

SOME ASPECTS OF HYDRODYNAMICS IN KURŠIŲ MARIOS LAGOON - THE NATURAL „SETTLING BASIN” FOR LITHUANIA’S WASTE WATER

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Kuršių Marios Lagoon (or Curronian Lagoon, Curronian Bay) is situated in the central part of eastern coast of the Baltic Sea (see Fig.1). The Lagoon is connected



Fig.1. Geographical Situation of Kuršių Marios Lagoon
(1 - Kuršių Marios Lagoon)

with the Baltic Sea by narrow strait near Klaipėda. Kuršių marios Lagoon (see Fig. 2) is the biggest water body in Lithuania with surface area about 1600 km² and mean water depth of 3.8 meters (amount of water is approximately 6.2 km³) [1,3]. The biggest Lithuania's river Nemūnas flows

into Kuršių Marios Lagoon, and the catchment area of the Lagoon is under 100 t.km², that is about 1.5 times bigger than all territory of Lithuania [2].

Kuršių Marios Lagoon has a major economical and recreative significance to the Lithuania. In the last decades in connection with industrialization, agricultural activities in the catchment, water quality in the Nemūnas River and especially in Kuršių Marios Lagoon has serious changed. Kuršių Marios Lagoon is becoming increasingly important for the Baltic Sea water quality and ecosystem, because it serves as natural regulator or „settling basin” for Lithuania’s waste water. Most pollutants floated by the Nemūnas do not get into the Baltic Sea and stay in Kuršių Marios Lagoon. Therefore various ecological processes (as eutrophication, oxygen deficit formation, suffocation of fishes, etc.) arise in Lagoon. Hydrodynamics is very important for state of this shalow water body. Good knowledge of hydrodinamics can help in understanding, forecasting and management of mentioned processes.

Hydrodynamics in Kuršių Marios Lagoon was investigated only in brief earlier, although geographical, meteorological, biological investigations were carried out by

some Lithuania's institutions. The authors of this article, hydraulic engineers, used 2-D models for simulations of hydrodynamic processes in Kuršių marios Lagoon.

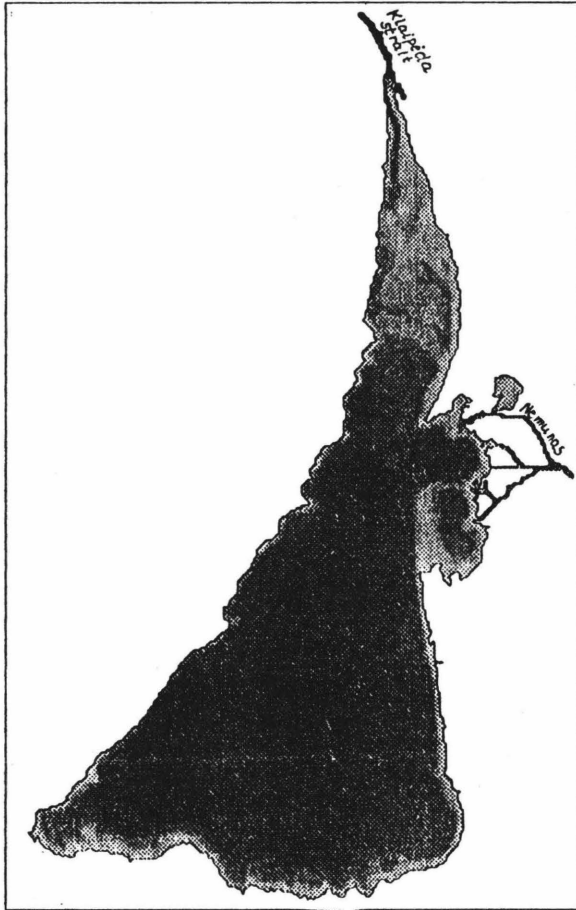


Fig.2. View to Kuršių Marios Lagoon

simulation of various ecological phenomena in Kuršių Marios Lagoon.

We hope Lithuania's governmental organizations will be interested in that.

REFERENCES:

1. Gamtinės sąlygos ir raida. - V.: Mokslas, 1978. (Kuršių Marios Lagoon. Natural Conditions and Evolution. Vilnius, 1978. (in Lithuanian).
2. Kuršių marios. Hidrologinis režimas. - V.: Mokslas, 1978. (Kuršių Marios Lagoon. Hydrological Regime. Vilnius, 1978. (in Lithuanian).
3. Куршский и Вислинский заливы. Ленинград, Гидрометеиздат, 1985. (Kuršių Marios and Visla Lagoons. Leningrad, 1985. (in Russian).
4. Žibas A. Kuršių marių hidrodinamikos modeliavimas. Modelio sudarymas ir pirmieji rezultatai. (Modelling of Hydrodynamics in Curonian Lagoon. Setting up of the model and first solutions) // Proceedings of International Scientific Conference „Hydraulic Engineering and Land Management”: Kaunas, 1996. (in Lithuanian).

Changes in the Nemunas discharge mostly influence on currents and water levels in Lagoon near mouth of the Nemunas and in Klaipėda strait (see Fig. 2.), especially in spring flood.

Kuršių Marios is almost isolated Lagoon, therefore water levels fluctuations and waves in the Baltic sea influence on hydrodynamics just in northern part of Lagoon, i.e. in Klaipėda strait.

Water levels, waves, and especially currents in all Kuršių Marios Lagoon depends mostly on wind speed and direction (as in most shallow water bodies).

Various results of simulations can not be described here widely and will be presented in overheads on conference.

The estimation of hydrodynamical situation in Lagoon is quite complicated and is possible only by using models. The output from hydrodynamic models can be used for