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Socio-economic estimation of the particularly protected natural territories (by the example of the Komi Republic preserves)

Complex socio-economic estimation of the seven preserves of the regional importance situated in the Komi Republic, including consideration of the three components (ecological, social and economic) is carried out. While analyzing the condition and the features of the particularly protected natural territories their influence on the reserves' efficiency has been revealed. The socio- economic problems of the preserves' territories are also revealed. The list of the territories' ecological services is represented, and these services' economic estimation is carried out. The alternativeness of approaches for the time factor's account (the problem of discounting) is noted.

Ecological services, traditional life support, recreational value, water-regulation, general economic value.

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There exist a lot of reasons to preserve biological resources; nevertheless, the economic ones play an important role in elaborating the plans for the territorial economic activities' development. The mankind has already realized that the quality of life is determined not by the prices, but by the values, including the ones given with by the healthy environment. The economists-ecologists try to estimate natural resources and ecological functions, to raise "the nature competitiveness" in its "struggle" with techno genesis' decisions.

There are a lot of ways for estimating natural resources. The protected objects (rare bio-resources put on the list in "The Red book") by virtue of their "invaluableness" have no regulated methods of their estimation. The modern approaches' lawfulness based on the ecological goods' accent, has disputable character to this day. As a rule, bio-resource and recreational reserves' functions are estimated. These estimations have been carried out by S.N. Bobylev, G.A. Fomenko, I.P. Glazyrina, S.N. Stetsenko and J.V. Panasovsky. Great contribution to the ecosystem services' estimation was made by A.A. Tishkov who showed new cost representation of the PPNT services (climate-regulating, water-regulating, soil-protective, assimilation, bio-productive, bio-resource, etc).

The research is devoted to the complex socio-economic estimation of various particarly protected natural territories of the republican value. Among the problems alternativeness of approaches for the time factor's account (the problem of discounting) is noted.

Particularly protected natural territories' distinctive features. There are 240 particularly protected natural territories (PPNT) In the Komi Republic, among them are: 2 PPNT of federal value (Pechora-Ilych State Natural Bio-sphere Reserve and National Park "Ugyd va") and 238 PPNT of regional value (165 natural reserves of various types and 73 nature sanctuaries). The total area occupied by the particularly protected natural territories (both of federal and of republican value), makes more than 6 million hectares, or about 14.6 % of the general the Komi Republic area of that exceeds the worldwide parameters.

All reserves and nature sanctuaries have the character of regional importance. If the importance of the reserves and the national parks of federal value raises doubt, there is less information about the reserves of regional value in spite of the fact that their share prevails. As a rule, the reserve's status is term-less. Recently, however, the question from the nature management officials on re-structuring protected objects has been raised rather often. In this connection this research gives the representation not only on the resources' value, but also on the rendered ecological services in various PPNT territories.

The research includes estimation of seven particularly protected objects of regional value. Among them are complex and ichthyologic preserves, cedar and marsh reserves. Despite of their status their functions are various, as well as the occupied area, the anthropogenic load level and the allowed actions' degree. The complex socio-economic estimation of territories includes consideration of three components: ecological, social and economic ones.

Biological importance. Territories differ with the extensive biological variety and representativeness of the existing kinds of plants, animals and organisms *(tab. 1)*. The volume of ecological services, including bio-resources consumed by a person, depends on his/her way of life. They are used in a greater degree by hunters, fishermen, and reindeer breeders, especially belonging to aboriginal population. In this connection, the importance of ecological services is extremely high for inhabitants of the settlements which are situated in the zone of PPNT availability.

Besides valuable organisms, the preserves are rich with various resources. In 2009 during field studies in the territory of the swamp reserve "Ocean" 240 plants' species, 76 birds' species, 10 mammals' species (elk, bear, muskrat, otter, fox, marten, squirrel, rodents), frog and lizard. Also single deer traces were met.

The flora of the "Udorsky" preserve is presented by vascular spore, gymnosperms and flowering plants (341 plants' species). On the preserve's flat part 96 leafy mosses' species and 170 lichens' species were found. The list of the birds' species found in the "Udorsky" preserve includes 82 species. This preserve is the place of dwelling for 36 mammals' species, 15 species of them are valuable animals.

