



TO THE ISSUE OF ZONAL SPECIFICITY OF WATER QUALITY
FORMATION IN THE RESERVOIRS OF THE SOUTHERN ARAL SEA REGION

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Annotatsiya: Mazkur maqolada Qoraqalpog'iston hudidagi limnik ekotizimlarini ekologik baholash va ularning mahsuldorligini boshqarish masalalari ko'rib chiqilgan. Limnik ekotizimlarni mintaqaviy va global atrof-muhit o'zgarishlarini aniqlashda eng asosiy axborot ob'ekti hisoblanadi. Qaratereng kulining gidroximik rejimining ekologik xususiyatlari undagi biogen moddalar kontsentratsiyasi o'zgarishining mavsumga bog'likligi ma'lum buldi. So'nggi yillarda tabiat va insonning o'zaro ta'siri muammolari orasida yer usti suvlarining antropogen evtrofikatsiyasi muammosida kurib chikilgan. Hozirgi davrdagi globallik va tabiiy ekotizimlardagi texnogen faktorning (bosimning) intensivligi, tabiiy ofatlar va iqlim o'zgarishining salbiy oqibatlari suv ekotizimlarining integratsion xususiyatlarining (hosildorlik, sifat va toksin ifloslanish,) buzilish haqida suz etilgan.

Kalit so'zlar: Janubiy Orolbo'yi, kislorod miqdori, ko'llarning evtrofiklanish, Mo'ynoq ko'rfazi, Qorateren ko'li, limnik ekotizimlar

Аннотация: В данной статье рассматривается экологическая оценка лимнических экосистем Каракалпакстана и управление их продуктивностью. Лимнические экосистемы считаются важнейшим информационным объектом при определении региональных и глобальных изменений окружающей среды. Выявлена зависимость экологических особенностей гидрохимического режима пепла Каратеренг от сезона изменения концентрации в нем биогенных веществ. В последние годы среди проблем взаимодействия природы и человека обсуждается проблема антропогенной эвтрофикации поверхностных вод. Глобализация и интенсивность антропогенного фактора на природные экосистемы, негативные последствия природных катаклизмов и изменения климата отражаются на ухудшении комплексных свойств водных экосистем (продуктивность, качество и токсическое загрязнение).

Ключевые слова: Район Южного Приаралья, содержание кислорода, эвтрофикация озер. Муйнакский залив озеро Каратерен, лимнические экосистемы

The annotation; This article deals with ecological assessment of limnic ecosystems in Karakalpakstan and management of their productivity. Limnic ecosystems are considered the

most important information object in determining regional and global environmental changes. The environmental characteristics of the hydrochemical regime of Karatereng ash were revealed to be dependent on the season of changes in the concentration of biogenic substances in it. In recent years, among the problems of interaction between nature and man, the problem of anthropogenic eutrophication of surface waters has been discussed. Globalization and the intensity of the man-made factor (pressure) in natural ecosystems, the negative consequences of natural disasters and climate change are reflected in the deterioration of the integrated properties of water ecosystems (productivity, quality and toxic pollution).

Key words: Region of the Southern Aral Sea region, oxygen content, eutrophication of lakes. Muynak Bay, Lake Karateren, Limnic ecosystems

Introduction: Analyzing the ecological features of eutrophication processes of water bodies in the Southern Islet region, the processes of change occurring in natural water ecosystems under the influence of environmental factors today, especially due to the increase of eutrophication processes of water bodies under the influence of anthropogenic factors and the degradation processes of water bodies in the hydrosphere large-scale research work is being carried out to determine the cases of reduction of recreational potential. In this regard, the study of the ecological condition of natural water bodies, the quantity of biogenic elements in water bodies it's important to monitor water ecosystems, identify their trophic levels, and use new innovative methods of bio-indication, as well as research to make the most of watersheds. [1,7]

At present actual water ecosystems research problem is study of periferal lakes as indicators of zonal specificity of water quality formation development of anthropogenic induced processes in waters of lands of different natural climatic zones, and also those global environmental changes taking place in the modern period [3,7]

Water objects are the most important component of natural environment surrounding humans. Water ecosystems are in a state of equilibrium with environmental conditions and have complex structure which is disrupted under the influence of anthropogenic factors. [1,6]. Modern intensity of anthropogenic activity and climatic changes lead to violation of integrative properties of aquatic ecosystems (productivity, quality, toxic pollution, sustainability, well-being, etc)[7]. Anthropogenic influence makes significant changes, first of all, into abiotic elements of lake ecosystems (morphometric characteristics, hydrologic and hydrochemical regimes of the lake), determining conditions for the life of hydrobionts [7]

Scientists have noted that in the formation of the qualitative composition of waters, the anthropogenic factor in recent years has become important on a par with natural geochemical and biological processes [7]. Watershed transformation, transboundary flows, at atmospheric precipitation, industrial and household waste water discharges, unorganized runoff from residetiol areas lead to changes in geochemical cycles of elements in “catchment - reservoir” system, the appearance of toxic components in the aquatic environment, entrophication processes, acidification and siltation which ultimately degrade water quality. Moreover changes

in atmospheric falls quality lead to changes in geochemistry of watershed system and natural flow of elements, which can lead to changes in water resources quality in vast territories limits [1,7]

Water ecosystems in south Aral coasts region formed as a result of changes in hydrological state of Amudarya-river and as a result of overflow of biogenic elements coming from watered fields of forms in Aral Sea region.

