ROUND TABLE RESOLUTION

Russian-Estonian-Finnish co-operation in the Gulf of Finland

Within the framework of the VII International Environmental Forum "Baltic Sea Day"

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Participants: 45

The topics discussed during the meeting represent the continuation of the joint work; research, monitoring and seminars carried out under the framework of the Russian – Estonian – Finnish co-operation in the Gulf of Finland during 12 years. Presentations were devoted to the most important problem of the Gulf of Finland – eutrophication of waters, its causes and search for optimal solution in order to develop effective measures to improve the state of the Gulf of Finland. The pressures to the ecosystem related to introduction of invasive species and increasing maritime transport were as well discussed.

1. Trophic State of the Gulf of Finland in 2005

Results of national monitoring programs carried out in the Gulf of Finland in 2005 showed no particular changes in the overall trophic state of the Gulf compared with the previous years. However, blue-green algal blooms were less intensive, which was caused by decreased wintertime phosphorus concentrations. Winter concentrations of inorganic nitrogen were higher than in 2004 resulting in higher vernal bloom of phytoplankton than in the previous spring. High algal biomasses and primary production were observed during the summer period in some coastal regions of the easternmost Gulf of Finland, especially in the resort zone of St. Petersburg and in the Vyborg Bay.

Mass occurrences of filamentous algae along the north-eastern coast of the Gulf of Finland still is the major eutrophication problem in this area. After storms large quantities of

organic material in the form of decaying remains of the filamentous algae are moved to the shore which causes the high organic pollution in the sea shore near the water line.

In the coastal deeps (of the Finnish territory) oxygen concentrations were generally better in 2005 than in 2004. This is mainly due to heavy storms, which mixed the water masses in January 2005. Despite relatively good deep water oxygen conditions surface sediments were still reduced at 70 % of the 30 observation sites. Benthic fauna was missing at the same sites. The occurrence of zoobenthos was very low in most the coastal deeps studied in August 2005. Abundant, healthy benthic communities were found only at two sites.

During the last 15 years, there has been a constant increase in summertime eutrophication going on in the Gulf of Finland. This is clearly connected with intensified internal phosphorus loading at the same time. However, an overall decreasing trend since the late 1980s has been detected in wintertime concentration of nitrogen along with decreased external loading. The observed decreasing vernal phytoplankton biomass in the western Gulf is likely in connection with the decreased load. Despite of this decrease, average phytoplankton biomass of the whole growing season has not increased since the early 1990s. The decrease in vernal bloom has been compensated by the increase in summer biomasses.

It is possible to regulate eutrophication by carrying out different water protection measures to decrease nutrient loading from various sources at the coasts and in the catchment area. This will in the long run also decrease the internal load via decreasing sedimentation of organic matter and nutrients, deep water oxygen consumption and further the release of nutrients from the sediment.

2. Cooperation in modelling

The necessity to develop measures to evaluate the significance of various water protection measures requires improvement of ecosystem models both for the calculation of scenarios and for developing of general integrated management system for the catchment area. There are several joint projects going on under the trilateral co-operation. Development of ecosystem modeling has enhanced the reliability scenarios and helped in the planning of measures to reduce the pollution load from land-based sources into the Gulf of Finland. Successful solution of this task can be reached only within the frame of trilateral cooperation on joint scientific projects.

The presentations on hydrodynamic and ecosystem modeling described the effects of different loading scenarios on the state of the Gulf of Finland and highlighted the importance of nutrient reductions from large sources, e.g. in the waste water treatment plants of St. Petersburg.

3. Invasive species and the state of macrofauna

The number of registrated invasive species in the Gulf of Finland has increased in recent years. In 2005 new invasive mollusk, false dark mussel *(Mytilopsis leucophaeata)* was recognized in location of Loviisa Nuclear Power Plant. Increasing amount of invasive species pose a risk for ecosystems. Expanding maritime transportation increases that risk.

In the frame of pilot project made by 3 scientific institutes was shown that even with modest financial resources a program of invasive species and monitoring can be developed and implemented. The international invasive species monitoring program should be pushed forward as a part of developing European early warning system on aquatic invasive species.