Thus, practically all the studied PPNT proved their high ecological value from the positions of ground and water ecosystems' safety.

Social status. The social parameters (employment, income per capita, salary) in the areas of PPNT arrangement are worse than in other republic's areas. The majority of areas, where the preserves are situated, have lumbering and agricultural specialization. Initially low profitableness of these branches, reduction of production volumes, and ineffective activity do not allow the territory to provide growth of the financial incomes of the population[1].

Liquidation of state farms and lumbering enterprises made villagers to be engaged with the traditional ways of life-support: personal subsistence farming, hunting, fishery and collecting. The rising unemployment leads to the growth of the traditional life-support role food provision and incomes of the population *(tab. 2)*.

[1] Dmitrieva, T.E, Maksimov A.A, Khokhlov, N.A. Fungi-berry industry can become a new sector of the Komi Republic economy / Region. – 2007. – № 1. – Pp. 34-37.

Table 1. PPNT values' features and authorizing actions in such territories

Preserve / Area, hectares	Valuable resources (put on the list in "The Red book")	Ecological services and their functions	Authorizing actions
Ichthyologic preserve *"Ilychsky" (532,400 h)*	Lamprey Peled Bullhead Grayling Salmon	Water regulation Carbon sequestration Bio-production Assimilation	Picking berries and mushrooms Haying Hunting Tourism
Swamp reserve *"Ocean" (179,000 h)*	6 birds' species 1 rare lichen species	Carbon sequestration Waterfowl breeding Birds' rest at migration Water regulation	**There is no provision**
Swamp *"Pechorsky" (6,392 h)*		Carbon sequestration Water regulation	Hunting Plucking
Complex preserve *"Udorsky" (42,422 h)*	9 plant species 11 lichen species Rare leafy mosses 4 amphibians' species 9 birds' species 2 mammals' species	Carbon sequestration Water regulation Assimilation	Hunting Fishing Haying Picking berries and mushrooms Tourism
Complex preserve *"Verhne-Lokchimsky" (242,000 h)*	15 plant species	Carbon sequestration The river Lokchim is the place of fish spawning Water regulation Assimilation	Recreation Tourism
Cedar Preserve *"Podcheremsky" (1,300 h)*	Cedar	Carbon sequestration Water regulation Assimilation Soil conservation The place of deer migration	Hunting Fishing Gathering mushrooms and berries Haying
Cedar Preserve *"Soplyassky" (600 h)*	Cedar	Carbon sequestration Assimilation, soil conservation	**There is no provision**

Table 2. The role of traditional life support

Features		Udorsky Region	Troitsko-Pechorsky Region	Kortkerossky Region
Actual unemployment, %		42	30	27
Activities, important for self-support, %	Growing food	100	85	100
	Cattle	40	29	10
	Hunting, Fishing	70	40	20
	Mushroom and berries picking	50	69	60
Source of income, %	Growing food	10	3	10
	Cattle	5	3	0
	Hunting, Fishing	15	6	0
	Mushroom and berries picking	5	10	0

In the settlements which are situated close to the PPNT areas, the high level of unemployment is marked. The demoralizing status of the unemployed causes theft which was not traditional in villages before. Low level of education, skills, technical experience; social and economic apathy, alcoholism, suicide are the consequences of the long-lasting asocial economy of the Soviet and Post-Soviet period. Drunkenness does not allow realizing available human potential[2].

The change in the employment structure is connected to labor moving from the fields of activity with low efficiency parameters (agriculture, lumbering, housing and communal

[2] Maksimov A.A. Problems of the traditional livelihoods' revitalization of. (In the book: North: the problem of peripheral areas). – Syktyvkar, 2007. – Pp. 301-316.

services) to the dynamically developing ones (trade, communication, construction). In the majority of areas the share of the employees in the non-productive sphere makes more than 60 % by virtue of the industrial sphere absence.

The transport network plays a great role in the socio-economic development of the territory. Very often the places of recreation, hunting and fishing can be reached not due to motorways, but either by means of the rivers, or winter roads.

