of peat fields while their extraction within the same industrial area what also results in the alteration of the relatively small patches of peat fields on different stages of development and recultivation.

Project on peatlands restoration in Meschera National Park – example of cooperation of Federal SPNA and stakeholders

The case study for peatlands rewetting in the Meschera National Park in Vladimir oblast demonstrates the example of cooperation for extracted peatlands management of the Special Protected area of the Federal level with Federal forest authorities, regional and local administration and NGO. The project included several phases.

Preliminary Evaluation (2001-2002) has been funded within Wetlands International Russia Programme project "Conservation and wise use of wetlands – Global Programme" within The Netherlands DGIS Global Peatland Initiative Grant. The specialists on peatlands drainage engineering from the All-Russian Peat Institute have been contracted to prepare estimation and work plan for peatland restoration project in Meschera Park. The National Park and regional administration have been involved in the discussion of main project activities. The workshop was held with regional administration to estimate the urgent needs in peatlands management. The All-Russian Peat Institute had carried out together with local stakeholders study to assess needed funds to implement the project of peatlands restoration and management improvement. The detailed report (40 pages) has been prepared.

The next phase has been funded within the Wetlands International project 2003/019 Conserving Peatlands of Central Russia: the wise use approach to peatlands ecosystem management funded by The Dutch Ministry of Agriculture, Environment and Food Quality LNV (PIN MATRA). Project documentation has been developed and key specialist has been hired to deliver recommendations on the sites and projects implementation.

Fig. 16: Rewetted (left) and restored (right) sites in Meschera National Park (Photo A. Sirin)

Projects implementation has been undertaken in 2005-2008 funded from Federal, regional and local budget. The total area of 18,000 ha has been rewetted.

Currently the team formed on the previous phases of project implementation is involved in the monitoring activities.

The Meschera example could be considered as successful due to the unique form of land management in national parks in Russian Federation. The lands are under use of different stakeholders, but managed by National Park administration.

Projects on peatlands restoration in Taldom – example of cooperation of the regional SPNA and stakeholders

Purposeful activity on restoration of reclaimed peatlands takes place only in Taldom district of the Moscow region (see paragraph 5.3 below). Works in this direction are carried out since 2000 under the initiative of Taldom Administration of Specially Protected Nature Areas, which "core" was formed by the professional ecologists.

The regional specially protected area "Crane Land" located in Taldom District of the Moscow Region 120 km north from Moscow presented several projects aimed on peatland restoration:

- Rewetting of reclaimed flood-plain bogs used for agriculture;
- Rewetting of abandoned fields of peat extraction in the flood-plains of small rivers;
- Rewetting of fire-dangerous farmlands on the drained peatlands and fields of peat extraction;
- Rewetting of alder bogs in natural territories, partly disturbed by drainage.

Project summary

Executive organization: Taldom Administration of Specially Protected Nature Areas

Partnership: Wetlands International Russia Programme

Sponsorship organizations: Global Environment Facility Trust Fund, The Netherlands Ministry of Agriculture, Nature and Food Quality (in the frame of "Peatlands in Russia" of Wetlands International Russia Program) and Program "Ecology of the Moscow region" of the Moscow Regional Government.

Overall aim of the series of projects (specific aims of each project are specified below)

1. Reduction in threat of peat fires on the drained peatlands.

2. Restoration of important habitats for rare birds.
3. Elaboration of rewetting methods for peatlands with different degree of ecological disturbance, different drainage system and different economic use.
4. Education and vocational training of experts and local people.

Location: Moscow region, Dubnensky mire group, 120 km north of the Moscow city.

Peatland type: Eutrophic and mesotrophic peatlands affected by drainage and peat extraction.

Project background

Dubnensky peatland group is represented by eutrophic, mesotrophic and raised peatlands, is the largest in the north of the Moscow region. It is located in the basin of rivers Dubna and Khotcha, being inflows of Volga. The general area is more than 32,000 ha.

The Dubnenskaja lowland has been transformed in 1930th–1970th. Wide-scale drainage, cutting down of inundated woods, drainage of mires and peat extraction for needs of agriculture has been carried out.

Despite of the economic development, Dubnenskaja lowland plays an essential role in the preservation of biodiversity of the all Moscow region. Its territory is a unique complex of various type wetlands and habitats of rare species of plants, birds, mammal and insects. Here a system of 15 working and 5 perspective natural protected areas of regional value was created. A core of the complex of natural protected areas is the reserve "Crane Land" – a place of breeding and staging common cranes. All complex of mires and peatlands are included into the Ramsar Shadow List and the list of Russian Important Bird Areas. In the reserve "Crane Land" the state regional administration of natural protected areas was created.

Currently some areas of the Dubnenskaja lowland (not used for agriculture) are in different stages of natural forest rehabilitation and rewetting. But the main part of extracted peatlands, reclaimed mires and abandoned farmlands are dry and frequently covered with fires.

Local people are interested in rewetting and protection of drained mires, because resources of traditional wild foods (fish, berries and mushrooms) are very important for them. Also mires are used for bird watching. Active position of local people is directed on the conservation.

Series of projects on mires restoration and conservation are carried out by the Taldom Administration of Specially Protected Nature Areas during five years.

Projects description

Rewetting of reclaimed flood-plain bogs used for agriculture (August 2000 – July 2001)

Realization of the project was carried out in the pilot plot with area 27 ha. Rewetting was made by the blocking of all 12 drainage ditches with peat dams 4-5 m wide. Dams were erected with using of bulldozer. Sod revetment was done on the top of each dam, willow seedlings were planted on the edges for the reinforcement of sod.

Results

Five years' monitoring has shown success of the lead actions. The water level in the ditches during the summer period averages 0.7 m, and before dams – up to 1.3 m. The increase of breeding duck numbers was recorded, waders and predatory birds have appeared. The formed system of waters has involved beavers.

In 2005 in the lowered part of rewetting territories has been marked restoration of the marsh vegetation, representing by mosaic of Calamagrostis, Phragmites, Typha, Glyceria, Carex-Hypnum and other associations, conditioned by mosaic peat fires in years previous to the project realization.

Fig. 17: Earthen dam made in the ditch (photo Taldom Administration of Specially Protected Nature Areas)

Rewetting of abandoned fields of peat extraction in the flood-plains of small rivers (November 2000 – September 2001)

Realization of the project was carried out in the plot of eutrophic mires (85 ha) in the flood-plain of river Khotcha, reclaimed in 1950th. About 50% of this area is occupied by the fields of former peat extraction; 36 ha were destroyed by peat fire in May 2000, before project starting.

For the prevention of fires and degradation of ecosystem rewetting was made by the erecting of dams 5 m width and up to 10 m long. Each dam was constructed from two wooden barriers with earthen bank between them, making by bulldozer. Soil from the plot destroyed by fire was used for banks and willow seedlings were planted on the banks for the reinforcement of

the soil.

Results

Five years' monitoring has shown success of the lead actions. The water level in drainage ditches increased. There are active processes of bogging in spaces between parallel drainage ditches, where have appeared extensive reedy plots. Human disturbance of some vulnerable ground-breeding birds has decreased, which resulted in growth or stabilization of their numbers (ducks, harriers, Black-tailed Godwit, Curlew).

Rewetting of fire-dangerous farmlands on the drained peatlands and fields of peat extraction (February 2001 – February 2003)

For the project realization were chosen area with 1200 ha, difficult for rewetting. Only 40 ha of this area are occupied by the abandoned drained peatlands, all other territory is represented by farmlands on the drained former fields of peat extraction.

For the prevention of peat and forest fires, the special system of hydrological regulation was created in collaboration with the local community of hunters. More than 40 wooden gates were constructed with the purpose of closing pipes on drainage ditches, in the places where dams with pipes cross with the ditches. It was possible to block the pipe in full or in part, and also to remove the gates at all. It depends from a season and humidity. In dry fire-dangerous period the gates are fully closed. In wet period they are partly or fully opened, to avoid excessive wetting and soil degradation on farmlands.

Results

After the project realization, high level of water in drainage ditches was supported during all summer season. It enables to use fire-engines (pumps) productively at suppression of arising fires. Numbers of ducks breeding on the banks of the edges of ditches have increased.

Fig. 18: Pipe in the drainage ditch with partly opened wooden gate (photo Taldom Administration of Specially Protected Nature Areas)

Rewetting of alder bogs in natural territories, partly disturbed by drainage (April 2003 – December 2005)

During project realization 5 earthen dams and 2 abatises from fallen trees were constructed in the drainage ditches. These blocked flow of water with the total area 510 ha. All works were carried out manually, to not break vegetation. The total amount of soil and peat stacked in dams makes more than 120 m3.

55 geobotanical sample plots were established in this area, for the monitoring of plant succession in the conditions of rewetting of eutrophic bogs close to untouched.

Results

On the main part of alder bogs covered by the project (450 ha), rewetting with periodic floods was recorded and succession of vegetation is going to the characteristic plant association Carici elongatae Alnetum.

16 ha of adjacent mesotrophic mires with pines and 44 ha of adjacent mesotrophic mires with birches were also included into the rewetting zone, with the process of renewal of typical mire plant association. Beavers and waders have appeared in the new rewetted habitats.

NGO and local communities' projects

Over latest years, various organizations, including NGO's, carried out effective watering of several cutover peatlands for purposes of fire control, but also keeping in mind restoration of mire ecosystems in the long term.

