

Lake Peipsi/Chudskoe

EXPERIENCE AND LESSONS LEARNED BRIEF

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1. Description

Lake Peipsi/Chudskoe-Pskovskoe, sometimes called Peipus (hereafter, Lake Peipsi/Chudskoe), is the largest transboundary European lake, and Europe's fourth largest lake overall. Its three names originated from three languages historically used in the region—Peipsi came from Estonian, Chudskoe-Pskovskoe or Pskovskoe-Chudskoe from Russian, and Peipus from German. Lake Peipsi/Chudskoe belongs to the water basin of the Narva (or Narova) River, a 77-km long watercourse which connects Lake Peipsi/Chudskoe with the Gulf of Finland of the Baltic Sea (Figure 1). Estonia and the Russian Federation (hereafter, Russia) share Lake Peipsi/Chudskoe and three countries, including Estonia, Russia and Latvia, share the Narva River basin. Latvia has only 5% of the basin, and pollution from its territory is very small in the overall pollution load in the basin.

What makes Lake Peipsi/Chudskoe specific and different from other great lakes of the world is that it is located on the European Union border with Russia and is shared by countries in transition. Estonia regained its independence from the Soviet Union in 1991. Before that, Lake Peipsi/Chudskoe was a large, internal lake in the

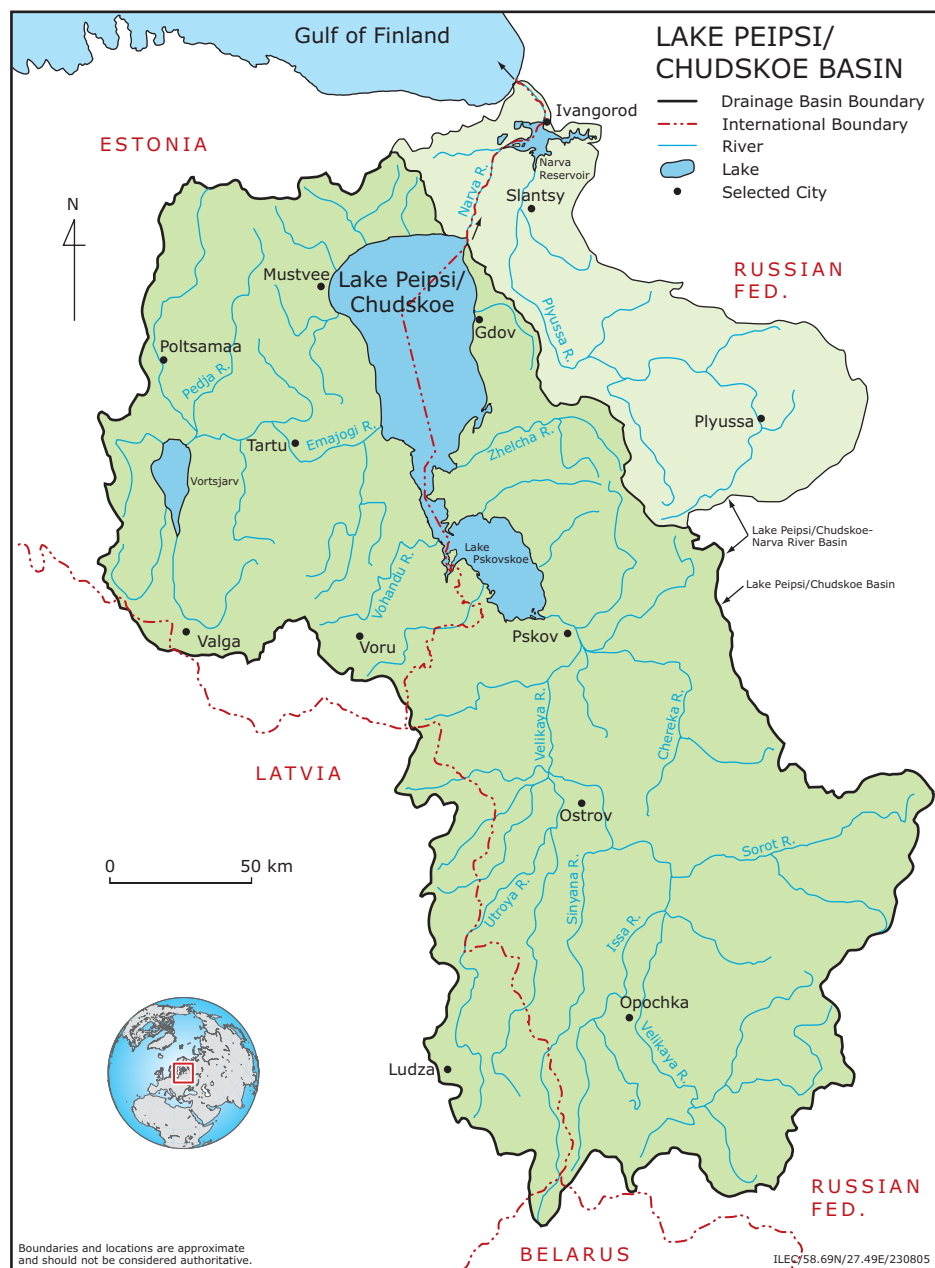


Figure 1. The Lake Peipsi/Chudskoe Basin.

northwest of the Soviet Union, where the same legislation, procedures, environmental standards were applied for the whole lake basin. Therefore, it is a new transboundary lake. With these radical political changes at the beginning of the 1990s, the socio-economic context of water management also changed drastically, and the main challenge for the future development in the Lake Peipsi/Chudskoe basin is the growing gap in socioeconomic development as well as in formal frameworks, including norms and standards, as well as differences in practices and information on the two sides of the border.

