Materials of Conferences

THE RESEARCH OF RADIOACTIVITY COMMERCIAL ICHTHYOFAUNE OF RAZDOLNAYA RIVER ESTUARY (PRIMORSKIY REGION)

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Fishing industry in seas, bays, rivers give the considerable share of protein in ration feed on population of the country. Water always contains definite quantity of natural radionuclides. At the same time, radioecological characteristic of reservoir abrupt deteriorate out of anthropogenic radiocontamination in consequence of development atomic power both military and peaceful aims. The anthropogenic radionuclides in ecosystems of Amursky bay and Razdolnaya River (Peter the Great Bay, Japan East Sea) generally have its origin from nuclear weapon tests pursued formerly. Cs-137 and Sr-90 are the most hazardous in regard to sanitary-hygienic aspect. Artificial redionuclides Cs137 and Sr-90 are analogies to biogenic elements potassium and calcium accordingly and accompany them in nature. Entering hydrobionics by different ways Cs-137 accumulates mainly in muscular tissues and Sr-90 – in bone tissues. The objects of investigation were freshwaters fishes of Razdolnaya River such as Silver carp, Carp, Crusian carp and semipassing by species of fishery (Far Eastern dace, Asiatic smelt, Haarder). Razdolnaya estuary being the largest in Primorye in the same time is the transitive zone between the freshwater and seawater place for semipassing species of fish and their fatten getting from the river basin. To fix contamination of the radioisotopes in ichthyofaune the radiochemical method was used. Cs-137 was picked out as cesium bismuth iodide and Sr-90 was defined by its daughter's isotope Y-90 in the form of yuttrium oxalate. During investigation it was ascertained that the lowest concentration of radionuclides have semi-passing fishes Cs-137 (1.9-2.9 Bk/kg) in muscles and Sr-90 (0.8-2.4 Bk/kg) in bone tissue, concentration of Cs-137 and Sr-90 in fresh water living fishes of Razdolnaya River was 3.5-5.6 and 2.7-6.6 Bk/kg respectively. It shows that the way of life of fishes determines its radionuclide concentration level essentially. Semi-passing fishes calling at Razdolnaya River to propagate mainly lives at sea and thus concentration of Cs-137 and Sr-90 in them are lower of fresh water ones. Adduced data shows that the low level of mineralization of Razdolnaya river water increase concentration of radionuclides in fish tissues.

According to existing standards, which prescribes "Hygienic requirements of food's safety and food's value" the Cs-137 contents in living fishes and in raw must not be more then 130 Bk/kg and Sr-90 contents – 100 Bk/kg. Obtained of artificial radioactivity of fish in Japan Sea with sanitary norms for food production we can see that these levels considerably lower of permissible and consequently the fish safe in radiationally-hygienic terms.

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HYDROLOGICAL RISK ON KAMA WATER BASINS AS CONSEQUENCE OF CHEMICAL POLLUTION

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Hydrological risk as variety and component part of ecological risk creates the danger of the disadvantage influence on organic and health of the people. The risk into the reservoirs formed the first to account of the contamination their water masses unset industrial enterprise that to account technical press on water objects.

In upper part of the Kama reservoir is located Solikamsko-Bereznikovskiy and in upper part of the Votkinsk reservoir - Permsko-Krasnokamskiy industrial complexes. They are the main source of water pollution, their contribution to technical load on basins more than 90%. For feature of the particularities hydro-chemical mode of the Kama and Votkinsk reservoirs analysed material removals reservoirs executed in 2003. The hydro chemical analysis was made in seven points:

- head range of Kamskoe reservoir (Tyulkino);
- two points near Solikamsko-Bereznikovskiy industrial complexes;
- point under Berezniki;
- point near entry in central enhanced part of water reservoir;
- point in bottom part of reservoir (Dobryanka);
- point in the dam area of Kamskoe reservoir (Kamskaya Hydroelectric station).