One of the most important indicators defining quality of water in lakes is oxygen state of water masses which depends on biogenic uploads and conditions of mixing. Downfall of contents of mixed oxygen brings to appearance of anaerobic conditions in close -to-bottom waters, and sometimes in significant waterbody masses. Anaerobic conditions give way to chemical and biochemical reactions flow of recreation type. This leads to accumulation of such units as ammonium nitrogen, methane, sulphuretted hydrogen. Because of water pollution by the things and pieces of rotting organics lakes are not practically useful for needs of drinking water supply, recreation, fish productivity of the waterbody.

The most of water ecosystems were transformed [1,4]. Taking into account specificity of region and specificity of anthropogenic influence, we were given a task to define separate indicators representatively showing the condition of one or another system to estimate direction of transformation of organic things. Such indicators are oxygen contents. Its saturation spatial distribution and also content of organic things, relation of its forms, speed of production and destruction of organic things. Bio productive qualities of lakes are the most important ecological characteristics of waterbodies. The main indicator by estimation of the character (direction) and intensity of bio production processes is absolute and relative oxygen content. Oxygen regime specificity research in seasonal aspect showed that its dynamics in spring and autumn periods, thanks to active circulation, doesn't have cutting difference between water – table and bottom-water layers [3,5]. Oxygen regime in lakes which are most influenced by anthropogenesis factors and coming agro irrigational flows significantly differs from other waterbodies.

Oxygen regime is also basic physical and chemical characteristic of practically all biological systems and which is in close relationship with anthropogenesis influence on water eco-systems [1,5].

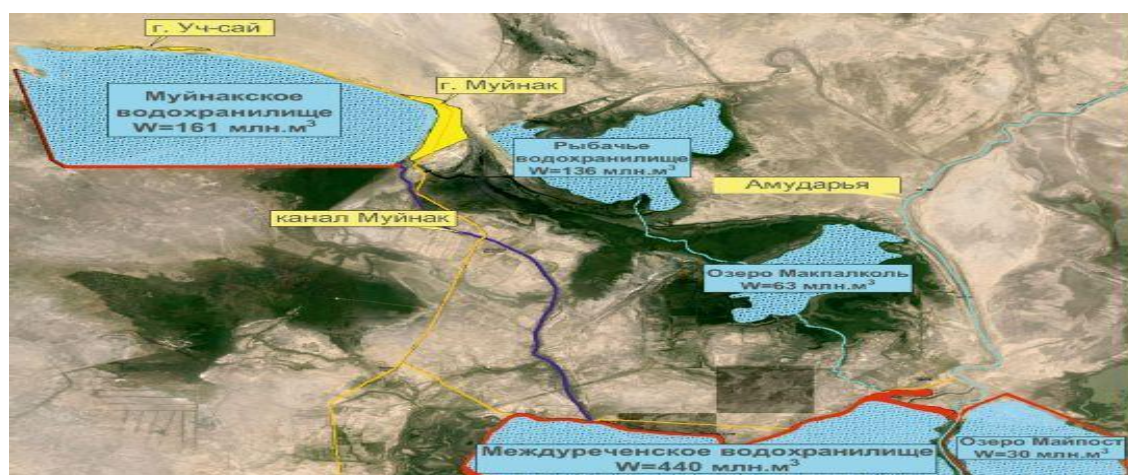
Most of limnetic ecosystems in the South Aral Sea region by oxygen contents are related as medium – planted water -bodies [2,4]. These lake -systems during vegetation periods are characterized by sharp changes in oxygen Concentration as well as in water table and at the bottom. In water table layer absolute units of oxygem contents range from 8,2 mg to 12 mg O₂ /l.

We have been studying oxygen regime in research objects for many years. Oxygen contents in lake stations and channels much variably depends on multitude of factors and is defined by season of year. During period of spring and autumn homothermic and full remixing of water masses, mixed oxygen is spread in water body equally. Its concentration during this time is about 5,7 mg O₂ /l – 12,62 mg O₂ /l that isn't above 100% of saturation. In summer period

oxygen contents in water table layer of researched lakes varies from 8,0 mg O₂/l, to 10,2 mg O₂/l. It's about 120% of saturation. It was also found that downfall of oxygen in natural layers may come to zero point.

During fish farming works special attention is paid to water – bodies oxygen regime research, because mixed oxygen presence in water is obligatory condition for most water organisms' wellbeing. Need in oxygen of some kinds of fish is different. So, it is found that for normal life activity of salmons oxygen concentration must be 8 mg -11 mg O₂/l, and for carp - 5,8 mg, O₂/l, with concentration lower than 3,0 mg O₂/l, threat of fish death comes. In open waterbodies oxygen contents muse not be less than 4 mg /l, otherwise anaerobic processes of destruction of organic things start and water rots.