Estonia joined the supranational European Union (EU) in 2004 thereby making Lake Peipsi/Chudskoe a transboundary lake shared by Russia and the European Union. Estonian legislation and environmental management system have been adjusted to incorporate requirements of the EU legislative and institutional framework. In the field of water management, requirements of the EU Water Framework Directive as well as of other relevant EU directives are being incorporated into the Estonian framework for water management. The EU legislation, norms and standards are different than those of Russia. There is great work to be done in managing the Estonian-Russian transboundary waters in a manner that will harmonize the methodological approaches, procedures, and standards across the border, as well as to ensure a more balanced social and economic development of the whole basin.

2. Physical Geography

Lake Peipsi/Chudskoe is a part of the Narva River basin, which is located in the central part of the southeast coast of the Baltic Sea and has an area around 56,200 km², which is 3.6% of the total area of the Baltic Sea basin. Three countries share the Narva River/Lake Peipsi/Chudskoe basin: Russia (36,100 km²; 64.3%), Estonia (17,000 km²; 30%) and Latvia (3,100 km²; 5.5%). The water basin area of the Narva River itself is 877 km² (only 15% of the total basin area). The mean annual

water discharge via the Narva River into the Gulf of Finland of the Baltic Sea is 12.6 km³ (approximately 50% of the average volume of Lake Peipsi/Chudskoe). Morphometric data on Lake Peipsi/Chudskoe for the water level of 30 m above sea level is given in the Table 1.

2.1 Socio-economic and Political Context

The lake has been a natural border between people who inhabited territories around Lake Peipsi/Chudskoe and resulted in the different cultural composition of the eastern (Russian) and western (Estonian) peripheries of the Lake Peipsi/Chudskoe basin. The majority of the population on the Russian side of the border is Russian, and on the Estonian side of the border two cultural minority groups reside. Russian Old-Believers, a distinct cultural minority group among the majority of the Estonian population, live in the central part of the basin in shoreline rural communities; and in the southern part of the basin live the Setu people, who speak a language that is very close to Estonian, but unlike Estonians, their religion is Christian Orthodox, like Russians. These minorities contributed a lot to the cultural heritage of the region and traditionally used the lake as a source of income.

In terms of economic development in the region, the commercial fishery and agriculture are the most important sources of income for the local population in the region. The Lake Peipsi/Chudskoe area is mostly located in rural agricultural periphery of the two countries but it exceeds all other large lakes in northern Europe as a fishery resource (Noges 1996).

Land use in the Lake Peipsi/Chudskoe basin is as follows: agricultural land (42%), forest (40%), wetlands (6%), open water (2%), and other uses including urban areas and roads (10%). A substantial fraction of the agricultural land is today unused or fallow land. For example, 40% of the agricultural land in the Velikaya River basin is of non-arable character.

Table 1. Morphometric Data on Lake Peipsi/Chudskoe at Water Level of 30 m asl.

	L. Peipsi s.s./ Chudskoe	L.Lämmijärv/ Teploe	L.Pihkva/ Pskovskoe	The whole Lake Peipsi/ Chudskoe-Pskovskoe
Area (km ²)	2,611	236	708	3,555
Water area in Estonia/Russia (km ²)	1,387/1,224	118/118	25/683	1,564/1,991
Percentage of surface area	73	7	20	100
Volume (km ³)	21.79	0.6	2.68	25.07
Percentage of total volume	87	2	11	100
Medium depth (m)	8.3	2.5	3.8	7.1
Maximum depth (m)	12.9	15.3	5.3	15.3
Length (km)	81	30	41	152
Medium width (km)	32	7.9	17	23
Maximum width (km)	47	8.1	20	47
Length of shoreline (km)	260	83	177	520
Percentage of total length (km)	50	16	34	100

Source: Janni (2001).

Besides agricultural land, land use in the drainage basin of Lake Peipsi/Chudskoe is dominated by 40% of forested areas and approximately 8-9% of wetland/bogs. Forestry and processing of timber is a rapidly developing branch of Estonian industry at the moment, making logging and timber processing a noteworthy alternative for those who lost their jobs in agriculture in the regions far from cities. On the Russian side, the main impediments to the development of forestry are the absence of roads in remote forested areas and the general economic recession of the region.

Large areas of peat deposits are located in the Lake Peipsi/Chudskoe basin. They are not used intensively because the bigger bogs and marsh areas are in protected areas. Moreover, wetland areas of Lake Peipsi/Chudskoe have been recognized as wetlands of international importance. Thus, Lake Peipsi/Chudskoe and its basin have a great potential for eco-recreation and eco-tourism.

The main branches of industry in this region are energy production, building and civil engineering, chemical industry, textile manufacture, foodstuff production and timber processing.

2.2 Water Use

There is enough of clean ground and surface water in the Lake Peipsi/Chudskoe watershed for the basic needs of the population. The only large settlement using the lake water for drinking is Narva (73,000 inhabitants), which takes its water from the Narva River, which is the only river flowing out of the lake. The part of Lake Peipsi/Chudskoe belonging to Estonia constitutes 89% of the surface area and yields 95% of the freshwater fish catch of the country. Lake Peipsi/Chudskoe has been considered a potential source of water supply for northeastern Estonia and the Estonian capital, Tallinn. In addition to the fact that the water resources of Lake Peipsi/Chudskoe can be regarded as practically inexhaustible for Estonia, the lake has also great importance from the point of view of the fishery and for recreation.