In some areas of other subjects of the Russian Federation (Moscow, Ryazan and Vladimir

regions) blocking of drainage ditches on the drained peatlands by dams is made by local societies of hunters and fishers, under their own initiative. The main purposes of this activity are:

a) Creation of shallow reservoirs favourable for breeding and staging waterfowl and waders – improvement of habitats for the interests of hunters.

b) Increase of fish productivity in the new shallow waters (natural and by release of artificially bred fish) – improvement of habitats for the interests of sport fishermen.

c) Associated reduction of fire danger.

The NGO projects have been implemented in different regions of the European Russia mainly with financial support of foreign nature protection foundations. The results of these projects were different by gave valuable experience in peat restoration activities both for NGOs, local communities and stakeholders. The examples of such projects are presented below.

Project: Local Environmental Action Programmes (LEAPs) for protection and restoration of peat bogs in Nizhegorodskaya region, central Russia

Executive organization: Dront Ecological Centre

Partnership: University of Dundy (UK)

Sponsorship organizations: British Council Small Ecological Projects (SEPS) and Committee for nature protection and nature use management of Nizhegorodskaya region (oblast)

Project duration: July 2002 – March 2003

Location: Nizhniy Novgorod region, Kamskoje-Osinovyje Kotly peat bog, ca. 50 km east of Nizhniy Novgorod city.

Peatland type: Extracted raised bog

Background

The Kamsko-Bakaldinskaya mire system is located 50 km to the east of Nizhniy Novgorod city on the left bank of the Volga river, covering an area of more than 100,000 ha. It contains a unique assemblage of mires of various types and ages which provide habitat for many rare and endangered plant, bird and insect species, and part of it is designated as a Ramsar Site. The central peat bog Kamskoje-Osinovyje Kotly (2,770 ha) has been badly disturbed by peat extraction, disrupting the integrity of the wetland area and fragmenting the populations of rare plants and animals. Peat working ceased during the economic difficulties of the 1990s leaving the people of the nearby village “Kuzmijar” without jobs and surrounded by drained

bogs with depleted resources of traditional wild foods (berries and mushrooms) and which burned, causing serious smoke problems, each summer. In 2002–2003, a local NGO known as Dront Ecological Centre, in partnership with the University of Dundee (UK), undertook a pilot project, to rewet some of the abandoned peat workings using the locally available labour force. As there are many settlements whose people have been unemployed since the collapse of peat enterprises, and peatland restoration is a relatively new concept in Russia, the involvement of local people and the demonstration value of the work were possibly more important elements of the project than the practical aspects.

Aims of the project

To develop the capacity of NGOs, local communities and decision-makers to discuss and to solve common environmental problems as an integral part of adopting modern (LEAP) approaches to environmental management and planning, through awareness raising and training.

To establish the ecological network principle within the nature conservation plan for Nizhegorodskaya oblast.

To set up an accessible knowledge base for understanding and implementation of the LEAP and ecological network approaches elsewhere, for practitioners and decision makers at different levels.

Realization

A wildlife survey was conducted on the Kamsko-Bakaldinski bogs in early July 2002. Later in the same month, four principal members of the Russian project team visited the UK for a 10-day workshop and study tour during which British experience in peat bog management and protection was discussed and demonstrated. On returning to Russia they began negotiations with local government and industry to secure agreement in principle, and then to seek out potential sites, for a program of bog restoration. It proved difficult to identify a suitable site, since it was necessary to find an interested peat enterprise, and to avoid locations where dam construction would cause flooding of areas where extraction was planned or where conflicts with foresters and the local community might arise. The team also hoped to find an area with no wood/tree layer. They finally obtained all the necessary approvals to work on a suitable plot within the Kamskoje-Osinovyje Kotly peat fields (Vorotynski district). The project was then discussed with local residents and a detailed survey of the site, including vegetation mapping and recording of wildlife, was carried out in September and October.

The construction of dams was planned with and carried out under contract by the local peat

factory "Enterprise Kamska", providing employment for local people. Each dam was made from two parallel wooden barriers with peat infill. The dam designed for the canal incorporated an overflow pipe and doubled as a bridge, facilitating movement of machinery and people for fire-fighting. Ten dams were installed between mid-November and mid-December 2002.

Publicity for the project included a web-site at http:\\www.dront.ru\lr\peatbogs.ru.html, an illustrated brochure and a press release which attracted newspaper, radio and television coverage. Finally, a workshop was held in March 2003 in Nizhegorodskaya oblast (region). This was organised jointly by Dront Ecological Centre and Wetlands International Moscow, and there were more than 40 participants representing 5 Russian oblasts and the Mariy El Republic.

Fig. 19: One of the drainage ditches before dams were installed (photo S. Brooks)

Results

The direct consequence of the construction of dams was that the water table was raised over a total area of 50 ha. Transplanting trials were made in pilot plots for the spring of 2003.

The most significant outcome of the project was, however, the high level of interest that it generated for peatland rewetting as a fire prevention measure. The provincial authorities were already concerned by the high frequency of summer peat fires over the preceding two years because the smoke is a public health issue that can necessitate costly evacuations, and because of the associated losses of forest. From here, interest spread to other local authorities who were interested in peatland restoration as a means of creating employment and regional authorities whose main concern was to reduce the incidence of peat fires.

Fig. 20: A single dam, designed to double as a bridge, was installed in the canal collecting water from the ditches crossing the peat field (photo Ecological Centre Dront).

Project: "Reviving peatlands" – dissemination of experience on preservation and restoration of mires

Executive organization: Russian Bird Conservation Union

Partnership: Institute for Sustainable Communities (Russian Representative Office)

Sponsorship organizations: USAID (ROLL project)

Project duration: January 2001 – March 2002

Location: Novgorod region, Vaskovo bog, ca. 220 km east from Veliky Novgorod city; Moscow region, Dubnensky mire group, 120 km north of Moscow city.

Peatland type: raised bog (Novgorod region), mesotrophic mire (Moscow region), both partly disturbed by drainage ditches

Background

In significant territory of woody bogs (usually small on the area) in the European Russia drainage works in 1960-1970th have been carried out, by laying of a network of drainage ditches. As a result of the drainage activity, an efficiency of berries (cranberry, cowberry, blueberry) used by local people has sharply fallen and numbers of game birds (Capercaillie, Black Grouse, Hazel Grouse) has significantly decreased. Only insignificant part of the drained area is used for needs of forestry, the majority of partly drained bogs are not used in the economy owing to small efficiency of wood. For the realization of the project have been chosen two typical pilot sites of bogs with a network of drainage ditches, not used in the forestry, close to the natural condition. Works in both territories were spent under the request and at the support of local people, after the approval by regional forestry committees.

Aims of the project

1. Introduction of foreign experience in restoration of the drained bogs (with adaptation to the Russian conditions)

2. Training local people to practical work on restoration of the broken hydrological mode and vegetation.

3. Dissemination the received experience by excursions and lectures.

Realization

Within the framework of the project on both mire sites has been solved to construct a network of dams in drainage ditches, using the techniques described in the manual of Rob Stoneman and Stuart Bruks (Stoneman, Brooks, 1997). All works were spent manually, without use of machines, to not break a moss cover of the bog sites. Holes for the outlet of surplus of water have been made in each of dams.

All dams in the Novgorod region have been constructed from sheets of the thin corrugated zinced iron. In total 12 dams have been established here, by the Scottish technique. 10 from them have been established on 4 ditches, on the distance of 150-200 m from each other.

In the pilot site within the Dubnensky mire group 18 dams from sheets of corrugated hard plastic have been made.

In addition, 8 excursions for schoolboys were specially organized. After each excursion, schoolboys could take part independently in the experiments of restoration of mire vegetation: they planted Sphagnum moss and low marsh shrub in the places undergone erosion.

For the dissemination of the project experience and results, special illustrated guidelines on the rewetting of mires were published.

Fig. 21: Construction of dam from the corrugated plastic sheets (photo Taldom Administration of Specially Protected Nature Areas)

Results

Experience of our work has shown that both types of materials (metal and plastic sheets) are acceptable for the construction of dams. They are light and can be cut up directly in a place of dam installation. However application of metal dams is more preferable, since it is possible to shut up them more deeply into a peat, not being afraid of damages and thus, it is more reliable to block possible undesirable drain of water around of a dam or under it.

Fig. 22: Drainage ditch in 2001 (left), before the project implementation, Vaskovo bog, Novgorod region, and the same ditch (right) in 2008 (photo A.Mischenko)

Monitoring of the project results has shown that the water level in the blocked ditches has noticeable raised, the process of Sphagnum mosses growth began appreciably more intensive. On the Vaskovo bog in the Novgorod region, layer of Sphagnum, Eriophorium and other vegetation in some places of blocked ditches for the seven years (2001-2008) became so thick and dense, that holds a weight of an adult man. Many naked sites of peat on the banks of ditches have become covered by plants.

Lessons learned

The project implementation analyses demonstrates, that there is urgent need of development regular procedures for extracted peatlands rewetting integrated with legislation, land use management and development plans.

The current experience includes the projects undertaken by:

regional and local administrations

federal special nature protected areas in partnership with stakeholders

regional nature protected areas in partnership with stakeholders

the stakeholders, joint in societies and voluntary associations

NGOs projects apart or in partnership with local stakeholders.

The most irregular and "illegal" activities are undertaken by local stakeholders' voluntary associations and NGOs. The small projects funded by voluntary investments or foreign funds have no capacity to develop project documentation, undertake EIA or technical expertise, provide monitoring and maintenance of the constructed facilities. Among NGO projects there are ecologically unsound and legally disputed examples of dam construction on drained forest lands.

