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## **METHODS AND TECHNOLOGICAL SEQUENCE OF CLEANING PONDS AND RESERVOIRS**

A reservoir is a balanced ecosystem in which self-purification mechanisms operate. This natural state of the biological balance of a reservoir, pond or lake can be disturbed as a result of the natural aging of the reservoir, accumulation of natural organic matter in the reservoir: foliage, branches, fish and waterfowl excreta, dead aquatic plants, and as a result of intensive pollution of the reservoir with organic matter and nutrient (biogenic) elements: garbage, storm sewage, sediment from fields and roads, poorly treated sewage, sewage, fertilizers in organic abundance deliver organics to the reservoir. There is also the problem of pollution of reservoirs with oil products, household and industrial effluents lead to disruption of the natural life of the hydraulic system, to a decrease in biological diversity and makes the reservoir dangerous for coastal ecosystems and impossible to use for recreation.

At the bottom of reservoirs, over time, silt naturally accumulates, and water begins to "bloom." To avoid this, it is recommended that at least once in 10 years a full cleaning of the reservoir and sanitary cleaning of the bottom, thinning of the vegetation around, cleaning of garbage should be done once a year.

As a rule, the end of spring - the beginning of summer is considered to be the season for cleaning water bodies, as over the winter period, the accumulated organic matter begins the process of decomposition, which leads to silting of the water body. It is necessary to understand that cleaning the reservoir from sludge is the most important work, since silting or overgrowing of the water surface with vegetation leads to a violation of the balanced system of the reservoir. Also, in addition to the cleaning of the reservoir itself, it is required from time to time to strengthen the banks in order to prevent erosion processes. If the cleaning is carried out regularly, it will be possible to avoid such negative moments as the blooming of water, the appearance of unpleasant odors.

Purification of ponds and reservoirs from silt, natural pollution or the result of human life - measures necessary for high-quality and safe operation of a natural or artificial reservoir of any volume, area of use and landscape.

Man-made pollution of water bodies with petroleum products, household and industrial effluents leads to disruption of the natural activity of the hydroecosystem, its eutrophication, reduction of biological diversity and makes the reservoir dangerous for coastal ecosystems and impossible to use for recreation. These pollutants accumulate in the bottom sediments of water bodies. During the summer season, bottom sediments warm up and sludge microorganisms release these substances, which immediately cause the blooming of microalgae. The rapid algal bloom leads to the rapid depletion of nutrient reserves, and this leads to the mass death of microalgae, which are not enough to supply nutrients. The decomposition of a huge amount of organic matter algae for a short period of time leads to a drop in the concentration of oxygen dissolved in water, and this causes fish to freeze and, as a result, leads to rotting water. In addition, the flowering of the reservoir caused by blue-green algae makes the reservoir too poisonous for most organisms.

Stage of preparatory work:

- study of the hydrogeological characteristics of the reservoir, its morphological parameters (depth, bottom topography), sampling of water and sludge sediments for laboratory analysis on the subject of chemical pollution.
- as a result of biotesting, living organisms of the reservoir are selected: invertebrates, phytoplankton, mollusks, etc. On the basis of a specially conducted analysis, the degree of

contamination of the reservoir (saprobic valence): water and sludge deposits is established - and a set of measures is assigned for ecosystem restoration.

Stage of technical rehabilitation of the reservoir: depending on the size of the reservoir, the presence of hydraulic structures, hydrogeological characteristics of the area and a number of other circumstances, the need for mechanical cleaning of the reservoir bed from sludge deposits is determined:

- lifting and removing snag, flooded objects and structures;
- clearing and shaping the shoreline;
- removal of rooted and floating growth-sod layer;
- removal of pulp (biomass, sludge, soil) into alluvium maps for a distance of up to 1.5 km;
- cleaning of underwater stones and blockages;
- removal of reeds and reeds, treatment of the bottom of the reservoir with special materials that prevent their germination;
- clearing and shaping the shoreline;

Stage of biological rehabilitation: a natural reservoir is a balanced ecosystem in which self-purification mechanisms operate. Self-purification of water in aquatic ecosystems occurs as a result of flowing physical, chemical and biological processes with the participation of aquatic organisms: plants and living organisms. One of the rather effective methods for improving the quality of water in water bodies is the technology based on the restoration of hydrobionts-filter feeders, which include:

- coastal and aquatic macrophyte plants;
- invertebrates;
- benthos (community of benthic organisms);
- microorganisms on suspended particles.

Cleaning of reservoirs is performed in the following ways: mechanized, hydro-mechanized, explosive and manual.

The most widely used mechanized and hydro-mechanized methods of cleaning the pond from sediment.

The explosive method is used quite rarely, mainly when clearing rifts on rivers to maintain navigable depths, the manual method of cleaning the pond is mainly for the selective extraction of sludge and sapropel for medicine.

Bottom sediments in water bodies are more often developed in a mechanized way with the production of earthworks "dry", as well as scooping from under the water and in a hydromechanized way with the production of earthworks in flooded faces.

Cleaning the river or pond in a mechanized way with the production of earthworks "dry" requires their prior emptying, removal of newly supplied water and carrying out measures to drain sediment with cutting drainage trenches and drainage canals.

After preparation for the production of cleaning the pond "dry" start the development of sediments single-bucket excavator on tracks, made in the swamp modification. To clean a pond without emptying it, two main methods are used: small silted water bodies with a width not exceeding 150 m can be cleaned with cable-scraper installations.

The second method - cleaning suction shells. The method includes the development of bottom sediments by suction from under water, hydrotransporting along the system of slurry pipelines and putting them in the hydraulic dump - storage.

Mechanical cleaning is usually used to restore ponds and small lakes: first, water is pumped out, then bottom sediments are mechanically removed, and then the bottom is covered with special waterproof clay — if necessary, the bottom is covered with sand and gravel and the water is refilled.