For the Russian Federation, the lake is not so important as a source of freshwater and fish due to the absence of big cities around Lake Peipsi/Chudskoe and the close location of bigger lakes such as Ladoga and Onega. The Lake Peipsi/Chudskoe region is more important from the political point of view as a border region with Baltic States and the North Atlantic Treaty Organization (NATO), and with the EU. Nevertheless, on the regional level the lake is an essential resource in terms of fishery resources, and in the future, for recreation, although at present tourism is still developing.

The lake itself is not used for irrigation purposes; its main use from the food production perspective is the fishery. According to present data, one species of lamprey and 33 fish species permanently inhabit Lake Peipsi/Chudskoe or the lower reaches of its tributaries. The main commercial fish catches are lake smelt, perch, pikeperch, ruffe, roach, bream, pike and,

until the 1990s, also vendace. The second rate commercial fish are burbot, whitefish and white bream. The total catch is usually 9,000-11,000 (25-31 kg/ha) metric tons of fish a year. In general, the lake provides generally favorable spawning and feeding conditions for fish. According to the classification used in fisheries, the lake was earlier referred to as a smelt-bream type of water body. Since the second half of the 1980s, it has acquired some qualities of a pikeperch lake.

At the beginning of the 1990s, the possibility to export fish to the European market appeared. The opening of this new and highly profitable market outlet resulted in rapidly increasing pressure on the fish resources, both in terms of the number of fishermen and in their effort.

The collapse of the Soviet Union in 1991 brought massive changes to the region's industry and especially agriculture. In communist times, the landscape in this northwestern part of the Soviet Union had always been used more intensively than other regions. The collective and state farms were mainly specialized in meat and dairy production and additional growing of fodder crops. Because of inefficient use of fertilizer and the lack of proper manure handling, agriculture caused high emissions of nutrients (nitrogen and phosphorus) into rivers and lakes, resulting in eutrophication problems (Leisk and Loigu 1996). After the 1991 political changes, there was an abrupt drop in the economic development in the lake region, especially in agriculture, the main source of pollution in the lake basin. Previous economic activities and cross-lake contacts for economic production and trade were disrupted after the establishment of the international border, and there began Estonia's transition in its legal and institutional framework for economic development, and Russia's introduction of import tariffs for Estonian goods in 1994.

According to Stalnacke et al. (2002), at present, the area has already been in a period of transition for more than a decade, and the future is still highly uncertain. Although the economy will definitely grow, especially on the western side of this new EU border, it is not yet clear whether the environment will gain or lose from that. The decline of agriculture during the 1990s actually caused nonpoint-source pollution to decrease and the quality of river waters to improve. In the future, it is possible that water quality will decrease again if agriculture recovers. On the other hand, water quality may benefit from EU regulation and good transboundary cooperation and agreement on farm mineral balances and better public wastewater treatment. Thus, nutrient loads and water quality are linked to future economic development in various, sometimes indirect, ways.

3. Threats to Sustainable Use of the Lake

One of the main problems with water protection is the eutrophication of surface waters caused by the increased load of nutrients of anthropogenic origin. During the last half of this century, ecological conditions of Lake Peipsi/Chudskoe have been constantly worsening. In the 1960s the lake was classified as mesotrophic. The eutrophication in 1970-80s

has caused the higher vegetation (mainly reeds) to spread and grow thicker. The nutrient content in the rivers of the Lake Peipsi/Chudskoe basin was high at the end of the 1980s causing eutrophication of water bodies. At the beginning of the 1990s, with the dissolution of all collective agricultural farms on the Estonian side and an economic depression on the Russian side of the lake, where the collective farms did not receive any more subsidies to use fertilizers on the fields or to keep large cattle stocks, the nutrient load to the lake has decreased considerably. Research results indicate that the nitrogen and phosphorus loads decreased by 53% and 44%, respectively, between the late 1980s and the mid 1990s. This has also noticeably improved the water quality of Lake Peipsi. The division of nutrient loads between Estonia and Russia as well as between different types of sources is presented in Table 2.

The majority of phosphorus and nitrogen compounds are carried into the lake by two rivers. The Estonian river Emajogi and the Russian river Velikaya account for approximately 80% of the total nitrogen load and almost 85% of the total phosphorus load into Lake Peipsi/Chudskoe. It is interesting to compare the studies done in the middle of 1980s and 1990s showing great decrease in pollution loads, especially concerning agriculture.

Diffuse pollution is increasing in recent years which is partially caused by drastic changes in economy. Industry is not so polluting any more due to sharply decreased production. Another factor influencing nonpoint-source pollution is forest cutting that contributes to additional dissolved and fixed nutrient pollution. At present, the drainage system built in Soviet times is not working, so previously ameliorated territories are becoming swamps again.

One additional problem is pollution caused by two large thermal power stations (Baltic and Estonian), which use the Narva Reservoir for cooling of steam machines (RSRIWM 2000). Waters from ash dumps having high alkalinity are also being discharged into the reservoir. Finally, the potential danger of overfishing is one of the main challenges to be addressed in the lake basin. Peipsi is one of the best lakes in Europe for commercial fishing.

3.1 Scenarios of the Environmental State and Regional Development

Researchers in the MANTRA East project elaborated integrated scenarios for the development and environment in the Lake Peipsi/Chudskoe basin for the period of 15-20 years based on which they formulated their statement on the major environmental issues in the lake basin and what should be done to improve the environmental situation.