The projects undertaken by peat industry enterprises sound as the most perspective. Anyway in this case the state has to act not only as supervisor for regulations implementation, but also to develop the economical incentives for peat industry.

The problem requires much more attention from all stakeholders, from the federal government to private businesses. Moreover, there is a need of conservation and restoration of lowland floodplain peatlands in industrial regions, where they have been disappearing under industrial and residential buildings.

FUTURE ACTION PLANS OF GOVERNMENT OR OTHERS

Russian Peatland Action Plan refers to the needs of peatlands restoration

The Russian Peatland Action Plan is a coordinated intersectoral framework document on conservation and wise use of peatlands, endorsed by the Ministry of Natural Resources. The document was developed and coordinated within broad spectrum of experts on peatlands and stakeholder agencies. The document contains statement on the need for the inventory of extracted and drained peatlands with further management plans including restoration

Since 2003, various organizations and experts carried out activities in line with principles and dimensions of the Russian Peatland Action Plan. The document is good framework for further legislation and methodology development in area of peatlands restoration.

Readiness of population

Gallup polls carried out in two regions of central European Russia within the Wetlands International project, where mires are plentiful and traditionally used by man, showed that all population groups, including local inhabitants and summer visitors, were unanimously cautious (Plusnin, 2006): don't touch mires and they won't touch you. This derives from an intuitively mystical attitude to impenetrable, uninviting mires full of devilry. Similar emotions must have dominated in the European countries where, centuries ago, peatlands were utilized for social and economic reasons. Nowadays, people of these countries, in contrast to those in most of Russia, are willing to incur considerable material and social expenses to protect and restore peatlands; however, this attitude cannot be exported to countries where peatlands remain important sources of direct or indirect economic interests and livelihood.

The possible development of the local activities

Activity on flooding of drained peatlands with the purpose of prevention of fires and improvement of habitats for game birds and a fish are expected to be continued in some regions at the levels of regional and local initiatives. The voluntary initiatives are expected as possible response to decrease of environment quality and result of public awareness raising by NGOs.

Such activities should be supported and directed by local authorities and implemented with taking in account legal and methodological aspects. One of the possible ways – is involvement of the environmental consultancies.

The possible incentives for peatlands rewetting on the Federal level

The implementation of the UNFCCC and Kyoto protocol could be considered as background for the development of the incentives for peatland restoration on the Federal level. The preliminary Assessment of peatlands inventories techniques as background for GHG sources and sinks reporting had demonstrated perspectives of that approach. Extracted peatlands are expected to become the objects of the obligatory inventory as GHG sources and sinks under UNFCCC national reporting. The rewetting projects are expected to become the objects for CDM projects under Kyoto Protocol. That direction could have good perspectives for the development.

Existing rewetting procedures: description of project process

Methodological background

The only one official document, which contains some recommendations on the rewetting of the extracted peatlands is "The instruction for reclamaition of peatlands after peat extraction" (endorsed 31.03.1998 г. Ministry of Natural Resources, RF)

Several instructive documents have been produced as the outputs of peatland restoration projects implemented by NGO and volunteers.

The most official among them is the document: Zaderenko O.I., Yampolsky A.L., Vlasov E.B. The temporal recommendations for the rewetting engineering of the extracted and withdrawn from exploitation peat deposits in: Recommendations for the conservation and wise use of peatlands in Russia. Part 3. Moscow, 2007, 77 pp.(Considered and endorsed by the Ministry of Ecology and Land Use of Moscow region for practical use (letter N 881-1 from 27.06.2006)

Birdlife Russia had published Recommendations in 2002, based on their project experience and manual by R.Stoneman and S.Brooks (1997).

The volunteer of peatland restoration Michael Voitekhov working in Taldom Protected Area have published 2 brochures with relevant recommendations.

Wetlands International had sponsored two reviews of peatland restoration by Olivia Bragg and Vladimir Panov (2006)

In 2006 FCGS "Ecologia" on request of the Ministry of Natural Resources had produced Assessment of peatlands inventories techniques as background for GHG sources and sinks reporting. This assessment have been focused on the inventory of drained and extracted peatlands.

During the last 10 years as minimum four peatland restoration workshops with broad participation of experts have been held in Russia and Belarus.

1997 (Tver oblast) – Fen Restoration workshop – the exchange of experience between IPS commission 2 and Russian peat experts.

2003 (Nizhny Novgorod) – discussion on issues of peatland restoration organized by the Dront NGO under support of the Darwin Initiative and the Peatland Conservation Project of the Wetlands International Russia Programme;

2004 (Belarus) – exchange in expertise on issues of peatland watering and restoration organized by the Byelorussian Bird Conservation Union, RB Ministry of Nature, and the Peatland Conservation Project of the Wetlands International Russia Programme;

2005 (Moscow – Tver) – workshop on problems of peatland wise use in Russia organized by the RF Ministry of Natural Resources in association with the Moscow Oblast Ministry of Environment and Nature Management, Peatland Conservation project of the Wetlands International Russia Programme, Tver State Technical University, Center of environmental and economic research and information, and the Mosoblecologia Research Center.

The current legislation

The rewetting activities legal background depends on the ownership both on lands and drainage facilities. The key Federal legislation to be applied: Federal Law on Melioration, Federal Law on EIA, Federal Law on Environment Protection as well as Land Code, Water Code and Forest Code.

Drainage facilities can belong to forestry or agriculture enterprises or to special organized enterprises for implementing drainage activities.

Drained or extracted peatlands could be identified as following land categories:

Federal forest lands managed by administrations of subjects of Federation

Lands in agriculture use in private property

Lands in agriculture use in state property

Agriculture lands under peat extraction

Industrial lands under peat extraction owned/rented by company

Reserved lands after peat extraction

Lands of Federal special protected natural areas

Different steps are to be undertaken to start rewetting activities

Case (1): endorsement by Forest management body of Subject of Federation; agreement with forest use enterprise (Renter); project documentation; state expertise; evaluation of losses to forestry

Case (2): initiated by owner; project documentation; state expertise; evaluation of losses where appropriate

Case (3): endorsement by Agriculture management authority; project documentation; state expertise; evaluation of losses where appropriate

Case (4): endorsement by Agriculture management authority; project documentation; state expertise (in case project documentation does not include restoration and/or dated later than 2003); evaluation of losses where appropriate

Case (5): project documentation endorsed by local administration; state expertise (in case project documentation does not include restoration, or rewetting as fire security measure and/or dated later than 2003);

Case (6): to change land status to any other (water, agriculture, forestry); project documentation endorsed by local administration and new owner; state expertise (in case project documentation does not include restoration, or rewetting as fire security measure and/or dated later than 2003);

Case (7): Decision on Scientific Technical Panel of SPNA supported by Rosprirodnadzor; endorsement of subject of Federation administration; Project documentation, Environment Impact Assessment.

The further actions needed:

- The analyses of legislation background for peatlands inventory and restoration in Russian Federation.
- The inventory of degraded peatlands in the European Russia.
- The development of the economic incentives for peatland restoration for administration and private sector.
- To avoid involvement of extracted peatlands in drained production.
- Raising awareness on peatlands restoration.
- Development of the methodological background for peatland restoration.
- Stimulation of environment consultancy involvement in peatland restoration.

Any existing rewetting procedures in Russia include:

Methodological background

"The instruction for reclamation of peatlands after peat extraction" (endorsed 31.03.1998 г. Ministry of Natural Resources, RF)

Zaderenko O.I., Yampolsky A.L., Vlasov E.B. The temporal recommendations for the rewetting engineering of the extracted and withdrawn from exploitation peat deposits in: Recommendations for the conservation and wise use of peatlands in Russia. Part 3. Moscow, 2007, 77 pp.(Considered and endorsed by the Ministry of Ecology and Land Use of Moscow region for practical use (letter N 881-1 from 27.06.2006)

The publications, summarizing on ground projects activities and literature reviews (Mischenko et al, 2002; Voitekhov, 2003, 2007; Bragg, 2006; Panov, 2006)

In 2006 FCGS "Ecologia" on request of the Ministry of Natural Resources had produced Assessment of peatlands inventories techniques as background for GHG sources and sinks reporting, focused on the inventory of drained and extracted peatlands.

During the last 10 years as minimum four peatland restoration workshops with broad participation of experts have been held in Russia and Belarus.

The current legislation

The rewetting activities legal background depends on the ownership both on lands and drainage facilities. The key Federal legislation to be applied: Federal Law on Melioration, Federal Law on EIA, Federal Law on Environment Protection as well as Land Code, Water Code and Forest Code. Different steps are to be undertaken to start rewetting activities, which in general format include endorsement by land owner, agreement with land user, project documentation; state expertise, EIA (in case of nature protected area), evaluation of losses in bordering areas where appropriate.

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Inventory Overview of Status of Peatlands in Ukraine

Polessie region in northwestern Ukraine, source: photoukraine.uk

Irina Mikitiuk

Sergey Chumachenko

Annett Thiele

CONTENT

PICTURES

TABLES

ANNEX

EXECUTIVE SUMMARY

Ukraine is with its northwestern temperate lowlands and western Carpathian mountains and southern subtropical peninsula Krim morphologically and climatically very diverse. A distinct decline of rainfall and a warmer climate in the south leads to a decline in amount and area of peatlands from north to south. So Ukraine's peatlands are mainly concentrated in the northern part of the country in the huge glacial valley shared with Belarus, the Polessie. From the whole territory of Ukraine 1.8% are covered by peatlands, which is more than 1 million ha. Total number of all peatlands in the Ukraine is 1 629. In addition, 767 peatlands have depth of peat layer more than 50 cm but less than 100 cm and are seen as not efficient for peat extraction. A certain amount of peatlands are polluted by radioactive elements and located on area of 30-km exclusive zone of Chernobyl Nuclear Power Station. 30 450 hectares (5.8%) of peatlands are allocated for peat extraction. At least 50 % of the peatlands are degraded and roughly 80% are drained in a more or less severe way.

