

## GULF OF FINLAND: HYDROCHEMICAL ASSESSMENT OF WATER AND SEDIMENT

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Ecosystems of the Neva Bay and the Eastern Gulf of Finland (GOF) have been affected by a multitude anthropogenic sources. The most important of them are outflow the River Neva, discharge of nutrients and toxic substances by treatment plants, coastal release of industrial objects and navigation.

The River Neva brings great amount of nutrients into the Neva Bay of the GOF. The principal part of total phosphorus (more 50 %) comes into the GOF from point sources, about 40 % – from river flows. Two south bays of the GOF receive phosphorus from the Sosnoviy Bor area and the River Luga. Rivers carry out 70 % of annual total nitrogen to the GOF: max of total nitrogen comes with rivers flow into the Neva Bay; min - into the Vyborg Bay (north of the GOF). The atmosphere part of nitrogen contamination the GOF is less than 20 %. The ratio N: P is between 15 – 25 that indicates obvious anthropogenic effect of nutrient on the River Neva, the Neva Bay and the GOF.

The Neva Bay is contaminated by heavy metals (Pb, Cr, Cu, Zn, Fe, Al, Mn), their content here is much higher to compare with the GOF. An about 25 % of the oil products comes into the GOF from point sources. The river flows bring the rest of coming oil pollution. The distribution of phenol contamination has similar trend. Our data displayed that in the Neva Bay phenols content is 14 times higher than in the GOF. The average annual phenols concentrations in the Neva Bay are within the 5 – 15  $\mu\text{g l}^{-1}$ . At the same time in the shallow and the deep-water parts of the GOF phenols contents are not exceed 3  $\mu\text{g l}^{-1}$ .

The volumes of wastewaters falling into the GOF and harmful substances are extremely irregular, vary in time and space, therefore the levels of pollution and quality of waters under essential oscillations. The contents of priority ecotoxicants (3,4-benzopyrene, PCB, chloroorganic pesticides and chloroform) in the water are lower than the detection limit of the analytical methods. It is known that capacity of bottom sediments to retain 3,4-BP keeps level of danger toxicant in the water at relatively low level. The sediments are the least polluted by ecotoxicants in the south bay of the GOF, close to island Gogland as well as in the shallow part of the GOF (in front of the dam). The most polluted sediments are near Zelenogorsk, close to Sestroretsk and in the Neva Bay.

Unlike chemical pollutants, established alien species can be a permanent problem: they reproduce and spread with unpredictable and irreversible consequences, prey on native species, compete for food and space, degrade habitats, food webs and water quality. In some cases the negative consequences of biological pollution for the ecosystem can exceed the impacts of all other anthropogenic factors. It is recommended to supplement research anthropogenic factors influence on the GOF ecosystem by study of biological pollution.