The scenarios were developed using the story-line methodological approach and using qualitative as well as quantitative information as input into the scenarios. Points of entry of the scenarios' development are the transboundary aspects and regional development (international cooperation and economical development) and their consequences for nutrient discharge/riverine loads and lake water and ecological quality. The driving force variables included population, wastewater treatment connection rate, fertilizer use, livestock amount, crop yields, atmospheric deposition and amount of agricultural lands. The following scenarios were elaborated (Gooch et al. 2002):

- I. Business as usual (BAU) scenario, that includes continuation of present trends where it is expected that the economic situation will remain the same and pollution loads remain at the end-of-1990s level;
- II. "Target/fast development scenario" where Estonia is described in this scenario by a fast adaptation to the EU and Russia by domestic fast economic and social development;
- III. "Crisis scenario" where conditions radically deteriorate into "crisis" in both countries;
- IV. "Isolation scenario" where Estonia has a slow and unwilling adaptation to the EU and Russia is characterized by the isolation from Europe and a growth of nationalist sentiments; and,
- V. A combination of scenarios II and III where Estonia is expected to have fast development and Russia remains in a crisis.

Results of the studies of the environmental state in and development of the scenarios for the Lake Peipsi/Chudskoe

Table 2. Nitrogen and Phosphorus Load Division between Countries and Sources.

	Agriculture	Other diffuse sources	Point sources	Total
Total-N				
Estonia	21.1%	13.7%	2.4%	37.2%
Russia	49.8%	8.4%	4.6%	62.8%
Total-P				
Estonia	12.7%	9.6%	9.5%	31.8%
Russia	48.2%	6.2%	13.7%	68.2%

Source: Stalnacke et al. (2002)

basin showed that given the five scenarios of the future regional development, the riverine nutrient loads into the lake is expected to generally decrease (Mourad et al. 2003). The target/fast development scenario (II) results in a substantial larger total nitrogen input to the lake. The crisis scenario (III) yields the largest total phosphorus load. No scenario predicts larger nutrient loads than in the communist period. Based on this scenario development, scientists developed the following assessment of the environmental state in the lake basin and policy recommendations (Mourad et al. 2003):

- Eutrophication due to significant nutrient loads in Lake Peipsi/Chudskoe represents a major threat for the water quality of the lake; the present ecological state of the lake is moderate;
- Change in the amount of land under cultivation is a major factor controlling nutrient loads to Lake Peipsi/Chudskoe; and,
- Although connection to wastewater treatment plants and larger removal efficiencies for these installations can solve hygienic problems locally, strategies for nutrient load reduction should mainly focus on agricultural nutrient runoff, especially in the Russian part of the drainage basin.

4. Institutional Framework

4.1 Political Setup and Border Issues

Lake Peipsi/Chudskoe belongs to the Republic of Estonia and the Russian Federation, who are responsible for the management and monitoring of the lake. The total length of the Estonian-Russian border is 333.8 km of which approximately two-thirds runs along Lake Peipsi/Chudskoe and the Narva River.

4.2 Legal Basis for the Transboundary Water Cooperation

Each country has its own legislation dealing with water management, but in order to provide sustainable use of the whole lake water basin taking into account basin approach, several bilateral agreements were signed between the Governments of Estonia and the Russian Federation. There are three bilateral agreements concerning water use and water protection in the region:

- *The Agreement between the Government of the Republic of Estonia and the Government of the Russian Federation on Cooperation in Protection and Use of Fish Resources of Lake Peipsi/Chudskoe, Lake Pihkva/Pskovskoe and Lake Lämmijärv/Teploe* signed in Moscow on 4 May 1994. The goal of the Agreement is to develop cooperation in protection and joint use of fish resources in Lake Peipsi, Lake Pihkva and Lake Lämmijärv. The Agreement required the establishment

of the Intergovernmental Commission on Fishery in Lake Peipsi, Lake Pihkva and Lake Lämmijärv;

- *The Agreement between the Government of the Republic of Estonia and the Government of the Russian Federation on Environmental Protection* was signed in Pihkva on 11 January 1996. According to the Agreement, the parties shall develop cooperation in environmental protection on the basis of mutual interests and equality. The cooperation is going on in the following spheres: joint research and project development; exchange of scientific and technical information, documentation and research results; exchange of environmental information and information on fulfillment of the parties' obligations; exchange of environmental management experience; joint conferences, symposia, seminars and exhibitions; exchange of delegations and experts; participation of experts of one party in international environmental conferences, symposiums and exhibitions held by the other party; and other mutually agreed activities;
- *The Agreement between the Government of the Republic of Estonia and the Government of the Russian Federation on Cooperation in Protection and Sustainable Use of Transboundary Waters*, signed on 20 August 1997 in Moscow. This Agreement is aimed to organize cooperation between the Russian Federation and Estonia in the sphere of protection and sustainable use of transboundary waters and their ecosystems. The Agreement deals with transboundary water basins such as the Narva River basin, including the Lake Peipsi/Chudskoe basin.

4.3 Transboundary Commissions

The Estonian-Russian Transboundary Water Commission (hereafter, the Commission) was established in 1997 after the signing of the intergovernmental agreement on the protection and sustainable use of transboundary water bodies between the Republic of Estonia and the Russian Federation. The responsible authorities for implementation of the agreement—the Estonian Ministry of the Environment and the Russian Ministry of Natural Resources—develop joint policies for management of the transboundary waters through the Commission. The Commission is the main actor in managing Lake Peipsi/Chudskoe. It organizes exchange of monitoring data between the parties in accordance with the agreed monitoring program; defines priority directions and programs of scientific studies on protection and sustainable use of transboundary waters; agrees on common indicators of quality for transboundary waters and methods of water testing and conducting analyses; facilitates cooperation between agencies of executive power, local governments, scientific and public interest organizations, as well as other institutions in the field of sustainable development and protection of transboundary waters; ensures publicity of discussions of questions related to the use and protection of the transboundary waters. The Commission adopts its working

plans and decisions at its annual meeting. Four expert working groups were created under the Commission: monitoring and research; water management; water quality; and cooperation with local authorities, NGOs and international organizations. The Working Groups include Estonian and Russian experts who conduct studies and prepare background information for the decisions to be made by the Commission.