Nowadays hunting and fishery are the important occupations for many rural families. In the structure of the average income per head the importance of hunting and fishery as the incomes' source is insignificant, though there are some families in villages for which these kinds of activity give the basic means, allowing to improve their living conditions and to send children to get higher education in cities[3].

According to the survey data, the percentage of local population's self-providing with fish practically in all rural settlements, belonging to preserves (except "Pechora", "Ocean" and cedar preserves) is approximately identical and makes about 20%. The high importance of hunting and fishing is characteristic not only for villagers' self-providing, but also as an integral part of their way of life and as a source of incomes. Families with low level of incomes are more active in holding subsistence farming, fishing, hunting and gathering of mushrooms and berries. But, despite of the stably hard socio-economic conditions in the majority of agricultural areas, very few people live their home places. The only way out from such situation can be employment in the field of traditional wildlife management.

In the territory of the Udorsky region the group of indigenous people legally declared their existence and lead active use of the preserve's territory, according to the principle of traditional wildlife management. Practically 95 % of all the results from collecting, hunting and fishing are used for self-providing. The local population very actively (40-50 % of the male population) participates in wildlife management, still following the principles of careful use of forest resources.

Villagers who live in the surveyed areas consider that they have the prior rights for fishing and hunting there. It can be shown in fastening the rivers sites and hunting areas with a view of traditional life-support. Low standard of living of the local population in practically all the settlements, belonging to the PPNT, the weak control and supervision over nature by the protection bodies and the absence of protective landmarks allow supposing poaching not only from the part of the locals, but also from the part of visitors hunters. Very often locals do not even guess, that nearby there are preserve's territories of regional value. And as the restriction of anthropogenic load on PPNT are not the positions and restrictive landmarks with the information, and but locals' well-being, bio-efficiency of the area and availability to potential buyers.

Economic estimation. The socio-economic estimation includes monetary estimation of *resources and services*. The resources for all studied PPNT are: tourism; fish resources; hunting resources – forest game, waterfowl; animals; mushrooms, berries and nuts.

The market estimation of the renewable natural resources is based on use of the market's data. The capitalized income at volumes of consumption which do not change calculates as the ratio of the profit from operations with resources (a year) to the rate of discounting. The profit from operations with resources a year is found by subtraction from the general gross proceeds of preparation costs.

As a rule, the value of a recreational object is determined by the number of visitors per year as the function of visitors' incomes, the prices, and some social and economic characteristics.

Generalizing the data on the studied preserves, it is possible to note, that in practically all preserves hunting for forest game, catching rare fish species, gathering mushrooms and berries is carried out. Anthropogenic loading is the most appreciable in complex preserves

[3] Maksimov A.A. Problems of the traditional livelihoods' revitalization of. (In the book: North: the problem of peripheral areas). – Syktyvkar, 2007. – Pp. 301-316.

"Udorsky" and "Verhne-Lokchimsky" and in ichthyologic preserve "Ilychsky" at though the resolved level of loading in all these territories is different.

As it is impossible to separate the volumes of legal and illegal fishing and hunting, the volumes of exemption are used for calculations in total.

Estimation of ecological services. Estimated services include water-regulation, absorption carbonic gas by the territory, biodiversity.

For calculations it is necessary to take into account that the wood environment and the marsh one differ in absorption of carbonic gas. Calculations of native researchers showed that the wood environment deposits carbon differently. For a steppe zone and a for a zone of deciduous forests the value makes 1 ton of carbon per hectare a year[4]; the woods located in the zone of middle and northern taiga have the values of 0.8 ton of carbon per hectare a year; marshes and river systems have the values of 0.6 ton of carbon per hectare a year[5].

The researches carried out by the scientists from Saint-Petersburg and Syktyvkar showed that the assimilation potential of woods in the northwest part of Russia is equal to 0.81 tons CO_2 for 1 hectare for deciduous species and 0.86 tons CO_2 for 1 hectare for coniferous ones[6]. In the Komi Republic the change of the mentioned parameter is observed: on the average it is 0.77 tons CO_2 for 1 hectare for deciduous species and 0.95 tons CO_2 for 1 hectare for coniferous ones[7].

