

Fig. 5. The scheme of anthropogenic objects located within the Neva Bay

1 — navigable water-way (a) and marine channels (b), 2 — important anchorage, 3 — areas of training mine fields, 4 — areas of explosive dumping, 5 — ground dumping, 6 — under-water sand-pit and sandy-gravel quarry, 7 — quarry using for hydraulic-filling of urban territories, 8 — dams, embankments: a — above water, b — under water, 9 — cable, 10 — important discharge outlets of industrial objects and water-purifying constructions (a), water scoop (b), 11 — anthropogenically changed coasts, 12 — port areas, 13 — urban areas, 14 — technogenic facies conditions, 15 — areas of under-water economic sand deposits, 16 — areas of under-water economic boulder-pebble deposits, 17 — reserved economic deposits, 18 — name of economic deposit

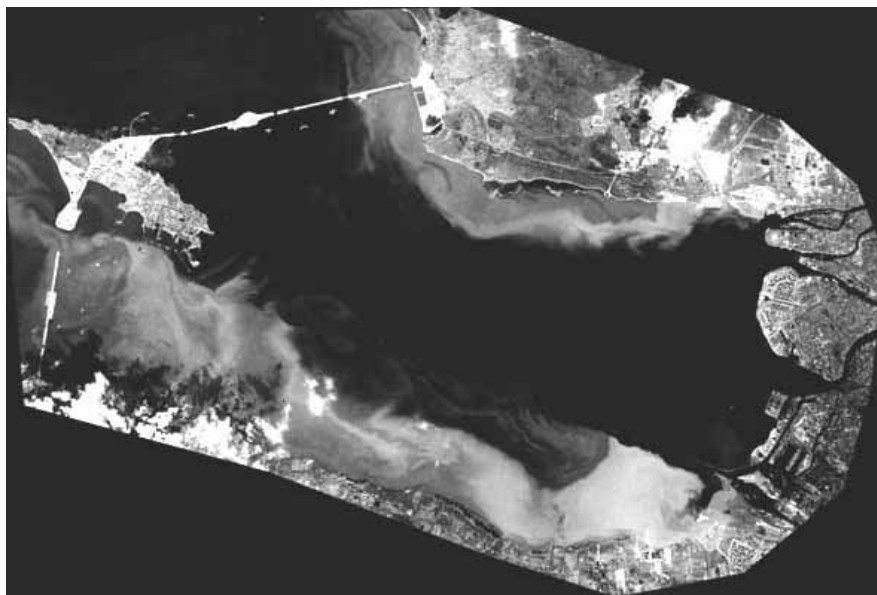


Fig. 6. The satellite photo of suspension flows in the Neva Bay derived from anthropogenic activity

sediment distribution and bottom relief, and forming along-shore bars and beaches. All this is combined with development of the flat profile of equilibrium underwater coastal slope. Additionally, the periodic fluctuations of the sea level including catastrophic flood rise of sea level, which can be combined with the often wind-effected phenomena, have the principle relief forming significance (Fig. 4). Ice abrasion connected with fluctuations of sea level in the winter season is also additional factor of active morphogenesis.

At present, some specific features of the recent coastal zone of the eastern Gulf of Finland are formed by active and almost common anthropogenic activity (Spiridonov, Winterhalter, 1995; Pitulko, Spiridonov, 2002). Locally, the coastal zone underwent almost total transformation by the influence of hydraulic-fill territories, underwater opencasts, hydraulic engineering constructions and various communications (Fig. 5). Such type of transformation is especially visible in the area of

building of the Flood Protective Complex of St. Petersburg known under a title of the St. Petersburg Dam and new ports in Ust'Luga, Visotsk, Primorsk and other towns of Leningrad Region (Fig. 1). The anthropogenic influence locally causes disturbance of natural equilibrium of the coastal zone that result in intensive silting (Fig. 6), erosion, rush overgrowing of beaches, waterlogging, landslides etc.

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REFERENCES

- AMANTOV A.V., ZHAMOÏDA V.A., MANUILOV S.F., MOSKALENKO P.E., Spiridonov M.A., 2002 — Geology and mineral resources of the eastern Gulf of Finland. Computer Atlas. [in Russian]. *Regional Geology and Metallogeny*, **15**: 120–132.
- KVASOV D.D., 1975 — Late Quaternary history of the large lakes and semi closed seas of the Eastern Europe. [in Russian]. Nauka, Leningrad.
- KVASOV D.D., Raukas A.V., 1970 — About the late-glacial history of the Gulf of Finland. [in Russian]. *Proceedings of All-Union Geographical Society*, **105**, 5: 432–438.
- MALAHOVSKY D.B., MARKOV K.K. (Ed.), 1969 — Geomorphology and Quaternary deposits of north-western European part of the USSR: Leningrad, Pskov and Novgorod regions. [in Russian]. Nauka, Leningrad.
- MARKOV K.K., 1931 — Relief development of the north-western part of the Leningrad region. [in Russian]. *Transactions of GGRU*, **117**.
- PITULKO V.M., SPIRIDONOV M.A. (Ed.), 2003 — Geoecological atlas of the eastern part of the Gulf of Finland. SRCEA RAS, VSEGEI, St. Petersburg.
- RYCHAGOV G.I., SEREBRYANNY L.R., 1982 — The marine basins and position of the coastal lines of the Eastern Europe in Pleistocene and Holocene. *In: Paleogeography of the Europe over a period of last hundred thousands years: 9–15*. [in Russian]. Nauka, Moscow.
- SPIRIDONOV M.A., ANOHIN V.M., GORBACEVICH N.R., GRIGORIEV A.G., ZHAMOÏDA V.A., MANUILOV S.F., MOSKALENKO P.E., SHAKHVERDOV V.A., 2001a — Major problems of environmental geology and results of water area monitoring of the coastal zone in the St. Petersburg Region. [in Russian]. *Regional Geology and Metallogeny*, **13/14**: 174–182.
- SPIRIDONOV M., WINTERHALTER B., 1995 — Will the Leningrad Flood Protection Dam have a detrimental effect on the stressed environment of Neva Bay? Can it be avoided? *Regional Geology and Metallogeny*, **4**: 141–148.
- SPIRIDONOV M.A., ZHAMOÏDA V.A., MOSKALENKO P.E., 2001b — The main features of the recent processes in the geological environment of the coastal zone of the eastern Gulf of Finland. *In: Margins Meeting. International Conference and Annual Meeting of Deutsche Geologische Gesellschaft and Geologische Vereinigung at Christian-Albrechts-Universität, Kiel*: 202–203.
- YAKOVLEV S.A., 1928 — Deposits and relief of Leningrad and areas around it. *Proceedings of Scientific-Ameliorative Institute*, **8**, 13.
- ZNAMENSKAYA O.M., CHEREMYSINOVA E.L., 1974 — Development of the basins of the eastern part of the Gulf of Finland during late- and post-glacial time. [in Russian]. *Baltica*, **5**: 95–104.