The management of fish resources of the whole lake is regulated by the bilateral intergovernmental Estonian-Russian agreement about cooperation in the field of use and protection of fish resources in Lake Peipsi/Chudskoe, Lake Pihkva/Pskovskoe and Lake Lämmijärv/Teploe concluded on 4 May 1994. According to this agreement, the Inter-governmental Estonian-Russian Fisheries Commission was formed in 1995. The functions of the Fisheries Commission are to develop recommendations for coordinated actions in fish resource management; coordination of research in fish resource assessment; possibilities and procedures for one party to fish in the waters of the other party; exchange of fishing quotas based on mutual interests and legislation of both parties; establishment of the maximum common catch for various fish species and its distribution between the two parties; regulation of allowable fishing gear and methods; minimum permissible size of commercial fish; allowable share of fry catch; seasonal and territorial limitations; improvement and efficient reproduction of fish resources including fish-breeding; procedures to resolve fishing disputes and incidents; access to fishing of the third parties' persons and organizations; control over the fulfillment of the approved measures; and other activities in protection and sustainable use of fish resources of Lake Peipsi/Chudskoe.

4.4 Transboundary Water Policies and Stakeholder Involvement

4.4.1 *International Basin Level Policies*

The Estonian and Russian governments are signatories to the UN ECE Transboundary Water Convention (1992). The two governments have signed a bilateral intergovernmental agreement on the use and protection of their transboundary waters in 1997. According to the agreement, the Estonian-Russian Transboundary Water Commission (the Commission) was established. The Commission is an important institution that can effectively coordinate implementation of integrated water management approaches organized by the riparian parties: Estonia and Russia.

Regarding the effectiveness of existing institutional arrangements for transboundary water management in the Lake Peipsi/Chudskoe basin, it is noteworthy that the Commission lacks capacity to implement integrated water management approaches in the basin. Due to a lack of financial and human resources, the working groups do not meet more often than once a year; information on the working groups' meetings is not disseminated widely (the minutes are available on request but no active dissemination of the Commission materials is taking place); implementation of working plans

are sometimes delayed; there was a year-long period in which the Commission's website was not updated. The Russian side of the Commission has long-term work experience in a transboundary water commission with Finland, as well as with China and other countries on the eastern borders of Russia. It seems that this experience is being well used to develop better cooperation in the Estonian-Russian transboundary water area also.

The Commission established a formal mechanism for development of cooperation with local authorities, NGOs and stakeholders, which allows NGOs and local stakeholders in the region to communicate their issues and interests directly to the intergovernmental commission. However, only a few regional NGOs are involved in the work of the Commission; the capacity of most local NGOs and stakeholder groups is low (although growing) and external financial support is necessary to promote development of capacity of local NGOs and stakeholders to enable them to get involved in management of transboundary waters shared by countries in transition. Regional NGOs, such as the Peipsi Center for Transboundary Co-operation (Peipsi CTC) and the Council for Co-operation of Border Regions, cooperate with the local authorities and stakeholders on regional development projects as well as on educational, research and social projects in the region. Peipsi CTC is also actively involved in the work of the Commission. Involving small NGOs, local and regional authorities and businesses in the Lake Peipsi/Chudskoe region into the work of the Commission remains one of the challenges to be addressed in the future.

4.4.2 *State/Federal Levels*

On the state/federal level, governments implement national legislation and plans that promote sustainable use of natural resources in the Lake Peipsi/Chudskoe Basin. Russian Water Code was adopted in 1995 that provides legal basis for water protection measures in the Lake Peipsi/Chudskoe Basin and in Russia as a whole. Estonian Water Act was adopted in 2000.

4.4.3 *Implementation of the EU Water Framework Directive in Estonia*

Estonia's wish to quickly accede to the EU brought about the need to adapt the Estonian legislative and administrative systems to EU requirements. Within this process, the Estonian Water Act also has been harmonized with the EU Water Framework Directive. In accordance with the EU Water Framework Directive, since 1 April 2001 Estonia has 8 sub-catchment areas and one nitrate-sensitive area. In each one of these, a responsible catchment administration will be set up.

4.4.4 *European Water Policy and Russia*

The Water Framework Directive (WFD) of the European Union does not have a mandate for Russia because the EU WFD is compulsory only for the members of the EU and is recommended for accession-countries. Nevertheless, it could be used for transboundary basins located on the territory of Russian Federation because it deals with question of joint water management in the case of EU and third-country

transboundary waters. In fact Russian water authorities started to test joint approaches based on the principles of the EU WFD on the transboundary Finnish-Russian waters. There is willingness on the Russian side to harmonize approaches with the Estonian water authorities and implement jointly principles of the European water legislation also on the Estonian-Russian transboundary waters.

