INTERNATIONAL JOURNAL FOR INNOVATIVE RESEARCH IN MULTIDISCIPLINARY FIELD ISSN: 2455-0620 Volume - 6, Issue - 12, Dec – 2020
Monthly, Peer-Reviewed, Refereed, Indexed Journal with IC Value: 86.87 Impact Factor: 6.719
Received Date: 13/12/2020 Acceptance Date: 25/12/2020 Publication Date: 31/12/2020

GEOECOLOGICAL ASSESSMENT AND RATIONAL USING RECREATIONAL POTENTIAL SHORE ZONES OF RESERVOIRS OF THE REPUBLIC OF UZBEKISTAN

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Abstract: *The purpose of this article is to develop theoretical and methodological foundations of the geoecological assessment of the recreational potential of the coastal zones of reservoirs and increasing the efficiency of its use. By the efficiency of recreational nature management, we mean the maximum satisfaction of recreational demand while minimizing the negative impact on aquatic- territorial complexes (ATC) of reservoirs.*

Key Words: *geoecological evaluation, the Republic of Uzbekistan, recreational potential, coastal zones, water reservoirs.*

1. INTRODUCTION:

Organization of recreation for the population is an important socio-economic task. This is especially important right now in connection with the acceleration of the rhythm of life, the increase in physical, psychological and emotional stress, leading to stressful conditions and an increase in the number of cardiovascular and nervous diseases. According to medical statistics, people who devote vacation time directly to rest are 3-4 times less susceptible to diseases and have high vital activity and efficiency, which brings a significant economic effect on a national scale. As world experience shows, recreation is a very profitable branch of the economy, often more profitable than industry or agriculture.

The most popular rest on the banks of reservoirs, because the presence of a water body significantly diversifies the structure of recreational activities. In the conditions of a significant scale of recreational nature management and a shortage of natural recreational water resources, reservoirs are becoming increasingly important for recreation purposes. Their role is especially great in regions with a high concentration of urban population, where reservoirs are often the core of the formation of a specific territorial-recreational system (TRS). At present, more people rest on the banks of the reservoirs than on other water bodies in Uzbekistan.

During the recreational use of water bodies, the main recreational loads fall on their coastal zones. At the same time, during the creation and operation of large lowland reservoirs, a number of changes in the coastal environment occur, which are especially large-scale for such processes as coastal reshaping, flooding, and changes in microclimatic characteristics. This entire complex of processes significantly affects recreational activities and their geo-ecological consequences.

Thus, the relevance of the topic is determined by the following factors:

- the intensively growing demand for recreational resources of reservoirs;
- a difficult ecological situation in many regions, which reduces the value of natural, natural recreational resources, including water;
- the specificity of geo-ecosystems of reservoirs, which requires the development of special methods and approaches to solving the problems of their rational recreational use.

2. LITERATURE REVIEW:

The peak of the creation of reservoirs was noted in the second half of the 20th century, when this process took on the scale of a planetary phenomenon. A significant number of scientific works have been devoted to various aspects of the problem of creating and functioning of reservoirs as complex natural and technogenic systems with a number of specific features [Avakyan , 1972; Avakyan , Matarzin , 1984; Avakyan , Sharapov, 1960; 1962, 1968, 1977,

1981; Butorin , 1963, 1969, 1983; "Reservoirs and their impact ...", 1986; Dyakonov, 1975; "Integrated research of reservoirs", 1971, 1973; Litvinov, 1968; Matarzin , 1967, 1971, 1983; Nezhikhovsky , 1990; Fortunatov, 1963,1970,1974; Edelstein , 1968, 1998, etc.]. The most significant and fundamental research in the field of recreational use of reservoirs belongs to the same period [Avakyan, Saltankin, 1988; Avakyan, Sharapov, 1977; Avakyan, Yakovleva, 1976; Avakyan et al., 1990, etc.].

3. MATERIALS AND METHODS:

When developing the theoretical and methodological foundations of the study of the problem, the following methods were used: geographical analogues, zoning and classifications, expert assessments, conjugate analysis of the components of the natural environment, mapping, geographical forecasting and statistical analysis.

The research included two stages: field (expeditionary) and office surveys of reservoirs. The complex of expeditionary surveys consisted of landscape, geomorphological, hydrogeological, hydrological, hydrochemical, hydrobiological, soil, geochemical, geobotanical and sociological (survey and questionnaire) research. Cameral studies included the analysis of materials from expeditionary surveys, analytical data and fund materials on the surveyed reservoirs.

4. ANALYSIS, DISCUSSION AND FINDINGS:

In the early 90-ies of the xx th century, there has been some decline in interest in the recreational category in Uzbekistan, which was caused by the peculiarities of the socio-economic conditions of the period. In recent years, research in the field of recreation and tourism has noticeably intensified in various aspects.

There were theoretical work, environmental, economic, social and regional profile Stefanovich A. A., Voskresenskaya E. N., Lubkov A. The S. Grigorev V. Yu., Millionshchikova T. D., Sazonov A. A., Chalov S. R., Romanova E. P., Alekseeva N. N., Arshinova M. A., Klimanova O. A., Kovaleva T. A., Kondratyeva T. I of.