Besides monitoring according to the HELCOM recommendation (HELCOM MARITIME, 2004) the risk assessment of biological invasions and development of early warning system, creation of methodology for ballast waters processing and the development of a ballast water management and the demonstration site for this activity in the Gulf of Finland area, as a part of maritime transport environmental safety, are also important.

At present the bottom macrofauna in the open area of the eastern Gulf of Finland is poor, as a result of oxygen depletion in 2003. In 2003 macrofauna was eliminated on a large area. The re-colonization of benthos after improved of oxygen conditions in 2004-2005 is slowly and not yet completed.

Fish catches in the Gulf of Finland are at present at the lowest level for decades. Existing practice of "total allocated catch" determination and fish catch quotation do not enable sustainable fishery in the Gulf of Finland and elaboration of new ecosystem approach for effective fishery regulation is needed.

4. Marine transport and environmental safety

The increase of maritime transport poses a major threat to the ecosystem of Gulf of Finland. Risk of oil spills and introduction of new invasive species in ballast waters of the ships has increased considerably. The most important tool for prevention of pollution by oil products and other hazardous chemical components is control of marine transport and port complexes. In the winter 2006 two remarkable oil spills took place in the Estonian coastal waters of Gulf of Finland. Tens of kilometers of coastline was polluted and thousands of seabirds died. This shows again the importance of development of trilateral co-operation in oil combating.

5. Recommendations

1. The research results highlight the importance of further nutrient reductions especially regarding the most important sources: large municipalities, agriculture etc. The plans on enhanced reduction of phosphorus loading from the wastewater treatment plans of St. Petersburg and other sources would mitigate eutrophication in the easternmost Gulf and decrease blue-green algal blooms elsewhere in the Gulf. The specific water quality management plan for St. Petersburg and Leningrad Oblast should be elaborated as the first stage.
2. Create comparable databases and establish well-organized exchange of information
3. Strengthen the role of socio-economic sciences in the assessment of the environmental aspects in Finland, Estonia and Russia
4. Develop a joint programme for assessment and regulating nutrient inputs into the Gulf of Finland from the catchment area taking into account possible temporal changes in the bio-geo-chemical circulation of substances in the Gulf and possible effects of climate change and economical activities in its catchment area.

In this respect:

- Perform joint work designed to collect data about numerous industrial, agricultural (animal husbandry and field cultivation) and municipal sources of phosphorus and nitrogen loads (point and diffuse) in the Gulf catchment area according to HELCOM PLC-5 Guidelines;
- Continue joint field research in various areas of the Gulf, with special emphasis on intercalibration, and create on this basis annual assessments on the status of the Gulf of Finland;
- Continue joint projects like EMAPS and SEGUE on comparison and development of three-dimensional hydrodynamic and ecosystem models. It will enable to develop instruments for prognostic estimations with the view to assess the response to changes in nutrient loads, as well as to simulate oil spill drift.
- Use the strategy and methodology of "clean production" and "best available technology" in industrial processes according to the HELCOM recommendations;
- To set governing principles for integrated management of coastal zones.

Oil spill combating

There is need for bigger oil pollution response vessels, able to operate in heavy wind and winter conditions. The response vessels need to be in stand by readiness to avoid delays in combating.

1. Aerial surveillance to assist in response operations and also carry out routine surveillance of illegal discharges should be further developed in Russia and Estonia.
2. It is vital, that legal and organizational structures are clear and that financial aspects will not affect the decision making nor delay the response operations or the request for international assistance
3. It is necessary to stimulate cooperation between countries in combating operations. The cooperation between national authorities should also be improved.

Alien species

1. The international invasive species monitoring program should be pushed forward as a part of developing European early warning system on aquatic invasive species.
2. Development of ballast water management and the demonstration site for this activity in the GoF area, as part of maritime transport environmental safety, are also important.

Other

The Round table discussed the planned Gulf of Finland Research Seminar. The Estonian delegation confirmed the readiness of Estonia to arrange the seminar in autumn 2006.