4.4.5 Stakeholder Involvement

Major stakeholders are local authorities and farmers. There are a growing number of grass-root non-profit organizations in both Estonia and Russia that deal with environmental protection and sustainable development issues in the Lake Peipsi/Chudskoe basin. However, still most of the small organizations in the region are weak and do not have sufficient capacity for large-scale activities. The major NGO that deals with transboundary cooperation in the Lake Peipsi/Chudskoe basin is an international non-profit Peipsi Center for Transboundary Cooperation (Peipsi CTC) (www.ctc.ee). The Peipsi CTC was formed on the basis of Lake Peipsi/Chudskoe Project. Established in 1993, the Lake Peipsi/Chudskoe Project was an informal network of researchers who were interested in studies of environmental issues in the Lake Peipsi/Chudskoe basin. Today Peipsi CTC is an international, non-governmental organization that works to promote sustainable development and transboundary cooperation in the border areas of the Baltic States and the New Independent States. Peipsi CTC main programs are Lake Peipsi/Chudskoe Water Management, NGOs and Civil Society, and Lake Peipsi/Chudskoe Ecotourism Program. Peipsi CTC organizes every year the “Lake Peipsi/Chudskoe Forum”, an international conference that brings together representatives of the governments of Estonia and Russia, international organizations working in the region, municipalities, businesses, and NGOs around the lake basin. There are more and more smaller NGOs get involved in the transboundary water projects but there is a need for additional capacity building measures and financial support to promote their involvement in water management in the transboundary water basin.

4.4.6 Scientists and Educators

Estonian and Russian universities started their cooperation through joint seminars, research, and educational projects and students’ exchanges in the 1990s. Since 1996, every year more than 5,000 schoolchildren from the region participate in an international children’s creative works contest called “World of Water Through the Eyes of Children”.

There are a number of multilateral large-scale research projects where universities and other organizations from the Lake Peipsi/Chudskoe area participate. Thirteen research institutions from six countries in Europe, including organizations from Estonia and Russia, are involved in a three-year research project “Integrated Strategies for the Management of Transboundary Waters on the European fringe—the pilot study of Lake Peipsi/Chudskoe and its drainage basin” (MANTRA-East; www.mantraeast.org) supported by the EU. This project produces multiple research

reports and publications that are actively used in preparation of management plans of the Lake Peipsi/Chudskoe basin. The MANTRA-East project also produced a transboundary GIS system as a central instrument for the information dissemination on the lake basin environmental issues and a regional Lake Peipsi/Chudskoe web portal that shall exist principally for the collection, processing and dissemination of information pertaining to the Lake Peipsi/Chudskoe region. The portal (available in Estonian, Russian and English languages at www.peipsi.org), with the aid of innovative web technologies, has the potential to tailor otherwise highly-specialized environmental information pertaining to the Lake Peipsi/Chudskoe region to individual needs of any stakeholder, including municipal government officials, businessmen, schools, NGOs and the local public.

4.4.7 International Organizations

The transboundary cooperation on Lake Peipsi/Chudskoe became possible thanks to the assistance of international donor organizations and governments of the Nordic countries, Denmark, the European Union, the US government and GEF/UNDP. The international funding possibilities are discussed at annual meetings of the Commission and are used to implement priority activities under its working plan. For example, support for the Commission’s work was coming from the Swedish Environmental Protection Agency (EPA) through Peipsi CTC, with implementation units on both sides of the lake, to develop coordinated environmental monitoring programs and to promote information dissemination in the Lake Peipsi/Chudskoe region. With the support of the Danish Environmental Protection Agency, a strategy for pollution load reduction (phosphorus and organic pollution) was prepared and cooperation with local authorities and businesses. The European Union and the Global Environmental Facility through United Nations Development Programme provided financial support to the Estonian and Russian governments to develop and start implementation of water management plans in the Lake Peipsi/Chudskoe basin (www.peipsi.org/gef). In 2002, EU LIFE-Environment Programme approved funding to the Estonian government to prepare the Lake Peipsi/Chudskoe Catchment Management Plan for the Estonian side of transboundary water basin that is to implement requirements of the Estonian national legislation and the EU WFD. In 2003, EU TACIS Programme supported preparation of the Lake Peipsi/Chudskoe Basin Management Plan on the Russian side of the lake basin in accord to the Russian Water Code as well as the EU water legislation.

4.5 Major Challenges Facing Transboundary Water Management

Some of the major problems associated with management of the Lake Peipsi/Chudskoe basin are as follows:

- Interrelations between Estonian and Russian stakeholders are not so strong and efficient;

- Interstate co-ordination in the lake basin is not enough especially in the environmental monitoring; and,
- Complicated border issues impede effective collaboration.
- **More human and financial resources to support transboundary communication and building trust** are needed. Water management in a transboundary context is much more complex and multifaceted than water management within one nation-state. In the situation where there is no one government to manage the transboundary waters and there are different states with their distinct political and economic interests, different histories, cultures, all **water management aspects become very political**. This political dimension should not be underestimated in the planning of water protection measures and **many more resources should be planned in transboundary water management projects** (to compare to the projects in water basins located within one nation state) **to support transboundary communication, conflict resolution and prevention through trust building measures across borders and development of institutions for transboundary cooperation. This is to ensure parties can achieve agreements on water protection measures to be taken.** In the Lake Peipsi/Chudskoe basin, the UNDP/GEF project that supports transboundary cooperation, information exchange and development of a transboundary water management program is important as it facilitates information exchange and cooperation between national Estonian and Russian authorities and international water management projects that are implemented separately, namely, the EU TACIS project in Russia and the EU LIFE project in Estonia.

There is a problem affecting ecosystems, as well. As far as the lake itself, it has remarkable characteristics, and the wetlands around it are Ramsar sites: the lake basin could be regarded as a huge natural complex having its own unique conditions. Hence these ecosystems are precious in their undisturbed state and the loss of any component will mean the change of the whole system.