A significant number of publications also appear in the foreign press [Sepiolo, 2004; Compendium of Tourism Statistics, 2005; Mechkovskaya O., 2005; Chris Ryan, 2003 and others]. However, despite the large number of studies on recreational nature management, complex works on geoecological problems of the recreational use of reservoirs are practically not presented in the scientific literature.

The work clarifies the system of basic terms, definitions and concepts in relation to the recreational use of reservoirs, since ambiguous interpretation of terms often complicates the perception of the results, hinders their understanding.

One of the basic concepts in the scientific and methodological system of recreational nature management is recreational water use, because recreation in the coastal zone and in the water area of water bodies is the most widespread. “From the standpoint of rational use and protection of water resources from pollution, recreational water use should be understood as the activities of the population associated with the implementation of various types of recreational activities (recreation, sports, tourism) on the water area and coast of water bodies, which has a direct or indirect (indirect) effect on the quality of water and ecosystems of water bodies” [Avakyan et al., 1983]. The definition emphasizes that water areas and coasts of water bodies are also involved in recreational water use. during the development of recreation, both coastal zones and aquatic complexes are used, and often the recreational loads on the coast are much higher than the loads on the water area.

In the recreational literature, the term recreational potential is widely used, which has many interpretations. By the author, the recreational potential of water bodies is understood as a set of components of water (aquatic) and coastal (territorial) complexes, their properties and individual parameters, which allows the most complete satisfaction of the needs for various types of recreational activities without prejudice to the ecological state of the unified coast-water system.

Currently, there is a sharp increase in the scale of recreational demand for the ATC of reservoirs, which is explained by the following reasons:

- reservoirs increase the recreational capacity and value of landscapes, and in some cases serve as a nucleus that creates recreational landscapes;
- the deterioration of the ecological state of natural recreational resources, including water resources, in industrially developed areas has led to the emergence of a "quality" shortage of water resources, and therefore, reservoirs for household and drinking purposes, the water quality of which must comply with sanitary and hygienic standards, become the most valuable recreational facilities;
- a significant number of integrated reservoirs have been created near cities, which makes it possible to use the existing infrastructure for recreational purposes;
- in the context of the economic crisis, recreation on suburban water bodies and, in particular, on reservoirs, which does not require significant financial costs, becomes the most popular.

Multifunctional water management complexes (VHC) are formed during the creation of hydroelectric complexes, reservoirs and canals. Recreational water use as a special type of activity, rapidly developing in recent years, is involved in the system of water management relations. In this regard, the definition of the place and significance of recreation in the composition of the VHK is not only of scientific, but also, above all, of practical interest.

The specifics of the functioning of reservoirs significantly complicate the task of their unified classification. At present there are several systems typing reservoirs by their parameters [Fortunatov, 1963.1970; Lifanov, 1946; Zhadin, Gerd, 1961; Avakyan, Sharapov, 1977; Matarzin et al., 1977], on the basis of which we developed an integral assessment of the recreational significance of reservoirs (Table 1).

Table 1. Classes of the recreational value of reservoirs by their main parameters

Index	Recreational value classes of reservoirs			
	I	**II**	**III**	**IV**
one	2	3	4	5
Reservoir parameters				
Altitude position	Plain	Foothill	Mountain	Alpine
Configuration	Any	Any	Dolinnoye	Dolinnoye
Dimensions	Large, in the middle, small	Small, very large	The largest	-
Depth	Middle depths, shallow, shallow	Deep	Very deep	Exclusively deep
Water exchange rate	Very big, big	Significant, average	Small	Small
The quantity drawdown level	Small, small	Average	Big	Very big, exclusively big
Water quality				
Water quality class, but hydrochemical indicators	1-2	1-2	3-4	5-6
Water quality by indicator trophicity	Dis t rofnye, oligotrophic	Mesotrophic	E vtrofnye	Semi-eutrophic, psereutrophi c
Water quality by indicator saprobities	Oligosaprobi c (pure)	Alphamesasaprob ic (slightly contaminated)	Betam e zaprobnye (average agrh znv others)	Polysaprobi c (heavily soiled nye)
Coastal zone parameters **				
Area of the coastal zone suitable for recreation,% of the total area of the coastal zone	> 60	60-40	40-20	<20
Area of anthropogenically distur bed areas of the coastal zone,% of the total area of the coastal zone	<20	20-40	40-60	> 60
Flooded areas,% of the total area of the coastal zone	<10	10-30	31-50	> 50

Length of abrasive shores,% of the total length of the coastline	<10	10-20	21-40	> 40
Coastal ledge height, m	0.5- 3	3-5	5-7	<0.5; > 7

Note: * I -parameter is maximally favorable for the development of recreational water use; II - the parameter is favorable for the development of recreational water use; III - the parameter is relatively favorable for the development of recreational water use (only for certain species); IY - the parameter is unfavorable for the development of recreational water use; "The parameters of the coastal zone were developed by the author on the basis of field observations and sociological survey data.