While calculating the absorbing ability of vegetation we shall omit the age structure of forest stands and species' structure, basing on the researches of zone distribution in the region.

According to the official data, possible cost of 1 t of fixed carbon is estimated from 5 to 50 US dollars[8]. The difference can be explained by many factors: trade mechanisms differ in the rates; in demand dynamics (for the recent four or five years), or in popularity of the mentioned demand (some countries getting quotas, hope to resell them further). In the present calculations we shall take the minimal rates of 5 dollars (150 rubles) for a ton of deposited carbon in view of actual absence of such "market" in Russia.

The specificity of the water resources' security in the territory of the republic consists in a great number of the rivers, but in their small volume of the drain. Swamps and lakes play an important role for formation and regulations of the drain. Water-regulation gives preservation of the natural cycle in maintenance with water, river drain, its quality and volumes. Its estimation occurs according to calculations of the losses reduction of the drain at deforestation, drainage of swamps, by means of compensational expenses. The Russian and foreign experts[9] designate these expenses from 3 to 5.5 dollars per one hectare depending on the environmental type – a swamp, a lake, a river, or a wood. That is, the given service is estimated 150 rubles per 1 hectare for swamps; 90 rubles per 1 hectare for rivers; 90 rubles per 1 hectare for woods.

Preservation and maintenance of the natural genetic and biochemical variety local biota, especially the selection resources is one of the main tasks on creation PPNT. Hence, it is necessary attract attention to the given service. The special role is allocated to the estimation of rare, put on the list in the "Red Book", resources.

[4] Ilinsky A., Cherepovitsyn A. Conceptual approaches to Kyoto protocol market mechanism implementation // Proceedings of the Nordic Minisymposium on Carbon Dioxide Capture and Storage, Finland, Espoo, September 8 – 9, 2005.

[5] Cheremisina A.V., Karakchieva I.V. The prospect of organizing the carbon credit market in Komi Republic / Management of Economic Systems, 2010 (http://uecs.mcnip.ru/modules date of access 09/20/2010).

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[8] Tishkov A.A. Biospheric functions and ecosystem services: the methodology of ecological and economic evaluations of the PPNT (www.biodiversity.ru/programs/international/teeb/ ... date of access 05/06/2010).

[9] Constanza R., et al. The value of the world's ecosystem services and natural capital // Nature. – 1997. – Vol. 387. – Pp. 253-260.

Table 3. Economic value of ecological services

PPNT	PPNT services' value, million ruble			
	CO_2 absorption	Water Regulation	Biodiversity	Total
Ichthyologic preserve "Ilychsky"	47.90	47.92	5.32	101.1
Swamp reserve "Ocean"	16.10	26.85	1.79	44.8
Swamp "Pechorsky"	0.54	0.96	0.06	1.56
Complex preserve "Verhne-Lokchimsky"	5.06	3.82	0.42	9.3
Complex preserve "Udorsky"	29.00	21.78	2.42	53.2
Cedar Preserve "Podcheremsky"	0.15	0.12	1.00	1.27
Cedar Preserve "Soplyassky"	0.05	0.05	1.00	1.1

The monetary estimation of the biodiversity service (the account of rare resources) is carried out through the parameters of the specific preserves' charges. For existence of rare resources is necessary to protect them and to restrict their exemption.

The data found by foreign researchers considerably differ from the data found by the native scientists to the position of reduction. R. Costanza estimates this service in 16 dollars per one hectare of the territory for maintenance of the genetic resources[10]. The Russian researchers set the lower limit of dollars per one hectare[11]. Kamchatka's experience fixes budget funds financing for the functioning of protected areas at a rate of 10-30 mill. rubles per year in an area of about 4 million hectares. Kamchatka's protected areas are supported by UNDP/GEF and WWF, which make about 25% of the cost of investments. Thus, for 1 ha of protected areas of regional importance the funding for their existence accounts for 10 rubles per hectare.

There is an illustrative example of the Krasnoyarsk region, where in 2008 the regional budget allocated more than 80 million rubles for 88 protected areas of regional significance with total area of 5.3 million hectares. That is the specific rate of Pas maintenance is determined in 16 rubles per hectare[12].