Ukraine has no common policy for peatlands use, management and conservation. The peatlands which are used for agriculture purposes are managed under agriculture policy. The peatlands which are used for forestry are managed under forest management. Peat lands which are allocated for peat extraction are extracted down to a depth of 50 cm of peat and afterwards transferred to agriculture or forestry lands. These peatlands are degraded and not suitable for agriculture or forestry and are often abandoned. Some of them are rewetting themselves, some stay dry. All peat extraction state companies have negative financial balance between -13.8% to – 5%. All state peat extraction companies are donated from the state budget. These companies underlie no legal measure to rewet these areas after extraction or abandonment.

The main use of extracted peat is the local energy market and the fertilisers for agriculture soil. There is a big chance and an urgently need to restore the neglected peatlands formerly used in agriculture and the extracted peatlands.

To secure a long term sustainability of the future rewetting activities the project initiators think about leasing the land for 50 years, that any changes in energy politics will not harm these areas.

GENERAL INFORMATION

Area: 60 354 800 ha, 6 035.48 km^2

Population: 46 041 626 people in 2008

Former extent of peatlands: general area -1 070 000 ha (1.8 % of the country),

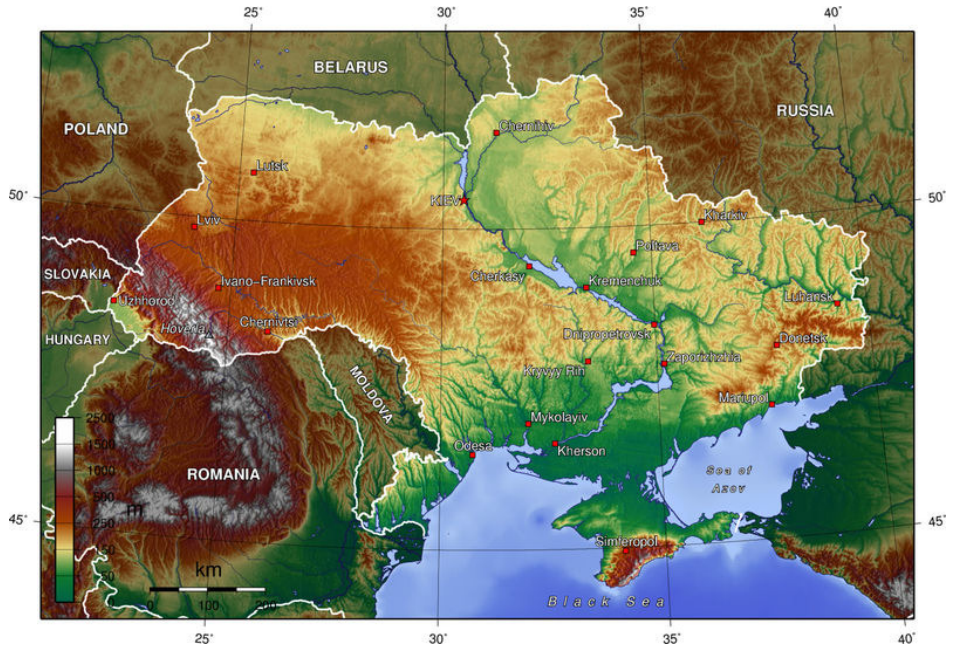
Present area of peatlands: 52 6479 ha (49.2 % remaining)

Peatland loss: about 50%, 80 % are drained (Mochvan & Vakarenko, 2000 a)

GEOGRAPHY

At 603,700 km² and with a coastline of 2,782 km, Ukraine is Europe's second largest country (after European Russia, before France) (Friedlein et al. 2001). The extent of the country from north to south reaches 893 km, from east to west 1316 km.

Ukraine has a mostly temperate continental climate, although Mediterranean to subtropical climate is found on the southern Crimean coast. Precipitation is disproportionately distributed; it is highest in the west and north and lesser in the east and southeast. Western Ukraine, receives around 1,200 mm of precipitation, annually. While Crimea, receives around 400 mm of precipitation. Winters vary from cool along the Black Sea to cold further inland. Average annual temperatures range from 5.5–7 °C in the north, to 11–13 °C in the south (Encyclopedia Brittanica 2007).



Pic. 1: Topographical map Ukraine

INVENTORY OVERVIEW OF STATUS OF PEATLANDS IN UKRAINE

The Ukrainian landscape mostly consists of fertile plains (or steppes 95 %) and a small part of highlands (5%), crossed by rivers such as the Dnieper (Dnipro), Seversky Donets, Dniester and the Southern Buh as they flow south into the Black Sea and the smaller Sea of Azov. To the southwest, the delta of the Danube forms the border to Romania. The country's mountains are the Carpathian Mountains in the west, of which the highest is the Hora Hoverla at 2,061 m, and those on the Crimean peninsula, in the extreme south along the coast (Encyclopedia Brittanica 2007). The complex landscape ecological zones dependent on climatic conditions mainly divide the country into four east-west stretching regions: the mixed forest zone and more south deciduous forest, the forest steppe zone and the steppe zone. On elevations between the sea level and 200 m wide lowlands with soft undulating hills named Black Sea lowlands, the Dnjepr-Lowlands, the Polessie Lowlands and the northeastern part of the Theiß Lowlands. Heights between 200 and 400 m asl are formed by a low sloping, undulating and often dissected land ridges and mountain ranges: the Podolic land ridge, the Dnjepr land ridge, the Donez ridge and the Asowschian mountain ranges. With the higher low mountain ranges of the Carpathians –climbing up to 1300 m and 1800 m- the Ukraine has the northern part of the Carpathian mountain range with its temperate climate. Another mountain range stretches on the peninsula Krim: the Krim Mountains, influenced by subtropical climate (Friedlein 2001). A huge part of the mixed forest zone, especially the Kiew Polessie and the Zytomyr Polessie were radioactively contaminated by the Cernobyl accident (Friedlein 2001, Pic. 9 in Chapter on Belarus).

Ukraine was the so-called bread-basket of Europe during USSR times, due to that the nature is influenced and changed through the long term utilization, by agriculture and melioration. The part of forests is comparable small (5.3 %).

STATE ADMINISTRATION AND LAND OWNERSHIP

During the Soviet regime, Ukrainian agriculture was organized in two centrally-controlled sectors of large scale farming. Kolkhozes were collective farms in which output and all assets were jointly owned by the members. Sovkhozes were state farms in which output and all assets were owned by the state. In addition to these centrally organized sectors, an important part of agricultural production originates in individual subsidiary farms, such as household plots of individual kolkhoz/sovkhoz members and garden plots assigned to city workers (Bondar & Lilje 2002). Forests are state owned, with 72% managed by the state forestry departments at the oblast level, 24% by state and collective farms and 4% by the military and institutes of teaching and research.

Ukraine is renowned for its outstanding natural endowments suited for agricultural production. Traditionally the country has been a substantial net exporter of food and agricultural products (Bondar & Lilje 2002). With the collapse of the Soviet system, the country moved from a planned economy to a market economy. Shortly after independence in December 1991, the Ukrainian Government liberalised most prices and erected a legal framework for privatization, but widespread resistance to reform within the government and the legislature soon stalled reform efforts and led to some backtracking. Output by 1999 had fallen to less than 40% of the 1991 level. Loose monetary policies pushed inflation to hyperinflationary levels in late 1993. Ukraine's dependence on Russia for energy supplies and the lack of significant structural reform have made the Ukrainian economy vulnerable to external shocks (geography.about.com, 1.07.08).

The country imports most energy supplies, especially oil and natural gas, and to a large extent depends on Russia as an energy supplier. While 25 percent of the natural gas in Ukraine comes from internal sources, about 35 percent comes from Russia and the remaining 40 percent from Central Asia through transit routes that Russia controls. At the same time, 85 percent of the Russian gas is delivered to Western Europe through Ukraine (Pirani 2007).

The Corruption Perception Index (CPI) revealed by Transparency International ranks the corruption perception on a scale from 1 to 10, whereas the 1 is the strongest corruption perception. Ukraine has a CPI of 2.7 in 2007, which ranks it to place 118 of 179 (transparency.org, 30.07.2008).

For the Land Code of Ukraine (1992) medium deep and deep peatlands belong to special valuable productive lands, where privatisation is not allowed. Majority of companies that are developing the peat lands are state companies or communal (local self-government ownership).

All companies are included in one consortium Ukrtorf which was set up in April 3, 2007 (Order of Cabinet Ministries of Ukraine). All peat extraction companies and their branches are under supervision of the Ministry of Coal Industry of Ukraine.

Main source of financing peat extraction companies is state budget. Majority of them are bankrupts with poor management.

A way to ensure long term management would be via land lease from state or private owner.

The main laws in Ukraine, which regulate the issue of the land lease, are the Land Code of Ukraine effective as of 1 January 2002, and the Law on Lease of Land of 2 October, 2003.

The Land Code permits to lease land plots under state and municipal ownership as well as under private ownership. Under the land Code leases may be either short-term (no more then five years) or long-term (no more than 50 years).

Land plots under state and communal ownership are leased out on basis of a decision by the state executive body or local government by concluding a lease agreement for the land plot. Land plots under ownership of individuals or legal entities are leased out on the basis of a lease agreement between the land plot owner (lessor) and a lessee.