Value general salinity. At winter period in point Tyulkino amount ion were 150-160 mg/dm^3, bottom software course (Solikamsko-Bereznikovskiy industrial complexes) it advanced to 240-480 mg/dm^3, and later decreases to 320 mg/dm^3. During the spring salinity falls and prepares 150-130-90-170 mg/dm^3. It joint with ingress of snow water. In summer concentration was 160-560 mg/dm^3. The maximum of year value salinity in this point was 560-220-140-160 mg/dm^3 and wasn't excess the most possible concentration (MPC).

Chlorides. The concentration Cl^- in first point remainder 12-32 mg/dm^3 in winter, 2-4 mg/dm^3 in spring and 6-14 mg/dm^3 in summer and autumn. The maximum value of chlorides in points near Solikamsko-Bereznikovskiy industrial complexes: 170 mg/dm^3 in winter, 42 mg/dm^3 in spring and 69 mg/dm^3 in summer. Bottom software course contents remainder 130-110-100 mg/dm^3 in winter, 27-14-29 mg/dm^3 in spring, 68-31-20 mg/dm^3 in summer.

Biogene elements. The concentration of biogene elements changes: ammonium ion – from 0,32 mg/dm^3 in Tyulkino to 1,5 mg/dm^3 under Beresniki (3 MPC) to 0,6 mg/dm^3 (1,2 MPC) in dam area in winter, in spring it was 0,55 (1 MPC)-0,44-0,30 mg/dm^3 and in summer - 0,24-0,22-0,21 mg/dm^3; the concentration nitrate ion in all points is less than 1 mg/dm^3, the contents of the nitrate nitrogen changes from 0,05-0,02-0,01-0,00 mg/dm^3 in winter to 0,04-0,03-0,01-0,00 mg/dm^3 in summer.

Iron (general). The Kama river has natural a high concentration of iron (1,2-1,6 mg/dm^3) and in all points the Kama reservoir was found the exceeding of MPC of these components (3-7 MPC).

Copper. The contents copper was enough stable and high in all time and whole length (2-4 mcg/dm^3). The exceeding of MPC of these components was found in all points (2-4 MPC).

Oxygen. The minimum of oxygen was less 6 mg/dm^3 in winter and it exceedingly unsafe. In points near Solikamsko-Bereznikovskiy industrial complexes concentration was 3,8-5,2 mg/dm^3, bottom software course contents remainder 6,0-5,0-4,1 mg/dm^3. Floor amount of oxygen was 9,4-8,9-9,6-8,7 mg/dm^3 in spring and 7,1-5,8-6,2-3,5 mg/dm^3. The contents oxygen was quite low in winter and summer and excited misgiving as environmental risk.

The analysis of this material allow made next conclusion:

- Value general mineralization and the main ions in reservoir and in all time its water mode is found in rate.
- At winter period is noted excess the most possible concentration (MPC) in upper part ion ammonium in 2-3 times; on the whole length excess at most-possible concentration exists Fe (in 5-7 times), Cu (in 2-3 times), Mn (in 8-10 times), Zn (in 1,5-2 times), Pb (in 1,5-2 times), O_2 (before 1,8 times), the chemical consumption of the oxygen (CCO) (in 3 times), the biochemical consumption of the oxygen (BSO) (in 1,5-2 times).
- At period of the spring in region Solikamsk-Berezniky is noted excess MPC the NH_4 in 1,5 times; on the whole reservoir excess MPC the Fe in 3-5 times, Cu - 3-4 times, Mn - 5-6 once, BSO - 1,2-1,5 times, CCO - 2-3 times.
- In summer and autumn excess MPC exists on the whole reservoir on: Fe in 4-6 times, Cu - 3-4 times, Mn - 8-10 times, Zn - 1,5-2 times, BSO - 1,2-1,5 times, CCO - 3 times; in dam area of reservoir contents of the oxygen have formed 3,5 mg/dm^3 at rate in 6,0 mg/dm^3.

