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RESEARCH TO CREATE A BIODIVERSITY DATABASE IN THE AREA OF THE CEMENT PLANT «CASPIAN-CEMENT»

Abstract. The result of field studies the state of biological diversity, in order to create a database for monitoring the state of the animal world, on the territory of the existing cement plant. The following taxonomic groups were studied: birds (the largest numerous groups, easily identifiable), mammals (requiring special research methods), reptiles and amphibians. The identification of species that occurred in the study area of the chalk Deposit was carried out and the bio topic requirements for each of these species were studied. Along with the classical methods of environmental assessment and monitoring, a new method for studying biological diversity in the mining area is used. The method is based on geoinformation analysis and mapping data. All data on biodiversity were obtained using a map divided into grid squares (500×500 m), and were collected in a qualitative way (the number of representatives of animal species per grid square). The study area on the South Shetpe Cretaceous Deposit in the area of the plant "Caspian Cement" met with widespread desert species (mole lemming, tushkanchik). In the local fauna there are absolutely no true steppe species, and there are few semi-desert species (small gopher, korsak, saiga). A qualitative assessment of the importance of biodiversity was presented, taking into consideration the landscape-stabilizing factor, maps of "natural habitats". A map of the territory of the cement plant with the site of the chalk quarry with the indication of the natural habitats of biodiversity and their database was compiled.

Key words: quarry, plant, cement, biodiversity, significance, wildlife, mammals, reptiles, database.

Introduction. Biodiversity directly affects the state of ecosystems, as its reduction negatively affects the structure of ecosystems. This leads to change and destruction of biotic communities.

Assessing the importance of biodiversity is essential for understanding the significance of potential environmental impacts [1,3].

This makes it possible to develop priorities to reduce the environmental burden. In general, the more biological species on the site of deposits and quarries, factories and industrial enterprises, the greater the value of this site [1,3]. During the operation of the cement plant, at the South Shetpe chalk Deposit, the impact may have been negligible at the beginning. But, as it is known, anthropogenic impact increases during the stages of construction and operation of the plant, and will decrease as measures are carried out to restore and reclaim the quarry. The significance of predicted impacts on biodiversity depends on the magnitude of impacts and the sensitivity of the ecosystems or species affected [2]. In this regard, research aimed at reducing the negative impact on biodiversity is relevant and timely [2].

Research methods: Along with the classical methods of environmental assessment and monitoring, a new methodology for the study of biological diversity in the mining area was used. The method was based on geoinformation analysis and mapping data.

All biodiversity data were obtained using a map divided into grid squares (500×500 m) and were collected in a qualitative way (number of species per grid square).

Research result. Mammals. Of the 178 species of mammals registered for the fauna of Kazakhstan, Mangistau region accounts for more than 67 species or 38% of the species composition. The mammal fauna of the region has a typical desert appearance.

The number of mammals in the desert landscapes of the chalk Deposit is small, mainly due to the harsh natural conditions.

On the territory of the study at the chalk Deposit of South Shetpe in the area of the plant "Caspian Cement" widespread desert species (slepushonka, jerboa) were met. In the local fauna there are absolutely no real steppe species, there are few semi-desert species (small gopher, Korsak, saiga). However, there is an endemic species-long-eared hedgehog. In addition, it includes representatives of the African-Asian desert complex: (hare-tolai, red-tailed gerbil, Jackal, Caracal). While there are almost no Turanian elements (tamarisk gerbil, jerboa Severtsova and small jerboa). Of the widespread Palearctic species, a wolf and a fox inhabit.

The results of the studies are presented in table 1, in the form of a qualitative list of biodiversity in the area of the cement plant.

Among the widely spread ones inhabiting the study area are: steppe agama (*Trapelus sanguinolentus*), tachyr roundhead (*Phrynocephalus helioscopus*), fast lizard (*Eremias velox*) (Table 1). The density of their settlement is usual, i.e., 1-10 individuals per 1 ha [4,8,9].

Of the desert species – Sarmatian skid (*Elaphe sauromates*). The density of the settlement is rare, less than 1 individual per 1 ha. There are also green toad (*Bufo viridis*) (1-10 individuals per 1 ha), water toad (*Natrix tessellata*) (1-10 individuals per 1 ha), ordinary copperhead (*Gloydius halys*) (1-10 individuals per 1 ha).