PEATLAND CLASSIFICATION

Depending on water and nutrient supply, peat type and vegetation cover, peatlands are divided into fens (eutrophic), bogs (oligotrophic) and transitional (mesotrophic).

Fens develop in low areas of the landscape – in depressions, overflown by rivers, cut-off meander and terrestrialising lakes. Valleys of rivers Pripyat (upper course), Turiya, Stokhod, Goryn etc. are paludified. Fens are rich in mineral substances. Herbaceous fens are dominated by *Carex* spec., other reed plants, *Typha* spec., *Glyceria* spec., *Equisetum* and mosses, with *Alnus glutinosa*, *Salix* spec., *Betula* spec. and *Pinus* spec.– among trees. *Betula, Pinus, Carex* spec. and *Sphagnum* mosses are widespread in transitional type peatlands; sparse *Pinus* growth, *Eriophorum* spec., *Oxycoccus palustris*, *Andromeda polifolia* and *Drosera intermedia*– at peat bogs.

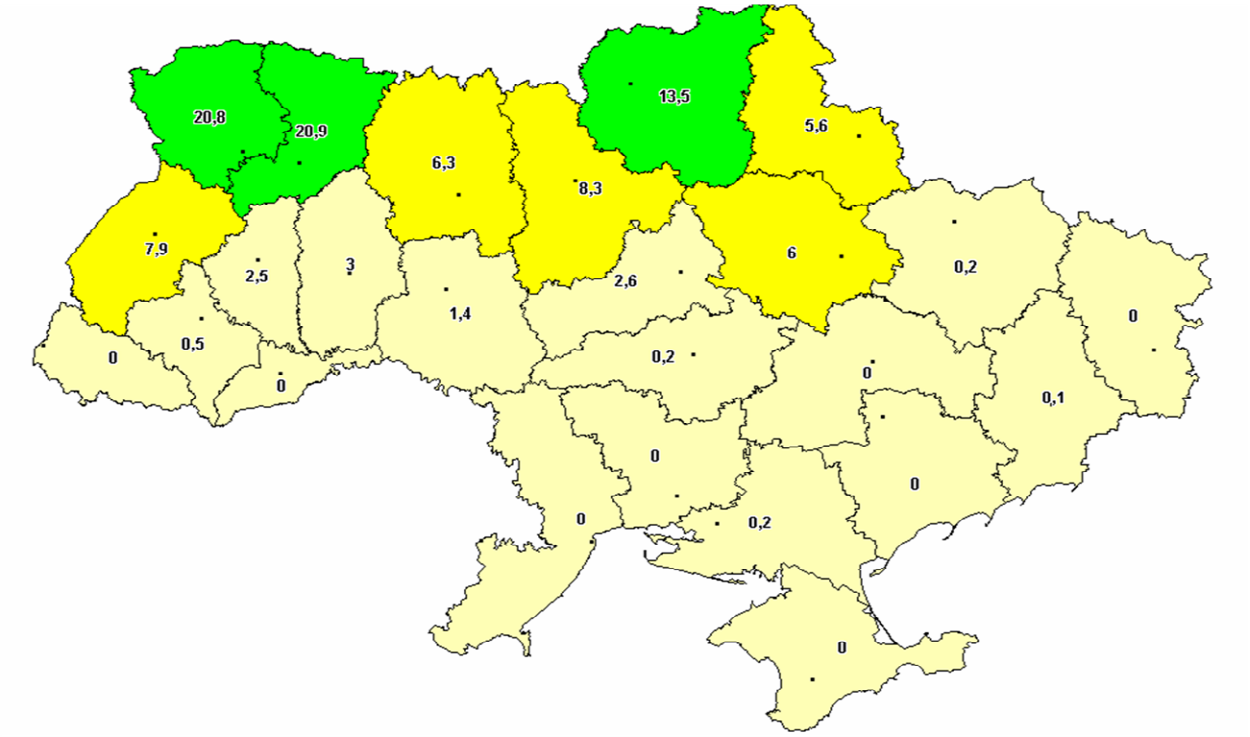
Bogs are significantly rarer; they appear at watersheds, sand terraces bedded on watertight rocks. They are supplied mainly by atmospheric precipitations, and therefore poor on mineral substances. Some bogs of Polessie are significantly large, for example Kremnevoye bog mass situated in Rakitnov and Sarny districts of Rovno region.

Transitional type of peatlands is also relatively poor on mineral substances; *Betula, Pinus, Carex* spec. and *Sphagnum* mosses are predominant among their herbage.

Peatlands are classified as peat lands if the depth of the peat over 50 cm. Peatlands are classified as agricultural/forestry lands if the depth of the peat less than 50 cm.

PEATLAND DISTRIBUTION AND DIVERSITY

There are five regions in which the country can be divided according to the peatland types and amount of peatlands: Polessie, Smaller Polessie, Forest steppe, Steppe and Carpathians with Pre-Carpathians.



Pic. 2: Peatland distribution in Ukraine.

Legend: yellow: regions with total area of peat lands between 5 and 10 thousand ha; green: regions with total area of peat lands <10 thousand ha.

The area of peatlands and peat-mire lands in Ukraine in the early 1980-s was over 613 000 ha; at the present moment it is estimated at approximately 1 000 000 ha. This is reasoned in the earlier stage of inventory of peatlands. Today a significant part of peatlands is reclaimed and is being used in agriculture and forestry.

Peat deposits most widely occur in the north part of Volyn-Podol bed, Ukrainian sheet, and Dnepr-Donetsk depression. The amount of peatlands decreases to the south, where peat deposits occur only in river valleys and small depressions. Peat deposits are absent in Crimean area, Prichernomorsky depression and Scythian bed. Fens are prevalent and constitute up to 90% of all the peatlands in Polessie. These fen peatlands have high ash content (30-50%). Transitional peatlands and bogs stake up small areas in north-west of Polessie and in Carpathians.

In Eastern and Western Polessie deposits of average size (200-1000 ha) are prevalent, in Central Polessie (Kiev and Zhitomir regions) the deposits are small (up to 100 ha). To the south of Polessie paludification of land decreases and peat deposits occur mainly in river valleys.

In Ukraine, peatlands as such take up the most land in Polessie, especially in Volyn, Rovno and Chernigov regions, in valleys of steppe and forest-steppe rivers and in Carpathians.

Table 1: Peatlands of Ukrainian territory

Natural region	Total area, thousands m^2	Peatlands area, thousands m^2	Paludified area, %	Number of peatlands

Polessie	99,5	6351	6,26	1535
Western	41,2	4481	10,87	947
Central	41,2	4481	1,19	216
Eastern	39,9	1651	4,14	372
Polessie Minor	7,9	416	5,26	91
Forest-steppe	2087	3054	1,47	914
Volyn	9,9	153	1,54	65
Podolsk	50,3	411	0,80	198
Right bank	67,1	353	0,52	251
Left bank	64,1	2054	3,20	301
Eastern	17,1	83	0,48	99
Steppe	240,3	79	0,03	92
Ukrainian Carpathians	38,8	181	0,46	86
Front Carpathians	14,8	180	1,22	55
Carpathians	20,9	1	0,05	31
Back Carpathians	3,1	–	–	–
Mountain Crimea	8,5	–	–	–
Ukraine	603,7	10081	1,68	2718

UTILISATION AND CURRENT DEGRADATION STATUS OF PEATLANDS

At the present moment, 3273,6 thousands ha, or 49,8% of Ukraine's peatland and reclamation fund, are reclaimed, beyond that further 2500 thousands ha are disturbed lands, bordering with reclaimed areas and are affected by complex processes of melioration. Since the Second World War these peatlands have been drained and converted into pastures, hay meadows, ploughed fields, forestry plantations and fishponds. Approximately, every sixth hectare of reclaimed land is in unfavourable condition through melioration, and approximately 70 thousands ha were heavily meliorated.

Around 80% of peatlands are meliorated in one way or another. This often triggers degenerative processes such as wind and water erosion, desertification and increased salinity, leading to loss of climate-regulating functions and contamination of water by organic matter. To improve melioration state of reclaimed land, it is necessary to implement complex measures – close the drainage system, care for water-retention, contour-melioration systems, wide implementation of automated melioration processes, improvement of structure of areas under crop, etc.

As of the present day (in accordance to data put in the Peat Cadastre of Ukraine dated 2003):

1) Registered: 526 479 ha of peat deposits;
2) Explored: balance 229 082 ha, outside of balance 67 676 ha;
3) Under extraction: 30 450 ha;
4) Agricultural land (reclaimed): 308 434 ha;
5) In natural state: 102 596 ha;

6) Natural-reserve fund: 71 336 ha;
7) Forest fund: 116 529 ha;
8) Under artificial water level: 11 204 ha;
9) In the Chernobyl zone: 2 459 ha.

Peat extraction for fuel and mineral soil conditioners/fertilisers:

The "National Energy Programme of Ukraine to 2010" prescribes annual extraction of around 1.6 million tonnes of peat and production of 0.7 million tonnes of peat briquettes under licence for the next 15 years. There are 170,000 ha of currently extracted peatlands but the rate of extraction is low due to lack of money and land privatisation. In 1999, extraction of 1,233,000 tonnes of peat including 889,000 tonnes for fuel was planned. The cut away peat fields are not restored. The peat products from extraction are used for fuel (81%) and as fertilizers (19%) (Inisheva et al. 2003).

Over the last 30 years, 120–150 million tonnes of peat have been lost as a consequence of such activities on about 60,000 ha of peatland.