The General conclusion: the Kama reservoir in all time of the water mode as before subject to most strong technical influence and quality of its water far from requirements both for person, and for different branches facilities edges.

Monitoring observation in the area of Votkinsk reservoir is being conducted in next points now:

- two points lengthwise Perm industrial complexes;
- point below Perm (N.Muly);
- two points lengthwise Krasnokamsk industrial complexes;
- point near Ohansk;
- point near Elovo;
- point in the dam area of Votkinskoe reservoir (near Tchaikovsky).

Value general salinity. The composition of sum main ions doesn't exceed the most possible concentration (MPC), but changes on the length of the under investigation region significantly, so quantity near Perm was 310-430 mg/dm^3, below Perm – 530 mg/dm^3 and decreases to 440 mg/dm^3 (below Krasnokamsk) - 390 mg/dm^3 (Ohansk) - 375 mg/dm^3 (Tchaikovsky) in winter. The contents of these elements insignificantly in spring - 78-105-101-82-79-83-92-95 mg/dm^3 (from Perm to dam area). The largest value salinity in summer was near Perm (380 mg/dm^3) and decreases to 200 mg/dm^3 (area Krasnokamsk-Ohansk) and 160-130 mg/dm^3 (area Elovo-Tchaikovsky).

Chlorides us dominant effect man-caused factor: the contents falls from 99 mg/dm^3 (near Perm and Krasnokamsk) to 61 mg/dm^3 (dam area) in winter, increases from 26 mg/dm^3 (above Perm) to 64 mg/dm^3 (bellow Perm) and falls from 25 mg/dm^3 (bellow Krasnokamsk) to 11 mg/dm^3 (Tchaikovsky) in summer.

Biogene elements. The contents of ammonium ion falls from 0,91 mg/dm^3 (Perm) to 0,51-0,65 mg/dm^3 (Krasnokamsk), 0,31 mg/dm^3 (dam area) in winter and exceed the MPC from 1,8 near Perm to 1,1 near Ohansk. The composition of this element in other period changes insignificantly: from 0,4 to 0,2 mg/dm^3 on the length of the under investigation region. The contents of nitrate ion doesn't exceed the most possible concentration. The value of the nitrate nitrogen exceeds the MPC near Perm in 1,8-2,0 times in winter and summer.

Iron (general). As in the Kama reservoir as in theVotkinsk reservoir contents of iron was high and found the exceeding of MPC in all time, so Fe falls from 0,91 mg/dm^3 (9 MPC) near Perm to 0,30 mg/dm^3 (3 MPC) near dam area in winter, increases from 0,43 mg/dm^3 (4 MPC) near Perm to 0,72 mg/dm^3 (7 MPC) near Elovo in spring and has minimum in summer (falls from 0,3 to 0,06 mg/dm^3 on the length of the re-

gion). The exceeding of MPC of these components was caused naturals and industrials factors.

Copper. The concentration of copper exceeds the most possible concentration for water consumption, that caused hydrologic risk, so contents falls from 4-5 mcg/dm^3 near Perm and Krasnokamsk to 2-3 mcg/dm^3 in over area all time.

Oxygen. The contents of oxygen has minimum near Perm in winter (5,4 mg/dm^3) and increase from 6,9 mg/dm^3 (Krasnokamsk) to 9,2 mg/dm^3 (Elovo) and to 7,3 mg/dm^3 (dam area). During the spring concentration of these element was 8,4-8,9 mg/dm^3. The contents of component exceed the most possible concentration in summer, so 5,7-6,0 mg/dm^3 near Perm, 6,6-7,4 mg/dm^3 in area Krasnokamsk-Ohansk and 3,6-6,6 mg/dm^3 in area Elovo- Tchaikovsky. The low concentration of oxygen can be causes hydrologic risk.