Materials and methods: Assessing water quality by up-given classification by Hainish it can be said that Shegekul take water in Moynak region of south Aral Sea region belongs to second class, medium – polluted.



Picture 1. The elimination of the Muynaq Basin from the 2020 Map.

From given data it is seen that oxygen cantents in water sometimes is less than enough. Watershed active reactions of fish in lakes (strong anxiety, jumping up out of water, secret crow dings, etc) prove the fact of oxygen deficiency. Oxygen budget, its layertolayer speediness, shown in form of oxygen chart, oxygen deficiteny in hypolimnion is the most widely used indicator of lakes eutrophication process. For those lake parts where ephthofication signs are marked, oxygen regime is very intensive almost during year, the difference between minimal and maximal great nesses became sharper, in close -to-bottom layers meta- luminous maximum is often marked [2,3].

Most often such situations appear in close – to-coast polluted parts, at parts with signs of ephthofication. They are hearths of fish death. Some kinds of water bugs, fish and mollusks are most sensitive to oxygen deficiency. Basic ways of struggling with fish death are saturation of water with oxygen and water- body defense from different organic and other things throw-down. Most easy way of pre-death situations forecast is watching day range of oxygen. Having defined

oxygen contents in the dark time and in the morning it's necessary to build a chart of downfall of oxygen content at night and pre – morning hours.

So fish death is bound to a very high ephthrofcation of water bodies. To define the time of pre-death condition in Moynak sleeve we defined oxygen contents, where at evening time (about 20:00) it was about 7,9 mg O₂ /l, and then in the morning oxygen contents was 5,2 mg O₂ /l, we can define that death time lasts about 12 days. In summer when extremal ecological situations take place it's necessary to define in what period fish death can take place. In order to do this in oxygen bottles daily biochemical need in oxygen (BNO) is defined and in dark bottles consumption of oxygen can be defined [6]. Due to this we conducted experiments at two stations and got the results shown in

Comparative analysis of BNO indicators to determine terms of fish death in water-bodies of southern Aral Sea Region

Table 1.

Station 1 BNO 1-1,2	Station 2 BNO 1-0,8
(ORI) Oxygen regime intensity will come if	
ORI 80% in 1,5-2 days	ORI 71%-79% in 3-4 days
ORI 55-70% in 4-6 days	
According to the results of our experiment:	
At the 1 station ORI- 92,3%	At the 2 station ORI-72,7%, fish death well come in 4-5 days

Results and discussion: Comparative analysis of obtained results at literature data showed that mineralization of Amudarya river water and studied water- bodies is continuously increasing and varies from 0.6 to 3,6 g/l. The results showed that oxygen regime is very dynamic, often quite tense and especially at littoral stations of lakes and bays, deficiency conditions and fish death take place. To prevent fish death constant water change is necessary.

Karatereng lake is located 25 km to the north of Takhtakupir Region of the Republic of Karakalpakstan, at the foot of Beltau hill. The water body is surrounded by irrigated lands from south and south-east sides. Beltau hillis locoted at the north and north-east sides.

At the end of the last century, when one of the Amudarya sleeves Kuvanig- Jarma had a dried connection with Aral Sea and through Yani-su fed the Karatereng lake, the lake had a very large square [4]. Currently total area of the lake is 2169 hectares.



Picture 2. Karatereng lake location map in the territory of Karakalpakstan

Main source of nutrition for the lake is ground water and wastewater. Maximum depth of the water-body is 8 m, average depth of the waterbody is 3 m, minimum depth of the waterbody is 0,4 m. water clarity is 2 m in autumn and 6 m in winter.

According to our observations, in recent years total overgrowth of the waterbody decreased slightly, due to decreased flowability. In the south -western part of the lake cattail-reed association prevails, in the southern and northern parts reed prevails. At the eastern coast reed and cattail are found fragmentarily.

Conclusions: The analysis showed that only 12%-15% of the total lake area is occupied by reed and cattail, spreading to the depth of 0,8m. farther to the depth of 1,7m, mainly charophyte algae is observed. Around the lake tamarisk – Soyinka association grow widely, at the western coast camelthorn thickets grow. The banks are flat, smoothly thinned [4]. Besides, biotic components of water ecosystems reflect trophic status of water object, which in its turn depends on quantity of organic matter dissolver in water. According to this, populations, kinds and communities of organisms have definite level of tolerance in current conditions. According to experts, food base for fish in the lake was favorable. Benthic organisms are represented by *Chionomida Trichoptera Odonata Dreissena Limnaea Vermes Grammaridae*[5]

So, considered water ecosystems are the most prosperous and perspective waterbodies in fisheries. Fed by irrigation runoff, relatively deep water, openness of waterbody, good miscibility, and water exchange are the factors favorable for fisheries development. In this connection, basic necessary measures for given, considered waterbodies must be regular influx of fresh river waters.

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