[10] Constanza R., et al. The value of the world's ecosystem services and natural capital // Nature. – 1997. – Vol. 387. – Pp. 253-260.

[11] Tishkov A.A. Biospheric functions and ecosystem services: the methodology of ecological and economic evaluations of the PPNT (www.biodiversity.ru/programs/international/teeb/ ... date of access 05/06/2010).

[12] Simanovsky A.A., Shakhmatov S.A. Integration of protected areas and the socio-economic development of regions of the Krasnoyarsk Krai / Wildness protection (http://www.uralgosnadzor.ru/article/tn_38_10_40.php date of address 09/26/2010)

Of course, these figures may be only a guide; however, they differ in their values, which captures not only the different financial capabilities, but also the relation to those issues of the management at all levels of government.

Explanation of such divergences in financing is the position of management of natural resources, unwillingness of a management to perceive importance of the given problem – preservation of bio-resources. Now there is the restriction in human and financial resources in the sphere of wildlife management (supervision, control and protection). Nowadays in Komi Republic there is no management in any of the preserves of regional value.

For territories with the small area of protection the following calculations should be done: charges are formed due to the sum on wages for minimum of three employees. According to the expert data this sum is set as 1 million rubles a year.

The estimation of ecological services in the preserves' territories is determined by their sum *(tab. 3)*.

Value of forest resources. Mushroom and berry production is estimated on the basic the regional enterprise "Matreko". The prices qaccording to which in 2010 "Matreko" bought forest products: white mushrooms 70 rubles/kg; berries – 50 rubles/kg. To estimate the volumes of mushrooms gathering is not obviously possible. The average price for mushroom is accepted at the rate of 40 rubles/kg.

The direct cost of fish catch is determined according to market prices. The expenses on fish catch are developed according to the charges for transportation, gasoline, tackles and equipment.

Table 4. Money value of the preserves' resources

PPNT	Money value of the preserves' resources				
	Mushrooms and berries	Fish	Hunting	Nuts	Total
Ichtyological preserve "Ilychsky"	8055	15120	209	-	23 384
Swamp reserve "Ocean"	121.5	252	152	-	523
Swamp "Pechorsky"	225	-	12	-	237
Complex preserve "Verhne-Lokchimsky"	630	75.3	290	-	995.3
Complex preserve "Udorsky"	2538	35	460	-	3 033
Cedar Preserve "Podcheremsky"	144	no data	76	144	364
Cedar Preserve "Soplyassky"	50	no data	48	68	166

Table 5. Travel costs of the tourists visiting Ilych on tours (thousand rubles a year) 2010

Tours	Tourists' expenses, thousand rubles			
	Transport	Tour expenses	Other expenses	Total expenses
Hunting calendar's mysteries	30	75	12	117
Manpupuner – stone idols	650	1 073	260	1 983
Manpupuner – Torre-Porre-Iz	320	813	128	1 261
Giants of the Manpupuner plateau	480	1 309	192	1 981
Down the rivers Podcherye and Ilych	-	1 001	72	1 073
Expenses in total	1 480	4 271	664	6 415

The direct cost of the hunting resources' use is also determined according to the market prices. Expenses for hunting are very high; they develop from the expenses for permits, licenses, expenses for equipment, including the weapon cost and transport charges. According to the expert data[13] of hunters, the cost's size lies within the limits of 50-60% from the received income.

Estimation of the income of gathering pine nuts follows the market price 500 rubles/kg. The monetary estimation of resources in the preserves' territories is determined by the sum of concrete resources' estimations; it is submitted in a tabulated format *(tab. 4)*.

Preserves' recreational value. In this research the estimation of PPNT economic value includes recreational component (ecological tourism). For its calculation the method of transport and traveling expenses which is the method of preferences' detection is used. This method is simple enough; the expenses for visiting natural object interesting to the population (for example, accommodation costs, food, cost of tickets, and cost of services) reflect the recreational value of this place. In this case the existing average tourists' expenses for visiting preserves are estimated.

Summer is the usual season for visiting such places. Tours pass in two preserves – ichthyologic "Ilychsky" and complex "Udorsky".

