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.

The work was submitted to the International Scientific Conference «Environmental monitoring», August, 16-23, 2008, Turkey (Antalya), came to the editorial office on 16.06.2008.

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.

The change of mossy and herb stratum in cut-over lands has a significant effect on the forest-regeneration processes. So, for example, the natural seeding of pine and fir trees occurs in the areas occupied with fireweed more often than in the areas covered with grass plants.

In table 1 the influence of grass cover representatives on the emergence of pine seedlings is shown.

Table 1. Influence of grass cover representatives on the emergence of pine seedlings

Grassland (dominant)	Type of soil conditions	Cut-over land type	Projective soil cover with herbs, %	Number of young seedlings, thousand of things
Small reed, leguminous	B_2	Grassland, gross grass	70-85	3,5-5,0
Clusterberry, small reed, moss	A_0, A_1, B_1, B_2	Clusterberry, clusterberry-small reed with green mosses presence	65-80	3,0-8,0
Fireweed, small reed	B_2, B_3	Small reed, grassland	55-70	2,5-5,0
Moss, small reed	B_2, B_3	green-moss-grassland	75-85	4,0-7,0
Fireweed	B_2, B_3	Fireweed	80-90	0,5-2,0
Other kinds	B_2, B_3	Grassland, gross grass, small reed	75-95	1,5-3,0

Thereat the fireweed coverage keeps the young pine and fir tree seedlings from dying off because of high and low temperatures.

In table 2 the average results of temperature and luminance measurements of the soil level during the vegetative season (the measurements were carried out from 12^{00} to 13^{00} on fair weather) are presented.

Table 2. Average results of temperature and luminance measurements of the soil level during the vegetative season

Cut-over land age	Soil level temperature, C^0	Soil level luminance, ths. of lx
First year after felling	29	89,3
Fourth year after felling	25	18
Eighth year after felling	23	14,8

But the fireweed thick cover influences negatively on growth. The grass plant cover influences especially negatively on the conifer young growth. It quickly affords a sod preventing the seeds from germination and seedlings from growth. Water soluble materials, which decrease the pine and fir tree seed vigor, growth and survival ability of the young plants, come into the soil and soil level together with precipitation from herb debris.

With the field layer thickness increase of the conditions for timber species emerging and growth get deteriorated. Thus, for example, the pine natural seeding increment made 5,6-6,6 cm per annum in the piny wood in the segments with herb stratum, and without the last - 7,3-9,9 cm per annum. Especially vividly this difference is manifested in the staddle growing near grass plant blocks. The clean felling in the areas, where relatively rich sabulous and loam soils, which are disorderly covered with herbaceous vegetation rendering not only coniferous, but also hardwood species regeneration difficult after growing stock felling, prevail are repopulated least successfully. In various kinds of grass plants the sod is formed differently. So, in grassy small reed a heavy sod is formed on the soil level, and wood small reed interweaves and thickens the ground litter and mineral horizons' top with its rhizomes. That is why the influence of these species on forest regeneration will be different.

In the felling year the conditions for timber species seed germination are favourable due to the field layer, good warming, soil ventilation and enough dampness competitive influence weakening. In the triennial and older cut-over lands the small reed thick sod hinders the emergence of seedlings.

In the first year after summer harvesting of wood the ground vegetation of the cut-over land differs little from that of under the cover. From the second year the pratal weed-grown herbaceous plants

dominance (see Fig. 1) begins. After winter harvesting of wood the field layer change is observed in the first year after the felling already.

The regularity in the direction of mosses' dying off and herbaceous vegetation abundant development manifests itself in the cover change.

Changes take place in the ground vegetation and forest litter with the felling age increase.

For clusterberry-small reed, clusterberry-green moss and gross grass cut-over types a good natural regeneration (more than 6 ths./ha) of commercially valuable species is indicative. The restoration of the vegetation cover typical of the forest community occurs 6-10 years earlier than in small reed, grassland and fireweed types of cutovers.

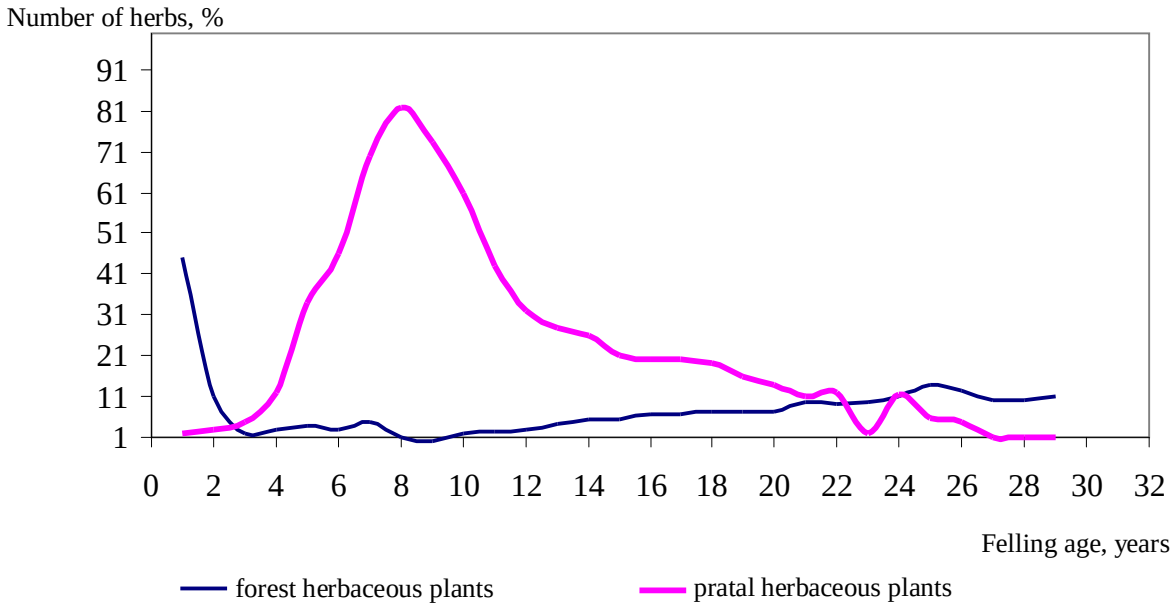

Fig. 1. Field layer time history after clear forest felling

Hardwood species defy competition with herbaceous plants forming no thick sods and prefer more humid soils.

On the research results one can come to a range of conclusions concerning the interrelation of forest associations, plant community structure and commercially valuable species regeneration:

- it is possible to judge on habitat conditions by herbaceous vegetation kinds;
- cut-over lands are subjected to heavy turf formation in places of relatively rich sabulous and loam soils (especially the places subjected to harvesting techniques), that hinders the development of natural regeneration;
- in some cases in apiarian runways a more successful regeneration than in the areas not subjected to skidding occurs;
- the most successful natural regeneration takes place in green-moss-grassland cutover types;
- the ground vegetation of derivative young growths is characterized by a greater, compared to the original forest type flora diversity due to the enrichment of the floristic composition with light-loving and meadow plants, retaining the species set peculiar to the original forest type.

The work is submitted to the Scientific International Conference "Scientific Research of Higher School on Priority Orientations of Science and Technology", June, 22-29, 2008, came to the editorial office on 22.05.2008.