Ordinary species include Central Asian turtle (*Agrionemys horsfieldi*) (1-10 individuals/ha), Caspian gecko (*Cyrtopodion caspium*) (1-10 individuals/ha). Numbers of the Central Asian turtle (*Agrionemys horsfieldi*) in this area are higher than 1, i.e., the density is common, which is typical for hilly sands and gypsum-loamy depressions of Karatau mountains (Western Plain).

Green toad (*Bufo viridis*) is found on the canal and the drying river, with brackish water and its number is small.

The Caspian gecko (*Cyrtopodion caspium*) is an inhabitant of vertical surfaces (Southern slope) and lives on chink cliffs, on rocks, in caves of natural and artificial origin (necropolises), in ruins and cracks of old buildings, in burrows of rodents.

The Steppe Agama (*Trapelus sanguinolentus*), the Takyr roundhead (*Phrynocephalus helioscopus*) and the Fast Lizard (*Eremias velox*) inhabit fixed and scattered sands, although sometimes found in clay, crushed stone and rocky deserts (foothills of the Northern and Eastern slopes). Density of lizard settlement on the territory of the deposit varies, making up 1-3 individuals/ha for the steppe agama, 1-6 individuals/ha for the takyr roundhead, 1-11 individuals/ha for the fast lizard. Snakes are usually rarer than lizards. Water snakes (*Natrix tessellata*) are closely connected to water during their lifetime and are confined to wet habitats [5,10].

Overall, the study found that the Mangistau region also plays a significant role for migratory birds and that these birds prefer the same areal habitats as most crossing species.

The reason for the absence of steppe predators and birds - steppe eagle, field and steppe moon, barrow, in which extremely monotonous conditions of the salt steppes are less favorable for the habitat of birds than complex multi-grass with a moderate level of pasture load and exploitation. It is possible to go 2-3 km. and not to meet a single bird [6,11].

Of all the species found in the chalk deposit, only 20-25% are nesting species. Long-legged buzzard (*Buteo rufinus*), Steppe Eagle (*Aquila nipalensis*), Steppe Kestrel (*Falco naumannii*), Alectoris (*Alectoris chukar*), Bustard (*Chlamydota undulata*), Black-bellied sandgrouse (*Pterocles orientalis*), Eagle owl (*Bubo bubo*), White-bellied Swifter (*Apus melba*), Blue-cheeked bee-eater (*Merops superciliosus*), desert crow (*Corvus ruflcollis*), Black-eared wheatear (*Oenanthe hispanica*), desert heater (*Oenanthe deserti*), stone sparrow (*Petronia petronia*), larks (*Galerida cristata*, *Eremophila alpestris*, *Melanocorypha bimaculata*). All observed mammals, amphibians, reptiles and birds nesting in the area are included in the database (table 1).

Table 1-Qualitative list of biodiversity on chalk quarry

Illustration	Name	Biotope	Status and the number of
Herpetofauna (reptiles and amphibians)			
	Agama sanguinolenta	Sand, clay, stone-e deserts and semi-deserts. It prefers areas with sparse shrubs winterfat, Calligonum and Haloxylon. Significance: eats harmful insects and other pests	Model form of a lizard. The population density of 1-3 individuals /ha (normal). On the deposit of chalk found on the North Slope, and the foot of the Downs. Low numbers associated with human activities.
	Phrynocephalus helioscopus	Fixed or to dispel the sands. Occurs in clay and rocky, stony empty's. Significance: eats harmful insects and other pests.	Common type. The population density of 1-6 individuals / ha (normal). On the deposit of chalk, found on the western plains and the foothills of the Hills.
	Eremias velox	Fixed or to dispel the sands. Occurs in clay and rocky and stony deserts. Significance: eats termites, spiders, beetles	Rspstranenny view. The population density of 1-11 individuals / ha (large). On the deposit occurs in the Cretaceous Hills foot.
	Cyrtopodion caspium	Dwells on the cliffs of cliffs, on rocks, in caves, in rodent burrows. Significance: eats insects and other pests.	The usual form. The population density of 1-10 individuals / ha (large). on the field Chalk is found in the foothills of the Hills.
	Agrionemys horsfieldi	Variety of habitats. On hilly sands and gypsum-clay depressions mountains, its density is normal (2-3 individuals / ha) Not significant. can participate in the transmission of pathogens	The usual form. Distribution turtle density is extremely uneven. On the deposit of chalk hills at the foot of the lives and in the South Valley.
	Elaphe sauromates	Lives in burrows of rodents, in the crevices between the stones, in hollow trees. Scientific value: eats mice and rodents, which benefits agriculture. Poisonous.	Occurrence of Pallas runner at 1-2 individuals for several kilometers. allows us to consider this kind of as a rare and vulnerable. Found in the Western plains and hills foot.
	Natrix tessellata	Closely related to the water. Is confined to wet habitats. Non-toxic. Overwinters as on land. Can produce damage by eating juvenile fish in fish ponds.	On the deposit of chalk found in the area of the canal and river sporadically. The high density of the water snake on the coast of the Caspian Sea (250 individuals / ha) (Duysebaeva T., 2009).
	Gloydius halys	Lives in different habitats: in lowland and upland steppes, in the semi-deserts, and rodent burrows. Poisonous. Gemotoksiny act on the hematopoietic system.	The most common type of snakes poisonous kind copperhead. On the deposit of chalk found in the Western plains and hills foot sporadically.
	Bufo viridis	Dwells on the banks of rivers, lakes and ponds, reed beds. Twilight leads lifestyle, and the day hiding in the burrows of rodents. Value: The object of research.	In Mangistau region toad - a widespread species. On the deposit of chalk near the canal and the river, a density less than 1 individual / ha.
Mammals			
	Plecotus austriacus Fischer	Found in the South of the gorge, caves and ledges. Significance: eats insects	Sporadically common type. Detachment of Bats (Chiroptera) The number is low. Mesterozhdenii chalk on gray long-eared bat rare in the Southern Valley
	Allactaga severtzovi Vinogradov	Found both on the open bare ground and among the thickets of thistles and camel thorn. Natural carrier of skin disease	Sporadically common type. Turanian element. Endemic species. The population density of less than 1 individual / ha. On the deposit of chalk vsrechaetsya on West Plains.