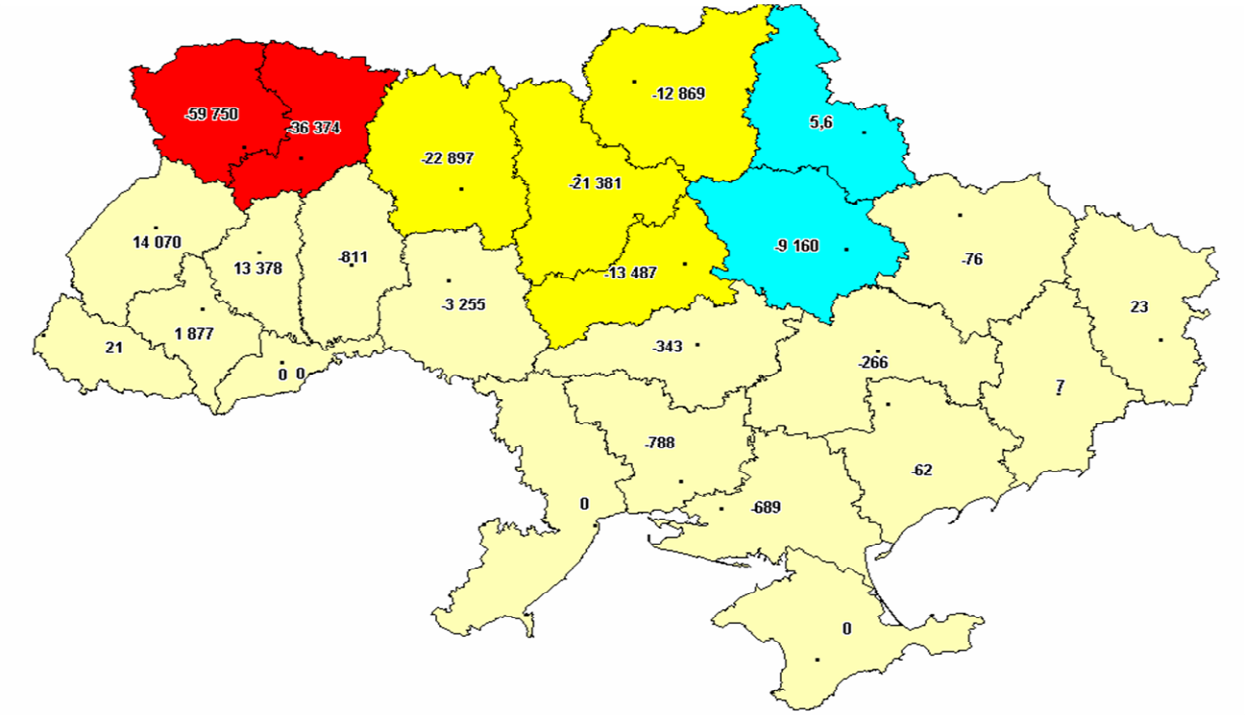
Extracted areas are normally used for agriculture (arable land, pasture, hay mowing), forestry or creation of fishponds. Spontaneous rewetting is not valued as an after-use, but it often occurs in practice due to lack of money (Mochvan & Vakarenko, 2000a).

Ukraine has no common policy for peatlands use, management and conservation. The peatlands which are used for agriculture purposes are managed under agriculture policy. The peatlands which are used for forestry are managed under forest management. Peat lands which are allocated for peat extraction are extracted down to depth of 50 cm of peat and are then transferred to agriculture or forestry lands. These peatlands are degraded and not suitable for agriculture or forestry and often are neglected. Some of them are re-wetting themselves, some remain dry. All peat extraction state companies have negative financial balance which is fluctuating from -13.8% to – 5%. All state peat extraction companies are donated from the state budget.

Exact data of current status and area of closed and destroyed peat lands are not available by date of reporting.

Rough figures are:

- 102 696 ha are non-drained under natural conditions, 384 peat lands
- 308,434 ha of peat lands are used for agriculture purpose. Some of them are degraded due to water, wind, chemical erosion, and neglected.
- 102 596 ha of peatlands are used for forestry.
- 11 204 ha are covered by water bodies, 46 peat lands
- 71 336 ha are located within nature protected areas, 84 peat lands,
- 158700 ha with depth of peat layer less than 50 cm



Pic. 3: Changes of peatlands area in different regions of Ukraine in the period from 1959 till 2005.

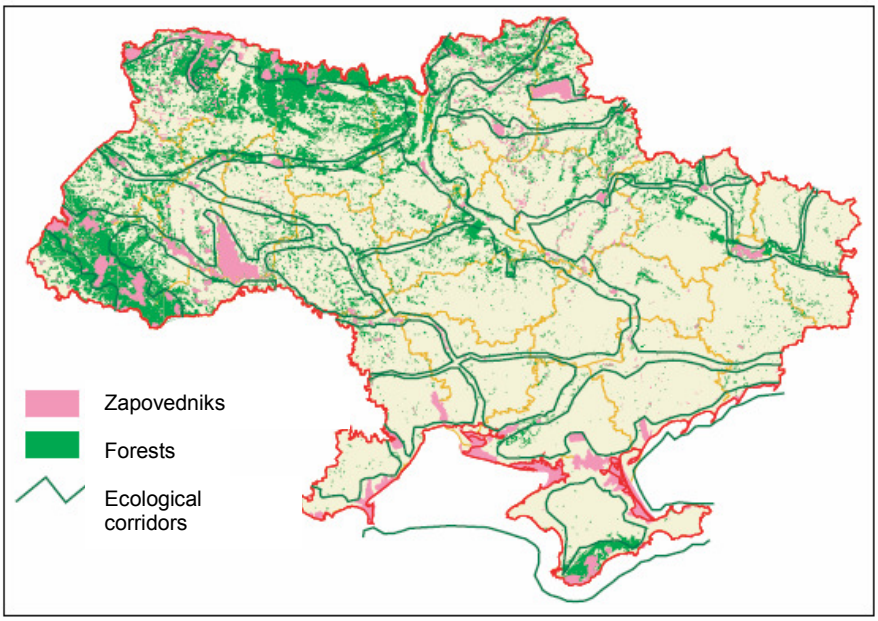
Legend: red: regions with level of peatlands losses < 30 thousands ha; yellow: regions with balance of peatlands losses between 10 and 30 thousand ha; blue: regions with losses <10 thousands ha but more than 5 thousands ha.

The State Program for peat industry of Ukraine Development until 2030 plans to increase the amount of peat used for energy production by five times from the base of 2005 and the use of peat as fertilizers will also rise substantially (see Annex III).

PROTECTION OF MIRES AND PEATLANDS

71 336 ha (13.5%) of peatlands have nature protection status.

1. In Ukraine there are about 1 million hectares of peatlands, from which near 100 thousand ha have been excavated, more than 150 thousand ha have been drained, 170 thousand ha are under the excavation, and near 100,000 ha are under the protection, taking small peatlands also into account.
2. Investigations on the state of conservation, use and restoration of peatlands need special approaches and assessments, as well as application of the best models of peatlands management.
3. The State statistic materials are not directed on ensuring conservation of the valuable peat ecosystems.



Pic. 4: Sapovedniks and ecological corridors (no conservation status) in Ukraine;

The whole protected area covers around 2.7 million ha, which is 4.5% of the area of the country. The most widespread protection measure for peatlands is their designation as Wildlife Reserves (Zakaznyks). Forest, steppe, mire and other landscapes can be granted Wildlife Reserve status if they possess the requisite scientific, nature protection and aesthetic attributes. Special regulations which impose restrictions on users apply for all protected areas (Parchuk 2003 in Bragg & Lindsay 2003).

Rovno nature reserve, created in 1999 is the biggest reserve in Ukraine with peatlands. All the peatland types existing in Ukrainian Polessie are represented. Polessie nature reserve was founded in 1968 in Olev and Ovruch districts of Zhitomir region over the space of 201 km^2. Peatlands and swampy forests take up a quarter of its territory, and in that area over 500 species of higher vascular plants 139 species of mosses, tens of species of lichen, fungus and algae grow. In the peatland area of Polessie Minor, Buschany botanical preserve was created in 1984, in Ostrog district of Rovno region, with an area of 385 ha. The complex of pine and alder forests and bulrush and ling peatlands in Zbitenka river valley is being preserved. The rarest plants of Red Book of Ukraine grow there.

Nature Reserves, National Nature Parks and Biosphere Reserves, together with 21 of the 44 Regional Landscape Parks and five of the 22 Ramsar Sites, have administrations with guards and research divisions. For other designations, including Wildlife Reserves, the responsibility for protection lies with the users, but although the activities of landowners are restricted they receive no compensation. Two National Nature Parks, four Nature Reserves and six Regional Landscape Parks together contain 90,000 ha of peatland. 13,500 ha of peatland in the Polessian Region (Volynska Oblast) were added to the Ramsar List in 1995, through designation of the Shatsk Lakes, the Prypiat River Floodplains and the Stokhid River Floodplains sites. Within the planned programme for establishing Ukraine's National Econet, 34 new protected areas will be designated and 11 existing Nature Reserves and National Nature Parks will be enlarged, by 2015. These measures will extend protection to 12 additional peatland ecosystems, the most important of which are the Snov River floodplains (4,500 ha), the Vorskla River valley (1,000 ha) and the swamp massif "Zamglai" (3,000 ha). In addition, more peatlands will be designated as Ramsar Sites. Small peatlands on mountain slopes in the Carpathians are not protected at all, but beyond that all types are represented in conservation areas.