Studies conducted by the author in various regions of the Republic of Uzbekistan have shown that the most attractive for recreation are lowland reservoirs of any configuration and size; medium depth, with developed shallow waters and with a small value from the level working; with an insignificant development of coastal abrasion processes and coastal flooding; located in favorable climatic zones. On them, as a rule, a diverse structure of types of recreation is formed.

5. CONCLUSION :

The conclusion summarizes the main results and conclusions of the research.

Justification of the effectiveness of the recreational use of reservoirs is achieved by carrying out a complex of studies, including the following theoretical provisions and practical developments:

1. Reservoirs are complex natural and technogenic objects, the functioning of which occurs as a result of close interaction and mutual influence of techno, geo -economic and socio-economic systems. By virtue of their specificity, they have a number of features that complicate their recreational use:

- the creation of a reservoir causes rapid and significant changes in natural characteristics (microclimatic, hydrogeological, hydrological, hydrobiological, etc.) of the water area and coastal zone of a natural water body;
- at the stage of stabilization of the reservoir as a geo-ecosystem, there is a high dynamism, and, consequently, the instability of the ATC of reservoirs to all types of impact, incl. - and recreational;
- When creating multipurpose reservoirs, as a rule, the interests of recreation were not taken into account in the VHK system. This led to the development of contradictions between recreational water use and other sectors of the economy;
- high anthropogenic loads on the ATC of reservoirs cause a deterioration in their ecological state and sharply decrease the recreational value.

All these reasons determine the need to take into account the geo-ecological (physical-geographical and ecological parameters of the reservoir's AF), anthropogenic (direction and intensity of anthropogenic loads) and socio-economic (demand, efficiency of use) characteristics of the geo-ecosystem of the reservoir when justifying and implementing the optimal structure of recreational water use.

2. Rest on reservoirs is associated with the use of a conjugate complex of two different, but interacting, types of natural complexes - aquatic and territorial. The solution to the problem of recreational nature management in reservoirs is possible in the study of a single geo-ecosystem "coastal zone - reservoir".

The formation of recreational nature management, at each specific reservoir, should be based on a comprehensive assessment of the state of the ATC and a forecast of their changes, taking into account natural and anthropogenic factors, which can only be implemented on the basis of a geo-ecological approach, which is a modern interdisciplinary area of territorial analysis.

The features of the ATC of reservoirs and their structure, as objects of recreational water use, are determined both by the general law of geographic zoning and its specific manifestations in the functional structure of the WCC of an individual reservoir.

When placing and planning recreation areas on water bodies, it is necessary to determine the significance of the components of the natural environment on the basis of qualitative and quantitative expert assessments that determine their priority for specific types of recreation.

Recreational use of reservoirs affects the state of all components of nature, the intensity and scale of which depends on:

- natural and climatic characteristics of the territory;
- purpose, parameters and hydrological regime of the reservoir;
- the scale and types of manifestation of the impact of the reservoir on the environment;
- direction and intensity of economic development of the coastal zone and water area;
- the scale and structure of recreational water use;
- the degree of recreational ATK digression.

A differentiated approach is needed to assess the negative impact of recreational activities on the ATC of reservoirs. The strongest effect on the natural environment, all other things being equal, has
unorganized (amateur) rest due to the spontaneous distribution of recreational loads over the territory and by seasons, the lack of the necessary arrangement in the areas of unorganized rest, etc.
3. Rational recreational use of the geo-ecosystem of reservoirs is based on a system of procedures and assessments: distribution of loads, intensity, volumes, types and routes of entry of pollutants;
- determination of the coefficient of recreational bonitet for coastal functional zones, which characterizes the state of the recreational area (from K = 0-10 % - practically undisturbed state to K > 50% - strongly depressed state);
- determination of the permissible recreational loads (RP) on the coastal and aquatic complexes of reservoirs for certain types from the breath and their observance for specific ATC. The DN level is determined by the weakest link in the "reservoir - catchment" system and by the most vulnerable element of the system;
- carrying out an environmental audit and recreational appraisal of the ATK of reservoirs;
- assessment of the recreational potential by type of recreation.
4. With intensive recreational development of reservoirs, processes of recreational digression of varying intensity develop in some areas.

The optimization of recreational nature management should be based on the data of the ecological audit of the coastal zone and the recreational assessment of the ATK of reservoirs for various types of recreation or their combinations, according to the results of which the assessment of the recreational potential is carried out.
It is possible to mitigate the contradictions between the increasing recreational demand and the preservation of the quality of the natural environment by:
- increasing the share of organized recreation and decreasing - amateur (unorganized);
- partial or complete arrangement of recreational areas, which is associated with certain costs. According to questionnaire surveys, 70 to 90% of amateur vacationers are in favor of charging a moderate fee for outdoor recreation, provided that the necessary measures are taken to equip recreational areas;
- determination of permissible recreational loads by types of recreation, their optimal distribution and regulation by the ATC of the reservoir;
- development of an optimal recreation structure for a given reservoir, and for large reservoirs - for their individual sections.

Thanks. The author expresses his deepest gratitude to the scientific consultant, Doctor of Biological Sciences. Professor Kuzmetov A.P. for consulting assistance, fruitful discussion of the results obtained and constructive criticism.

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