	Hemiechinus hypomelas Brandt	Elements of mountainous relief of the region (larvae, depression, mountains), but occurs even in the sands. Carrier fleas	Iranian-Afghan view. Sporadic. Population density is low. The color "black morphs." Occurs: the foot of the hills, South Valley
	Rattus norvegicus Schreder	No spatial conservatism, and they are willing to settle in the new territories. The carrier of the plague.	Sporadically common type. Imported by rail. The population density of 1-15 individuals / ha (large). Area of the plant.
	Spermophilus fulvus	Clay and loess deserts and semideserts, takyrs, solonetses but bare sand escapes. Involved in the transport of infection.	Sporadically common type. On the deposit of chalk lives on West Plains. On the state of the form affect economic activity
	Spermophilus pygmaeus Pallas	Herb-feather grass steppes, semideserts and sagebrush desert. Carrier of plague infection.	Sporadically common type. The smallest species. Occurs at the foot of the Hills, North Slope, West and Central Plateau.
	Lepus tolai Pallas	Inhabitant of the desert plains and mountainous terrain. The carrier of the plague microbe. Harms <u>peskoukrepitelym landings</u>	The species has a hunting-economic importance. On the deposit of chalk inhabits the foot Hills, North Slope.
	Caracal caracal	Caracal inhabitant crevices of rocks and holes porcupines and foxes. Significant. It feeds on rodents (squirrels, jerboas, hares).	Predatory mammal of the cat family. Rare species. On the deposit of chalk met at the foot of the hills and gorges of the South
	Vulpes corsac	Inhabitant of the steppes and deserts. Significant. Fur corsacs make hats are in demand. Korsak is a carrier of rabies and canine distemper.	Fur animal. Endemic species. Density (1-3 individuals / ha) regular.
Birds			
	(Columba livia)	They nest in the mountain gorges, caves and crevices on the cliffs of the rivers. Suffer respiratory diseases and other illnesses.	Bird of the pigeon family. Density (more than 10 individuals / ha) large. Occurs mostly at the plant and the South Valley
	Melanocorypha calandra	Sagebrush and sagebrush-grass steppe. It inhabits steppe and desert areas of western Kazakhstan and the foothills and plains. Eats insects.	Species of the genus of birds Steppe larks. Family of larks. Warbler. Normal numerous bird. Breeding migrant Found on motherboards career
	Passer domesticus	Widely distributed in Central Asia and Kazakhstan. It feeds on seeds of agricultural crops and residues of different products	The most common species of the genus of these sparrows. Everywhere is the resident birds. Occurs at the plant.
	Passer hispaniolensis	Nest in colonies on the branches of trees, shrubs, tall 1-1.5 m. Inflicts considerable damage to cereal crops	Passerine birds. Migratory. Breeding. Found in large numbers at the plant.
	Bubo bubo	Dwells in the gorges. Eating rats, mice, rabbits. At the same time have been known to kill and eat other birds, both day and night.	Type of birds of prey of the order Strigiformes. Live alone. Nesting. Found in the Southern Valley.
	Oenanthe pleschanka	Common in the steppe zone. Keeps near stony placers, clay cliffs, areas of steppe type. Eats small insects.	Bird species of flycatchers. Found on the North Slope, South Valley, Western Plateau.