Table 2: Conservation areas with peatlands

Conservation area (National Parks + reserves)	size in ha	peatland in ha
Rivnenskyi Nature Reserve	47,047	22,000
Shatskyi National Nature Park	48,977	14,700
Regional Landscape Park "Prypiat-Stokhid"peatlands	44,958	14,300
Polissian Nature Reserve	20,104	50,000
Desniansko-Starogytskyi National Nature Park	16,215	650
Carpathian Biosphere Reserve	57,880	60
Carpathian National Nature Park	50,303	50
National Nature Park "Synevyr"	40,400	45
Wetlands of International Importance (Ramsar sites) with significant mires components		
Shatsk Lakes	32,850	2,000
Prypiat River Floodplains	12,000	6,500
Stokhid River Floodplains	10,000	5,000

(Movchan & Vakarenko, 2000)

EFFECTIVENESS OF PROTECTION

The areas protected as Zapovedniks are under optimum conditions according to the sustainability of protection. The reserves with lower conservation status or in the buffer zone of Zapovedniks or in regional landscape parks a change in land use is possible, whereas peatland drainage and extraction is included as possible land use change. These possibilities depend on the administrational measures taken while dividing the reserve in certain zones. It is possible to fix all the necessities to avoid special land use changes.

TECHNICAL AND POLITICAL PERSPECTIVES FOR REWETTING

There is no legal background for peatland restoration activities. There are potential sites for restoration and no wide restoration practice introduced. In 1994 the group of scientists upon a request from the Ministry of Environment prepared the Program of measures concerning creation of protected reservations and restoration of wetland complexes in Polessie Region. They proposed the deconstruction of several draining systems. Among the criteria of the selection were: unsatisfactory status and low effectiveness, important habitats for birds before drainage, absence of other drained massifs nearby, distance to the settlements, location close to the protected areas (Bragg & Lindsay, 2003).

Limited requirements for peat deposits close-up actions are included in the State Program for Peat Industry of Ukraine Development till 2030.

Ministry of the Environment and Natural Resources of Ukraine is in charge of permissions for peat enterprises. Landowners can extract peat to a depth of 2 m without permission. Ministry of Fuel and Energy of Ukraine defines the strategy of peat mining and after-use.

Ministry of the Environment and Natural Resources of Ukraine intensifies activities concerning international agreements to bring nature protection near the European Union countries (Mochvan & Vakarenko, 2000).

The State Program for Peat Industry of Ukraine Development till 2030 has mentioned necessity of actions for protection of quality of peat deposits and fire management. Unfortunately the authors can't give examples of rewetting activities.

ACTION PLAN UKRAINE

The following thoughts have been compiled during the workgroup session with the inland experts from Ukraine.

The rewetting opportunities have been summarised as following:

1. Flooding large areas --- high position in political agenda at national and regional regions
2. Compare large number of peatland fires and large areas of peat fires--- sensitive issue in political agenda
3. Existing legal environment for JI projects preparation, implementation and monitoring
4. Existing legal environment for Green Investment Projects preparation, implementation and monitoring
5. Expertise knowledge in botany, hydrology, and other relevant fields
6. Political support at regional and local levels
7. Existing drainage infrastructure which is not used
8. Legal environment for land plots lease
9. Large area of peatland are neglected and not used
10. Large area of extracted peatlands

The bottlenecks in implementing a large scale rewetting project have been summarised as follows:

1. Absence of internationally certified methodology for GHG emission calculation
2. Lack of certified laboratories for green house gas measuring in country
3. Absence of National Program (Action Plan) for carbon trading
4. Absence of law regarding to carbon trade
5. Lack of political support at national level

6. Low level of awareness of stakeholders regarded GHG emission trade
7. Tender procedure for land lease procedure
8. Lack of capacity for GHG emission projects preparation

What shall be done?

1. Inventory of existing knowledge, capacity of different institutions for topics related peatlands re-wetting
2. Prepare and submit to parliament National Program for GHG emission reduction
3. Adopt law regarding GHG emission reduction, including trading
4. Certification of a laboratory according to the international requirements
5. Identify gaps in available country expertise regarding the requirements for peatlands rewetting and GHG emission trade projects preparation
6. Build motivation of key stakeholders in necessity of peatland rewetting
7. Build capacity in country for JI projects & Green Investment Projects preparation, implementation and monitoring
8. Improve information flow between potential partners for peatlands re-wetting
9. Update existing peatlands cadastre based on GIS technology, including information regarding current status of peatlands (drained, natural etc) and current use
10. Verify methodology developed in Belarus in Ukraine

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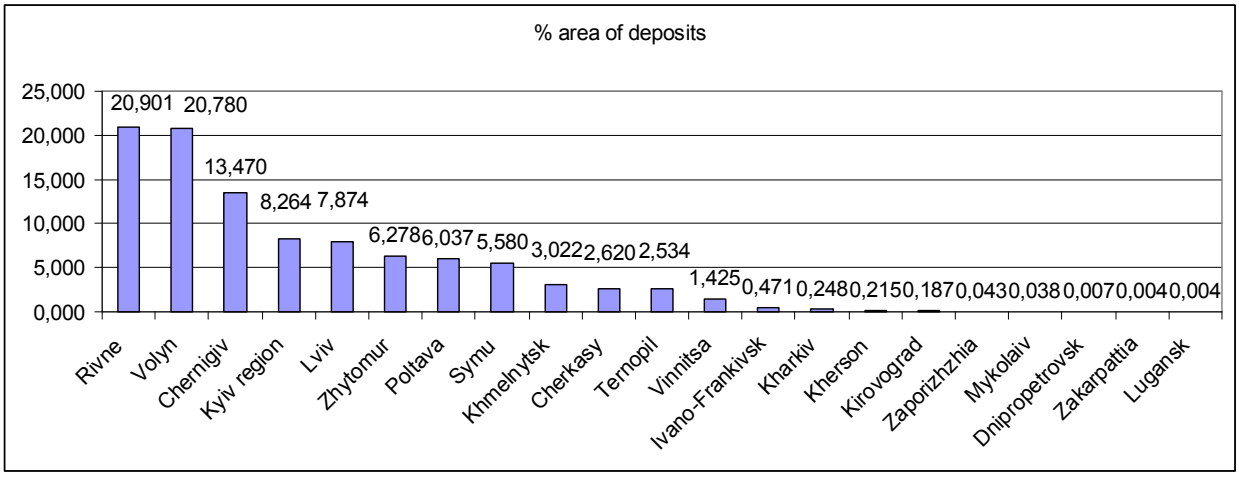
ANNEX

Annex I : Regional Distribution of Peat Lands in Ukraine, status 2007 (sources of information: State Program of Ukraine for Peat Industry Development till 2030, adopted in 2007).

Region	Number of lands	Area of lands, in ha
Vinnitsa	104	9 104
Volyn	380	132 791
Dnipropetrovsk	3	47
Zhytomur	240	40 116
Zakarpattia	8	27
Zaporizhzhia	5	277
Ivano-Frankivsk	65	3 010
Kyiv region	168	52 812
Kirovograd	5	1 193
Lugansk	4	23
Lviv	194	50 317
Mykolaiv	7	241
Poltava	96	38 579
Rivne	392	133 564
Symu	165	35 660
Ternopil	105	16 195
Kharkiv	34	1 587
Kherson	8	1 373
Khmelnytsk	172	19 309
Cherkasy	62	16 741
Chernigiv	266	86 076

TOTAL in Ukraine	2 501[1]	639 500

Annex II: Area of deposits by region



Annex II: Prognose for Peat Extraction in Ukraine for period 2006 – 2030 (source of information: State Program for Peat Industry of Ukraine Development till 2030), in thousand tons.

Peat for:	2005	2006	2010	2020	2030
Scenario 1					
Energy	557.5	595.0	1 500.0	2 000.0	2 500.0
Agriculture	50.5	200.0	500.0	1 500.0	2 000.0
Total	608.0	795.0	2 000.0	3 500.0	4 500.0
Scenario 2					
Energy	557.5	595.0	1 000.0	1 300.0	1 500.0
Agriculture	50.5	200.0	500.0	2 200.0	3 000.0
Total	608.0	795.0	1 500.0	3 500.0	4 500.0

[1] Number of peat deposit mentioned in the table differ from the number of the peat lands mentioned in the text due to different sources of information (Irina Mikitiuk)

Annex III : Area of Existing Bogs and Status of Ownership, *in thousands of hectares*. Status on 2007. *Source of information: The State Statistic Committee of Ukraine.*

	Land owners, land users and land in State Reservation Fund			
		Subtotal	Peatlands, including:	
			Up-river peatlands	peatlands
1	**All type of agricultural companies , including:**	**1,4**		**1,4**
1.1	***Non-state agricultural companies:***	***1,2***		***1,2***
1.1.1	**Agricultural cooperatives**	**0,1**		**0,1**
1.1.2	**Agricultural limited companies**	**0,7**		**0,7**
1.1.3	**Agricultural Departments of non-agricultural companies**	**0,1**		**0,1**
1.1.4	**Other non-state agricultural companies**	**0,3**		**0,3**
1.2	***State agricultural companies, including:***	***0,2***		***0,2***
2	**Private individual ownership (householder plots)**	**0,9**		**0,9**
3	**Non-agricultural companies and organizations**	**0,3**		**0,3**
4	**Nature protection organizations, recreation etc**	**0,2**		**0,2**
5	**Forestry**	**1,0**		**1,0**
6	**State Reservation Fund land, which is not contracted, including:**	**69,2**	**1,5**	**67,7**
6.1	***State Reservation Fund land ,which is not contracted and located within the borders of villages***	***17,8***	***0,3***	***17,5***
6.2	***State Reservation Fund land of common use***	***51,4***	***1,2***	***50,2***
7	**State Reservation Fund land, which is**	**1,5**		**1,5**

	contracted for short-time use			
	TOTAL in Ukraine		**1,5**	**73,0**

Annex III.1: Lands with High Level of Underground Water and Reclaimed Land, *in thousands of hectares*. Status on 2007. *Source of information: The State Statistic Committee of Ukraine.*