The participants of ecological tourism (about 99% of tourists) are visitors from big cities: Moscow, Saint-Petersburg, Yekaterinburg, Saratov and Perm. The data received from the tour operators testify to growth of interest of these routes by native tourists. Foreign tourists from Germany, Norway and Finland are also invited. Nevertheless, tourists from Russia's cities demonstrate the greatest interest to such territories.

The number of tourists from different cities is the following: Moscow (67%), Saint-Petersburg (5%), Kaliningrad (2%), Yekaterinburg (17%), Saratov (3%) and Perm (6%). The experience of the organized tourism is still very small, but, nevertheless, in 2008 38 people visited the place, in 2009 about hundred people did it, and in 2010 two hundred tourists visited the

[13] Bobylev S.N., Kasyanov P.V., Solov'eva S.V., Stetsenko A.V. Complex economic evaluation of salmon in Kamchatka – Moscow: Human Rights, 2008. – 64 p.

Table 6. Economic value of PPNT

PPNT	PPNT value, million rubles			
	Ecological Services	Resources' value	Recreation value	Total
Ichtyological preserve "Ilychsky"	101.1	23.4	6.4	130.9
Swamp reserve "Ocean"	44.8	0.5	-	45.3
Swamp "Pechorsky"	1.6	0.2	-	1.8
Complex preserve "Verhne-Lokchimsky"	9.3	0.9	-	10.2
Complex preserve "Udorsky"	53.2	3.0	0.5	56.7
Cedar Preserve "Podcheremsky"	1.3	0.4	-	1.7
Cedar Preserve "Soplyassky"	1.1	0.2	-	1.3

place. The tendency of tourist appeal's growth is obvious. Maintenance of infrastructure, transport availability and information appeal should be the main tasks for tourist business' development in the mtntioned territory.

The total average expenses of tourists in the structure of the general economic value for the preserve "Ilychsky" make 6.4 million rubles. The given figures are the bottom border of expenses. Real figures, according to the tourists' stream (who do not get tourist permits) are 2 – 3 times higher.

The recreational value of the complex preserve "Udorsky" exists though it is not supported with the official data of travel agencies. Therefore, it is possible to estimate this value due to visiting tourists and their minimal expenses for transport and their purchase of mushrooms, berries, and fish. Taking into account a stream of tourists of 100 people, the average recreational value of the preserve does not exceed 500 thousand rubles.

Growing interest to the question of tourism in territory of the region by all means will raise only the value of the preserves in the region.

PPNT value estimation. PPNT economic value is developed on the basis of the monetary estimation of the resources of hunting, fishing, berries', mushrooms' and nuts' gathering, recreational component and ecological services *(tab. 6)*.

The data confirm the importance of ecological services. The larger is the object, the more is its role. The resources' use, as a rule, occurs in the limited area; therefore in value it is much characterized by smaller parameters, than ecological services. The monetary estimation of the resources which participate in the turnover of using in the preserves' territories is determined by many factors. The major factor is demand (market prices).

Recreational value also does not dominate over the full PPNT economic value. The reason is the low level of availability of the site of rest and of infrastructural component. The low level of local population's culture, their weak interest prevents development of the tourists' stream.

The most difficult problem at definition of PPNT economic estimation is definition of discount norm at the account of the factor of time.

The features of discounting at estimation of natural systems are the following:

- First, their viability is supported due to the natural forces (solar energy, oxygen, carbonic gas, mineral substances, water);
- Second, natural systems do not become outdated morally and physically;
- Thirdly, at the general tendency of quantitative and economic growth natural resources become more scarce and, hence, finally, more expensive.

Three variants of norm of discount for calculations of the general economic value are offered:

1) Norm of discount of 2%. This norm can be named ecological and corresponding the concept of steady development, long-term interests of the future generations.