Some main conclusion:

- Value general mineralization and the main ion chemical composition of water in all parts reservoir and in all phases its water mode is found in rate.
- Excess of the rates MPC on NH_4 is noted in winter (in 1,1-1,8 times). In this period concentration the NO_2 (in 2 times) in Perm; the Fe (in 3-9 times), the Cu (in 2-5 times), the Mn (in 12-20 times, increasing beside Perm before 40 time), Zn (in 1,5-2,0 times), phenols (in 1,5-2,0 times). The most possible concentration of oil products near Perm (in 2-9 times) and Krasnokamsk (in 2-3- times). Disadvantage situation formed on contents of the oxygen in upper part reservoir and all part in average (Ohansk). The MPC of BCO (in 1,4 times) was noted in Krasnokamsk. The value CCO on the whole reservoir has formed 2,2-3,2 times of MPC.
- At the spring the most-possible concentration contents: Fe - in 3-7 times, Cu - in 2-4 times, on Mn - in 5-8 times, CCO - in 1,8-3,2 times.
- In summer and autumn is noted excess MPC on: Fe - in 1,2-3,1 times, Cu - in 3-5 times, Mn - in 5-7 times, Zn - 1,5-2,0 times, phenols - 1,5-2,0 times, CCO - 1,8-2,2 times. Besides, excess the most possible of concentration is noted on NO_3 in region Perm (in 1,8 times). It is noted excess MPC the oil products (in 1,5-3 times). The disadvantage situation on contents of the dissolved oxygen formed in Perm and in average part of reservoir. In the dam area of reservoir is noted excess MPC on the BCO (in 1,2 times).

The General conclusion – the Votkinsk reservoir in all time its water mode, as before, subject to most strong technical influence and quality of its water far from presented requirements both for person, so for different mades facility edge. Particularly, the disadvantage situation forms in region of the location Perm-Krasnokamsk industrial complex.

The called on studies have allowed to reveal the area of reservoirs the most subject to technical (first of all chemical contamination) influence; track the speaker and transformation of the contamination both in space, and at time; value the danger an hydrology risk in different phases of the water mode under investigation reservoirs; reveal the components chemical composition water, which follows to consider made risk. The got results are a central to the following development wildlife action.

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INVESTIGATION OF FIELD LAYER INFLUENCE ON REGENERATION CHARACTER OF CUT-OVER LANDS IN MIDDLE ANGARA REGION

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The problems of environmentally safe forest use, forest reproduction, maintaining at the desired level or preservation of ecological functions of the forest deserve special attention and detailed study.

A burning problem is the reduction of terms for growing forest resources, the improvement of quality state of forest restoring measures. For its solution a detailed study of the most common types of cut-over lands of the Middle Angara Area, the dynamics of their structural changes, and also initial phases of forest formation.

Changes of environmental conditions, differences in the flora, and its change reflect on the duration of the forest restoration period, at the contraction of which the forest productivity increases.

For the Middle Angara Area, after felling the plantations with pine and larch prevalence, the following types of cut-over lands are indicative: fireweed, small reed, herb, gross grass, clusterberry-small reed with green mosses presence.

Considering that the field layer defines the environs for the regeneration and initial phases of forest formation, the research on permanent and temporary sample plots for the purpose of its change dynamics study has been carried out. Annual observations allow finding out the dynamics of ground covering with some or another species of plant, stating the regeneration principles connected with the dominant kinds of grassland vegetation.

The investigations are carried out by defining the occurrence of various kinds of suffruticous-grassland and mossy-lichenous plants, their projective cover, abundance, vital power, distributional pattern by area. A comparative analysis was carried out on the estimate results. Annual observations allowed detecting some or other plant species coverage area dynamics, establishing regeneration regularities connected with the dominant kinds of grassland vegetation.

On fresh cut-over lands the forest herbs prevail, changes begin with the cut-over age increase.