Conclusions. Elements of biodiversity are resources that are of real benefit to humans today, or may prove useful in the future. Biodiversity has both economic and scientific benefits. Actions to conserve biological diversity, in particular environmental monitoring and control, should be planned on the basis of environmental and social priorities equally.

This means that the focus of this activity should be not only protected natural areas, but also areas where production facilities are located and people live, that is, residential and industrial zones.

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«ҚАСПИЙ-ЦЕМЕНТ» ЦЕМЕНТ ЗАУЫТЫ АУМАҒЫНДА БИОӘРТҮРЛІЛІК ДЕРЕКҚОРЫН ҚҰРУҒА АРНАЛҒАН ЗЕРТТЕУЛЕР

Аннотация. Биоәртүрлілік экожүйелер жағдайына тікелей әсер береді, өйткені оның азаюы экожүйелердің құрылымына теріс ықпал етеді. Бұл биотикалық қауымдастықтарды өзгертіп, жояды. Биоәртүрліліктің маңыздылығын бағалау қоршаған ортаға ықтимал әсердің мәнін түсінудің маңызды шарты болып саналады. Бұл экологиялық жүктемені азайту бойынша басымдықтарды әзірлеуге мүмкіндік береді. Жалпы жағдайда, кен орны мен карьер, зауыттар мен өнеркәсіптік кәсіпорындар участасеінде биологиялық түр неғұрлым көп болса, бұл участке соғұрлым құнды болады. Биологиялық әртүрлілікке болжанатын әсерлердің мәні әсер ету шамасына және әсер ететін экожүйелердің немесе биологиялық түрлердің сезімталдығына байланысты. Осыған қарай биологиялық әртүрлілікке кері әсерді азайтуға бағытталған зерттеулер өзекті болып саналады. Жұмыс істеп тұрған цемент зауытының аумағында жануарлар дүниесінің жай-күйін бақылау үшін деректер базасын құру мақсатында биологиялық әртүрліліктің жай-күйін зерттеуге далалық зерттеу нәтижелері ұсынылды.

Келесі таксонометриялық топтар зерттелді: құстар (ен маңызды үлкен топ, онай анықтауға болады), сұткоректілер (арнайы зерттеу әдістерін қажет етеді), бауырмен жорғалаушылар және қосмекенділер. Бор кен орнының зерттеліп отырған аумағында кездесетін түрлер сәйкестендіріліп, осы түрлердің әрқайсыына қатысты биотоптық талаптар зерттелді. Экологиялық бағалау мен мониторингтің классикалық әдістерімен қатар тау-кен жұмыстары аймағында биологиялық әртүрлілікті зерттеудің жаңа әдістемесі колданылды. Әдіс геоакпараттық талдау мен картаға түсіру деректеріне негізделген. Биоәртүрлілік туралы барлық мәліметтер тордың квадраттарына бөлінген карта арқылы алынды (500×500 м) және сапалы түрде жиналды (тордың квадратына жануарлар түрлерінің өкілдерінің саны). Зерттеу аумағында Онтүстік Шетпе бор кен орнында «Каспий цемент» зауыты ауданында кең таралған шөлді түрлер кездеседі. Жергілікті фаунада нағыз дала түрлері мұлдем жоқ, онда шөлейт түрлері де аз (кіші сарышұнақ, карсак, ақбөкен). Сонымен қатар, эндемикалық түр – ұзын инелі кірпі бар. Сонымен қатар, оның құрамында Африка-Азия шөл кешенінің өкілдері кіреді: құмқоян, қызыл құйрықты құмтышкан, шиебөрі, қарақал. Сонымен қатар, мұнда тұран элементтері жоқ (құмтышкан, северцов қосаяғы және ұсақ қосаяқ). Кең таралған палеарктикалық түрлерден қасқыр мен тұлға мекендейді.