Nevertheless, there are some strong points connected with water management in the basin:

- Good will to cooperate in the region;
- Developed legislative base;
- Existing institutional arrangements for water management on the both sides;
- Signed bilateral agreements;
- Working intergovernmental Commission; and,
- Existing monitoring facilities on both sides.

As Lake Peipsi/Chudskoe is a relatively new transboundary water basin, the procedures of international coordination of water management have to be elaborated in the context of Estonian entry into the European Union for which it has adopted EU standards and norms that are different from those of Russia. This task in the context of an international lake shared by transition countries is not easy to achieve—development of cooperative integrated water management is a long process, and along with water management issues, economic and social development problems should be resolved. The most important planning and development issue concerning Lake Peipsi/Chudskoe is the preparation work for Lake Peipsi/Chudskoe Management Programme. In co-operation with the Estonian and Russian governments, regional and local authorities, private companies and public, this is to be completed by 2005 with the support from the Global Environmental Facility/United Nations Development Programme, and a contribution from the EU LIFE and TACIS programs.

5. Lessons Learned and Recommended Initiatives

Based on the experiences of the transboundary cooperation in the Lake Peipsi/Chudskoe basin, the following lessons learned and recommendations for effective management of transboundary waters could be formulated.

- **Communication and information activities are also very important in the transboundary water management context as information is exchanged across different legal and institutional frameworks, cultures and languages.** Along with the specific technical information, contextual information is to be communicated to the parties on the other side of the border. In this context, **the role of regional transboundary groups (research cooperative groups, businesses or NGOs) as translators of this type of information is critical** to ensure transboundary communication takes place and is effective.
- **The political will from the governments of the riparian countries is a prerequisite for the start of successful transboundary cooperation.** The Lake Peipsi/Chudskoe basin shared by Estonia and Russia became transboundary again (after re-establishment of Estonia's independence) at the beginning of the 1990s; the transboundary water management agreement was signed and a joint transboundary water commission was established in 1997. Signing the agreement and establishment of the commission were critically important events in the process of development of the transboundary cooperation in the Lake Peipsi/Chudskoe basin.

- **At the initial stage of establishment of transboundary cooperation, special attention is to be paid to elaborating an appropriate design of cooperative institutions; also detailed procedures of work of joint bodies** should be developed. For instance, it is necessary to ensure that the design of cooperative institutions is done in a way that all interest groups in a specific water basin have possibilities to get involved in the process of making decisions on issues of use and protection of the transboundary water resources. This could be done through creating a possibility for representatives of diverse interest groups to participate in the work of joint bodies as observers to these bodies (commissions) or otherwise creating special expert groups under joint bodies dealing with stakeholder and public participation. In the Lake Peipsi/Chudskoe basin, a working group dealing with cooperation with local authorities and NGOs was set up. Unfortunately, no specific procedures of work of the Estonian-Russian Transboundary Water Commission were developed and this, of course, decreases the level of effectiveness of the work of the Commission in addressing issues of water protection and use in the basin.
- An important instrument to ensure communication and coordination of measures across borders is **establishment of institutional arrangements for management of transboundary waters**. This includes establishment of joint bodies (commissions or secretariats) for coordination of implementation of transboundary water agreements. The joint bodies may vary as to format, structure or functions according to the specific circumstances in question. The value of joint bodies comes from providing a forum for working together and for addressing and resolving common problems. Often joint bodies deal with difficult issues, some of which have large-scale environmental and economic impacts and some joint plans take a long time to resolve, but the process of working on those plans is important, and as a rule, the result of these cooperative processes is the resolution of difficult plans and issues.
- The political as well as social and economic context and environmental challenges in transboundary water basins change with time in every lake basin; and **institutional arrangements should be established to be flexible to accommodate the changes in the socio-economic and political context** in the region. Structures that are too rigid are often unable to demonstrate quick response to changing situation and provide appropriate administrative and financial support to transboundary cooperation.
- To ensure an integrated approach to managing transboundary waters, it is important that **members of joint bodies represent the different organizations** involved in water management on different levels so that different perspectives are represented: for example, it has proved effective for example, for the Estonian-Russian Transboundary Water Commission to have in the Commission not only the representatives of ministries of the environment and foreign affairs, but also border guards, regional and local authorities. This composition of members of the joint bodies creates conditions for adopting the most viable working solutions to problems.
- **Involving local stakeholders into the work of joint bodies** and preparation and implementation of transboundary water management plans as well as other strategic documents is critically important to ensure that inter-municipal cooperation is included into the transboundary water cooperation process. Involving municipalities and local stakeholders allows for including the interests of the local population into implementation of transboundary water regimes. When implementing the proposals of joint bodies and riparian governments, ownership of the local population and the decision-making ministries is essential. Involving local stakeholders in transboundary water management is not a luxury but a necessary condition for the long-term sustainable development by developing social capital, promoting social learning, and developing capacity through networking in the region and with experts and organizations in other transboundary water regions. Such instruments will also contribute to the **overall sustainability of the results produced by numerous international/national projects** and programs through attracting local/regional funds which will help to provide efficient use of achieved results and implementation of the strategic documents.
- In a transboundary water basin, with considerable differences in legislation as well as gaps in the socio-economic development, etc. between the different sides, **both national water management plans on different sides of a border and an umbrella transboundary water management program should be developed**; a mechanism to coordinate water measures planning activities on different scales—transboundary, national and local—should be set up. This model of water planning (combination of development of an umbrella transboundary water management program with the development of national water management plans) worked well in the Danube River basin and is being effectively implemented in the Lake Peipsi/Chudskoe basin within the UNDP/GEF project during the project period, 2003-2005. The process of planning of water protection measures on different scales should be organized interactively providing communication between teams developing national water management plans and transboundary water management strategies.
- Parallel to the process of developing cooperation on the intergovernmental level between nation-states, it is important **to provide support to transboundary**