Region / oblast	Subtotal Area of land	Area of Land with high level of underground water	Reclaimed Lands, status 2007	Reclaimed Lands, status 1984[2]	Reclaimed Lands, status 1965[3]
Crimea	**2608,1**	**5,1**	-	-	-
Vinnitsa	**2649,2**	**29,3**	**57,3**	**41,9**	**6,1**
Volyn	**2014,4**	**115,7**	**416,6**	**372,4**	**184,9**
Dnipropetrovsk	**3192,3**	**26,5**	-	**0,8**	**0,7**
Donetsk	**2651,7**	**10,2**	**4,7**	**4,5**	-
Zhytomyr	**2982,7**	**99,2**	**425,4**	**362,8**	**96,8**
Zakarpattia	**1275,3**	**0,8**	**183,8**	**179,3**	**145,0**
Zaporizhzha	**2718,3**	**6,7**	-	-	-
Ivano-Frankivsk	**1392,7**	**2,8**	**195,4**	**167,3**	**46,4**
Kyiv region	**2812,1**	**50,0**	**188,8**	**176,5**	**65,8**
Kirovograd	**2458,8**	**10,7**	-	-	-
Lugansk	**2668,3**	**16,4**	**11,1**	**12,4**	**1,6**
Lviv	**2183,1**	**9,4**	**513,2**	**495,1**	**347,4**
Mykolaiv	**2458,5**	**21,3**	-	-	-
Odessa	**3331,3**	**72,2**	**4,4**	**3,8**	-
Poltava	**2875,0**	**85,9**	**37,2**	**39,7**	**20,4**
Rivne	**2005,1**	**105,3**	**390,4**	**357,8**	**184,0**
Sumy	**2383,2**	**62,9**	**106,6**		

[2] Reclamation in Ukraine/ Editor I.A. Garkusha.-K.:Urozhay, 1985, 376 p.

[3] Reclamation in Ukraine/ Editor I.A. Garkusha.-K.:Urozhay, 1985, 376 p.

Ternopil	**1382,4**	**5,6**	**165,6**	**141,5**	**20,6**
Kharkiv	**3141,8**	**30,6**	**11,8**	**8,7**	-
Kherson	**2846,1**	**31,1**	-	**8,7**	-
Khmelnytsk	**2062,9**	**20,4**	**117,5**	**89,7**	**17,3**
Cherkasy	**2091,6**	**30,8**	**55,7**	**44,4**	**30,6**
Chernivtsi	**809,6**	**1,2**	**121,8**	**99,6**	**26,6**
Chernigiv	**3190,3**	**125,4**	**300,0**	**257,0**	**125,8**
UKRAINE TOTAL	60354,8	975,8	3307,3	2 952,8	1 372,8

Annex IV: Peatlands fire statistic, *in hectares.*

Region	2002	2003	2004	2005[4]	2008
Volyn	183	75	50	Data not available	Data not available
Rivne	17	Data not available	Data not available	Data not available	Data not available
Zhytomyr	0,8	Data not available	Data not available	Data not available	Data not available
Lviv	73,7	Data not available	Data not available	Data not available	Data not available
Kyiv	32	Data not available	Data not available	Data not available	188,58
Sumy	Data not available	Data not available	Data not available	Data not available	Data not available
Chernigiv	0,9	Data not available	Data not available	Data not available	Data not available
Poltava	Data not available	Data not available	Data not available	53	Data not available
UKRAINE	307,4	75	50	53	188,58

[4] National Report of the Ministry of Emergency of Ukraine, 2005

The three countries differ in the extent and percentage of degraded peatlands available, in the public awareness about the threats of degraded peatlands and about the multiple opportunities of restored peatlands, in experience with rewetting, in political will and action with regard to peatland rewetting.

Country	**Belarus**	**Ukraine**	**Russia**
Paludified land (%)	14.2%	1.8%	~ 8%
Degraded peatlands	51.2%	50%	No data
Rewetting activities	++	-	+
Private rewetting activities	+	?	+
Bogs	++	+	++
Fens	+++	++	+
Transitional peatlands	+	+	-
Governmental rewetting activities	+	?	+

Belarus does not only have the biggest relative share of peatlands, it has also vast experience with rewetting and a very open political climate towards rewetting.

Belarus' striking rewetting activities, conducted in close collaboration of UNDP and the Ministry for Forestry, were successful in the last years in rewetting 33,000 ha (see p. 20). This concentrated experience is unique in Central Europe and hopefully will be applied on a much larger territory and will disperse to other countries.

The hierarchic system of state administration in Belarus is efficient and reliable with regard to implementing conservation action that is also in the wider interests of the country. The openness for conservation concerns and the readiness to take action was already demonstrated at the Michael Otto Conference 2007. The Ministry of Natural Resources and Nature Protection promised to reallocate 500,000 ha of degraded peatlands and thereby showed a willingness to change the actual conditions of degraded peatlands. The main rewetting activities concentrated on extracted peatlands of the forest fund. A focal point for the work in the next years will be the involvement of rewetting activities of ineffectively used agricultural peatlands.

Despite the rewetting efforts there are also simultanous activities that continue to contribute to peatland destruction, such as the planned intensification of peatland extraction and the recultivation of abandoned fen sites in the Polessye. This shows that aspects of energy supply and food production is given priority. But scientists in Belarus are optimistic that it would be desirable and manageable to change the way of ineffective and unsustainable exploitation of degraded peatland, if the economic advantage of alternative utilisation such as paludiculture (reed cutting or sphagnum farming) could be shown. The expansion of extraction sites has its limits in the decreasing amount of peat suitable for extraction (Bambalov 2009, pers. comm.).

The new Water code of the **Russian Federation** (2007) recognises peatlands as special water objects. Changing the use or intensification activities are regulated under this Code. There is a distinct division of conservation planning and peatland exploitation between federal, provincial and local level. The authors are supporting an inter-sectoral corporation and coordination regarding this issue. After the decreasing peat extraction activities in the 1990s, a new period of intensification can be observed in the surroundings of densely populated regions after 2003. On a regional level official rewetting activities were conducted, mainly after very dry summers like in 2002. Similar to Belarus some companies of the peat industry finance rewetting activities voluntarily. The main driving factor of peatland restoration, while there is actually no law that forces the peat cutting industry to rewet the extracted areas again, is the prevention of fires. Nature conservation, concerns about climate change and recreational aspects are secondary aspects. Summarising the rewetting activities in Russia, most activities were undertaken by the peat industry enterprises. Numerous informal rewetting activities have been undertaken by local stakeholders or NGOs, which unfortunately often lack sustainable funding for long term monitoring and maintenance of the measures undertaken. During the discussion at the seminar peatland specialists argued that there will be a market inside of Russia to sell emission reductions from rewetting of Russian peatlands, due to an ongoing discussion about scientific uncertainties and lack of centrally organised and technically integrative implementation.

In **Ukraine** the first internationally financed (FMENCNS, MSF, RSPB) large scale rewetting project is actually planned. In the time of report compilation there were no examples of rewetting experiences available. The problems of summer drought leading to fires and the high amount of trace gas emissions from drained peatlands are recognised as well as in all the other countries. The main difference to Belarus will be that the rewetting activities are planned by the nongovernmental sector. Due to the dynamics in the political system the sustainability of rewetting activities are seen to be safer if a land lease for approximately 50 years could be implemented and the land leaser will be a nongovernmental conservation organisation or an organisation which can be contracted according to the aims of the project.

SUMMARISING CONCLUSIONS AND DEMANDS CONDUCTED AT THE SEMINAR

The main bottlenecks are:

- Lack of knowledge within national and local decision makers
- No expertise/experience nationally in designing and conducting carbon projects
- No verified methodology to calculate avoided emissions
- Lack of legal and policy framework
- Insufficient knowledge of the current situation with peatlands

What can be done?

<u>On the international level:</u>

Establish mechanisms - lobby at UNFCCC for inclusion of temperate peatlands into REDD.

Science:

Estimate the GHG emission in degraded and restored peatlands.

Communication:

Promote peatland restoration in Eastern Europe to donors and other funders.

<u>On the national level</u>

Policy:

- include the restoration of peatlands in the national strategies and action plans for implementing the Kyoto protocol
- develop National Programs for restoration
- adopt legal regulations towards GHG emission reduction
- include ecosystem services into land use planning

Strengthen institutional capacity for:

- applying market-based mechanisms
- developing restoration projects
- development of JI and voluntary projects
- certifying and verifying carbon credits

Capacity building for designing and conducting carbon projects

- organize donor funded projects
- capacity building seminars

Sustaining the financial base for peatland restoration

- establish financials mechanisms such as a Trust Fund

Communication

- raise awareness among key national and regional stakeholders

Technical guidance and science

- complete and update database on peatlands
- apply site selection criteria to take account of environmental, social, economic, political and technological factors
- develop guidance on technical aspects of restoration
- explore the water services of restored peatlands

These collected demands can and should be a source for the planning of future restoration projects in the focal countries.

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