Биоәртүрлілік элементтері – адамға нақты пайда экелетін немесе болашакта пайдалы болуы мүмкін ресурстар. Биоәртүрлілік экономикалық және ғылыми пайда түсіреді. Биологиялық әртүрліліктің сактау жөніндегі іс-әрекеттер, атап айтқанда экологиялық мониторинг пен бақылау экологиялық және әлеуметтік басымдықтар негізінде тең дәрежеде жоспарлануға тиіс. Бұл тек қорғалатын табиғи аумақтар ғана емес, сонымен қатар өндірістік кәсіпорындар орналасқан және адамдар тұратын жерлер, яғни тұрғын және өндірістік аймақтар осы қызметтің басты назарында болуы керек дегенді білдіреді.

Мақалада ландшафты тұрақтандыруши факторды, «табиғи аймак» карталарын ескере отырып, биоалуантүрліліктің маңыздылығын сапалы бағалау ұсынылған. Бор карьерінің участасеі бар цемент зауыты аумағының картасы жасалып, онда биоалуантүрліліктің табиғи ареалдары және олардың мәліметтер базасы көрсетілген.

Түйін сөздер: карьер, зауыт, цемент, биоалуантүрлілік, маңыздылығы, жануарлар әлемі, сұткоректілер, бауырмен жорғалаушылар, мәліметтер базасы.

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ИССЛЕДОВАНИЯ ДЛЯ СОЗДАНИЯ БАЗЫ ДАННЫХ БИОРАЗНООБРАЗИЯ В РАЙОНЕ ЦЕМЕНТНОГО ЗАВОДА «КАСПИЙ-ЦЕМЕНТ»

Аннотация. Биоразнообразие напрямую влияет на состояние экосистем, так как его сокращение отрицательно сказывается на структуре экосистем. Это приводит к изменению и разрушению биотических сообществ. Оценка значимости биоразнообразия является важнейшим условием понимания значения потенциальных воздействий на окружающую среду. Это дает возможность выработки приоритетов по снижению экологической нагрузки. В общем случае, чем больше биологических видов на участке месторождений и карьеров, заводов и промышленных предприятий, тем большую ценность представляет этот участок. Значение прогнозируемых воздействий на биологическое разнообразие зависит от величины воздействий и чувствительности затрагиваемых ими экосистем или биологических видов. В этой связи, исследования, направленные на снижение негативного воздействия на биологическое разнообразие, актуальны и своевременны. Представлены результаты полевых исследований состояния биологического разнообразия в целях создания базы данных для контроля за состоянием животного мира на территории действующего цементного завода.

Исследованы следующие таксонометрические группы: птицы (самая значительная многочисленная группа, легко поддаются идентификации), млекопитающие (требующие специальных методов исследований), пресмыкающиеся и земноводные. Выполнена идентификация видов, которые встречаются на исследуемой территории месторождения мела и изучены биотические требования для каждого из этих видов.

Наряду с классическими методами экологической оценки и мониторинга, использована новая методика исследования биологического разнообразия в районе горных работ. Метод основан на данных геоинформационного анализа и картирования. Все данные по биоразнообразию были получены с помощью карты, разбитой на квадраты сетки (500×500 м) и были собраны качественным путём (количество представителей видов животных на квадрат сетки). На территории исследования на месторождении мела Шетпе Южное в районе завода «Каспий Цемент» встречены широко распространенные пустынные виды (слепушонка, тушканчик). В местной фауне совершенно отсутствуют настоящие степные виды, мало в ней и полупустынных видов (малый суслик, корсак, сайгак). Вместе с тем имеется эндемичный вид – длинноиглый еж. Кроме этого, в ее составе есть представители африкано-азиатского пустынного комплекса: (заяц-толай, краснохвостая песчанка, шакал, каракал). При этом здесь почти нет туранских элементов (гребенщиковая песчанка, тушканчик Северцова и малый тушканчик). Из широко-распространенных палеарктических видов обитают волк и лисица.

Элементы биоразнообразия являются ресурсами, которые представляют реальную пользу для человека сегодня или могут оказаться полезными в будущем. Биоразнообразие приносит как экономическую, так и научную пользу. Действия по сохранению биологического разнообразия, в частности экологический мониторинг и контроль, должны планироваться на основе экологических и социальных приоритетов в равной степени. Это означает, что в фокусе этой деятельности должны быть не только охраняемые природные территории, но и местности, где расположены производственные предприятия и живут люди, то есть селитебные и промышленные зоны.

Представлена качественная оценка значимости биоразнообразия с учетом ландшафтно-стабилизирующего фактора, карт «естественных ареалов». Составлена карта территории цементного завода с участком карьера мела с указанием естественных ареалов биоразнообразия и их база данных.

Ключевые слова: карьер, завод, цемент, биоразнообразие, значимость, животный мир, млекопитающие, рептилии, база данных.

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