- networks of local authorities and stakeholders** specifically in communication within the networks and in developing their shared vision of the future for the whole water basin. In the Lake Peipsi/Chudskoe basin, there are still weak but already existing cooperative networks between municipalities, schools, NGOs and commercial companies. The local transboundary cooperation in the region should be supported by the nation-states involved in the transboundary cooperation.
- **To promote interactive planning of water management measures in transboundary water basins, innovative tools and instruments for information exchange and communication, including the Information and Communication Technologies, should be elaborated.** Possibilities to use ICT to promote communication and cooperation across borders are growing as there is a growing number of people in the Lake Peipsi/Chudskoe region who use the Internet and as travel across the border remains difficult and expensive for local people. In the Lake Peipsi/Chudskoe basin, a communication and information strategy has been developed as a part of the transboundary lake basin management program and special tools for information exchange and communication were elaborated with the aim to facilitate effective management of transboundary waters. One important tool is a regional Lake Peipsi/Chudskoe Internet portal at www.peipsi.org that uses knowledge management technological solutions to provide comprehensive information on environmental issues and management of the lake basin. The portal exists in Estonian, Russian and English languages.
 - **Research and educational transboundary cooperation** projects play an important role in elaborating visions, developing scenarios for transboundary water basins as well as helping to develop expertise and capacity of water experts in the region. Cooperation between research and educational organizations in the water basin is also important to produce shared and reliable information that can be further used to make management decisions. Coordination of information on research projects by the transboundary commission allows more efficient use of results of the research projects in preparation and implementation of water basin management plans. More independent research has to be encouraged to produce new ideas and approaches for more effective work of handling transboundary water management challenges. Many of the scientists working with water research work as experts for joint water bodies. It is important to have a broad base of expertise among experts involved in transboundary water management. The role of experts is important in developing common ground for the environmental protection strategies to overcome existing differences in environmental standards, norms, and legal and institutional frameworks.
 - To ensure that the institutional arrangements are updated to reflect changes in the cooperation context and environmental issues, a mechanism for **regular evaluation of effectiveness of institutional arrangements** should be set up. Having an evaluation mechanism would ensure the institutional arrangements address priority environmental issues in a transboundary water region. Results of such independent evaluation should be open as much as possible for providing the base for changes in the system.
 - Implementation of water protection measures requires considerable financial resources, usually much higher than are usually available in the transboundary water region. Implementation of water protection measures requires utilization of matching finances from the respective governments as well as from regional and local authorities and the private sector. It is important to take into account that transboundary areas shared by countries in transition consist of peripheral and usually less economically-developed regions of neighboring countries. Therefore, the budgets of local authorities are poor and few private entrepreneurs in those border areas would be willing to put their resources into water protection. The market for businessmen is much wider in capital areas where most of the wealth of countries is concentrated. In this context, it is an imperative especially in transboundary water basins shared by countries in transition to bring together **environmental objectives with economic development priorities of the border regions** within the water management basin plans that reflects priority interests of people living in transboundary water regions. This is the only way to ensure availability in the long term of financial resources for implementation of water protection measures.
 - **Incorporating the unique history and cultural context** of transboundary water regions into the water management is important. All transboundary lakes and rivers have unique histories and cultural heritage related to the water itself and in many cases this is reflected in the music, art, poetry, legends, architecture and other forms of cultural expression. Different cultural contexts need to be factored in to the design of lake basin management plans. Transboundary water organizations can capitalize on people's interest in the cultural heritage of the region to find common ground and break down barriers to cooperation that had come about in more recent history.
 - Effectiveness of the transboundary water cooperation depends on a **range of differences in the levels of social and economic development** on different sides of the borders. Studies showed that when these differences are not great, the differences could promote cooperation; if a gap in socio-economic development and political organization is as great as to prohibit partners on different sides of the border to understanding each

other's problems and issues, this could create mistrust and serious impediments to effective cooperation. If no arrangements are adopted to manage and overcome disparities, the growing gap in socio-economic development and living standards on different sides of the border, including norms, standards, practices, and information, is likely to become the main bottleneck to implementation of integrated water management strategies. The Estonian-Russian border area is an example of where a growing disparity in socio-economic development is a worrying feature that may become an impediment to the transboundary cooperation. It is obvious that the disparity will be the case as Estonia has become a member of the European Union and Russia is now on the external border of the EU. However, this gap should be manageable and would still allow understanding, trust and cooperation with Estonia; Estonian businesses should be still willing to invest on the Russian side of the border and Western tourists would be willing to visit the Russian side of the border region. To ensure this balance, it is important to provide more international, mostly EU, as well as Estonian government funding, to the Russian side of the border for the infrastructure and building administrative and institutional capacity of stakeholders.

- Finally, **coordination of international water initiatives on the water basin level** is of utmost importance and there is a positive experience of the coordinated implementation of international projects in the Lake Peipsi/Chudskoe basin. Coordination in preparing the Estonian and Russian national plans of water protection measures and the Lake Peipsi/Chudskoe transboundary water management program is organized through the development of detailed joint plans of work between the relevant authorities and their projects' implementation units, regular consultations between the project managers and establishment of shared projects' steering committees that include the same representatives from the Estonian and Russian relevant authorities who oversee implementation of all the major projects in the water basin.

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