2) Norm of discount of 6%. To this norm there corresponds the policy of the state aspir-

Table 7. Capitalized general economic value of PPNT (million rubles)

PPNT	Total value parameter	Discount norm		
		2%	6%	10%
Ichthyologic preserve "Ilychsky"	130.9	6 545	2 182	1 309
Swamp reserve "Ocean"	45.3	2 265	755	453
Swamp "Pechorsky"	1.8	90	30	18
Complex preserve "Verhne-Lokchimsky"	10.2	510	170	102
Complex preserve "Udorsky"	56.7	2 835	945	567
Cedar Preserve "Podcheremsky"	1.7	85	28	17
Cedar Preserve "Soplyassky"	1.3	65	22	13

ing to take into account the ecological factor in market economy, to raise competitiveness of ecological projects. It is applied in programs / projects with the state participation, to the state investments in ecological and social spheres;

3) Norm of discount of 10%. This norm corresponds to the market realities in economy most. In this case the future value of the natural goods, ecological damages and benefits are to the greatest degree leveled and minimized from the positions of modern choice. The priority is given to the modern goods and fast benefits.

The generalized data on the capitalized total economic value (TEV) are designed on the basis of the following formula:

$$TEV = (DV + IV)/D, \quad (1)$$

where:

DV – investment income from the resources' use and tourism,

IV – ecological services' estimation,

D – norm of discount.

In Table 7 the generalized calculated data on capitalized modern estimation of economic value of PPNT are represented.

For the decision of environmental problems it is necessary to aspire to achievement of the rational distribution of industrial resources. For this purpose the structure of supply and demand should be formed with the account of maximum full reflection in the structure of production costs of any goods' kinds in objective economic estimations of natural resources.

Conclusion

The following results were got after having carried out the research:

- Territories of practically all PPNT differ with extensive biological variety and representativeness of the existing plants', animals' and organisms' species owing to the preserves' high ecological value was confirmed from the positions of protecting ground and water ecosystems.
- PPNT natural capital includes not only resources forests with a complex of its hunting resources, mushrooms, berries, nuts, etc., but also the ecological goods, among them are water-regulation, a biodiversity, assimilation ability of a forest to absorb carbonic gas, etc.
- Low standards of living of the local population in practically all the settlements, belonging to particularly protected territories, weak control and supervision over nature by the protection bodies and absence of protective landmarks allow to suppose poaching not only from the part of locals, but also from the part of visitors.
- The activity of a person in the territories of the studied PPNT, practically everywhere is identical - hunting, fishery, gathering of mushrooms and berries. The level of poaching is limited only by the availability of getting to places of hunting and fishing.
- The complex socio-economic estimation took into account the resources used by people which are the most significant for the region.
- For the economic estimation market and non-market methods of estimation were used,

the volumes of resources' withdrawal were estimated as a result of expert data.

• For modern economic value's estimation the parameters reflecting the developed economic and social situation in the region are basically taken. These figures can be considered as the bottom border of PPNT value as the use of resources, tourism and other components reflect low level of the areas' economy, and low level of the population's well-being not only in the Komi republic, but also across Russia that has a negative effect on trips, tourism and recreation which essentially determine the direct cost of the resources' use.

• The investment income from the resources' use is calculated, proceeding from their cost in the potential market (Syktyvkar) minus the expenses for organizing hunting, fishing, gathering of mushrooms, berries and nuts. The expenses' part on hunting, fishing, gathering of mushrooms, berries and nuts was accepted on the basis of international, Russian and expert sources and made accordingly 60 %, 30 %, 10 %.

• Recreational component is included into the structure of PPNT estimation. For its calculation the method of transport expenses is used. This method is based on the expenses for visiting natural object interesting to the population which reflect recreational value of a place. Summer is the usual season for visiting such places. Tours pass in two preserves – ichthyologic "Ilychsky" and complex "Udorsky".

• The basic part of economic value of many PPNT is made with the indirect cost of use connected to the role of ecological regulation PPNT. Value of ecological services even at the minimal specific sizes gets the huge importance for preservation of the mentioned territories. So, in practically all PPNT the importance of ecological services makes more than 50 %, and for larger preserves this size can be more than 90 %.

• The high level of ecological services' value proves the necessity of their reservation. The biological resources' presence in the PPNT territories and the sanction for their use attracts introduction of mushroom and berry picking, hunting, fishing and ecological tourism as the alternative ways of forest management.

• The method of PPNT estimation including the account and the importance of ecological services serves for acceptance of the timely administrative decisions on re-structuring such territories.

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