

ANNOTATION

for the academic degree of Doctor of Philosophy (PhD)

The specialty 6D060800 – «Ecology»

ZHIDEBAYEVA AINUR ERBULATOVNA

on the topic of dissertation work

«Conservation of biodiversity of flora and fauna in the area of the Caspian plant Cement at the Mela Shetpe deposit Yuzhnoye in the mountainous Mangystau»

The relevance of research.

Despite the fact that the intensive development of industrial production has a positive effect on the growth of the country's economic level, the negative impact on the environment on a global scale does not concern nature lovers. This is because nature is undergoing various changes, and even some species are destroying their existence. This trend accelerated up to 100 times compared to previous times, which led to consideration of the issue and consideration of ways to find a solution.

We know that all the elements released from production have a harmful effect on the elements of the biosphere, although the contribution of cement industries to environmental pollution, characterized by solid and dust, gas pollutants, is unique. After all, cement dust has a detrimental effect on all elements of the natural environment. This is a vegetation cover that quickly absorbs industrial emissions from a cement plant. Vegetation with high sensitivity is one of the first to perceive anthropogenic impact. In addition, it is important to study the negative impact of the plant on the animal world.

During the visit of the Head of State Kassym-Jomart Kemelevich to our region in November 2022, it was also noted that "illegal landfills and quarrying in Shetpa must be stopped. I instruct you to develop a special program for the disposal of these wastes."

In the Mangystau mountain arid zone, there is a need to study the state of flora and fauna using satellite images and GIS technologies related to the condition of the Caspian Cement Plant, Shetpe-Southern Chalk quarry. Conducting physico-chemical analyses of the impact of boron mining on flora and fauna, substantiation and differentiation of factors of resistance to the impact of mining of geosystems and biodiversity, which serves as the basis for its assessment. As a result of comprehensive research, it is relevant to develop proposals and solutions to reduce the impact on the environment and preserve biodiversity. The dissertation work is aimed at studying and solving this problem.

Purpose of research.

Providing solutions and measures for the conservation of biodiversity with an assessment of the environmental impact of the Caspian Cement plant at the Shetpe Yuzhno-Cretaceous deposit in the mountainous Mangystau.

The main objectives of research:

- identification of environmental impact problems of cement enterprises and substantiation of the relevance of the research issue;

- carrying out environmental monitoring of atmospheric air pollution on the territory of the Caspian Cement plant;
- assessment of the soil condition at the Shetpe Yuzhno-Cretaceous deposit;
- study of the impact of the Caspian Cement plant on flora and fauna;
- evaluation and justification of the effectiveness of triangular corrugated solar stills as a solution to reduce the negative impact of the Caspian Cement plant on flora and fauna.

Object of research: The Caspian cement plant at the Shetpe Southern spruce deposit in Mangystau.

Subject of research: conservation of the biodiversity of flora and fauna with an ecological assessment of the state of the environment in the area of the cement plant.

Research methods:

The method of atomic absorption spectrometry with plasma atomization using AAC MGA 915 was used to analyze environmental components, in particular heavy metals in soil and vegetation cover. The method of calculating the concentration of harmful substances in atmospheric air in the emissions of enterprises (OND-86) has been applied. For a comprehensive analysis of complex spatial information, a single software package "Prism-zone" version 3.0, a single program for calculating the atmosphere with software modules for calculating the size of sanitary protection zones "SANZONE" (a single program for calculating atmospheric pollution (UPRZA)) was used.

Micrographs of the anatomical departments of CAM V500B. 1.5 megapixels with a 6M video camera with a resolution of 1440 x 1080 pixels were created using a MEIJI microscope. Statistical processing of morphometric indicators was carried out in accordance with the methods of G. F. Lakin.

Statistical processing was carried out using the Statistica 10 analytical software interface. The schematic maps of the studied area were performed using satellite images and using GIS programs (Google Maps, Mapinfo Professional V. 12. The processing of maps and diagrams was carried out using CorelDRAW graphics programs 11. Cartographic materials are created using GIS group software products: Mapinfo Professional V.10.2, SAS. Planet 160707.

Scientific novelty of the research:

1) a scientific study was conducted on the relationship between negative impact factors and indicators characterizing the biodiversity of the Shetpe Southern Chalk quarry and cement plant in the arid and hot climate of the Mangystau region.

2) a qualitative assessment of the importance of the biodiversity of flora and fauna in the conditions of the arid zone was carried out and databases of biodiversity and digital maps of the studied zone and "natural areas" were created, taking into account the factor of landscape stabilization to ensure environmental management of the studied territory.

3) an ecological and economic assessment and the formation of a methodological approach to biodiversity conservation measures in the Shetpe area - the Southern Chalk quarry and cement plant.

4) in the area of the Shetpe-Southern Chalk quarry and cement plant, in order to suppress dust, prevent secondary salinization of the soil and prevent corrosion of metal products in arid zones, a mobile solar installation was recommended in the desalination of underground salt water and an increase in desalination productivity was achieved using a second pool.

Provisions issued for the defense of dissertation work:

The results obtained in the course of research are confirmed by retrospective, gravimetric, atomic absorption, analytical methods and statistical processing of experimental data. Special certified methods, standard GOST RK, were used to perform planned research works and chemical laboratory experiments. The equipment and materials used in the research meet the requirements of the regulatory and technical documentation.

The main principle recommended for protection:

- results of environmental monitoring of atmospheric air pollution in the territory of the Caspian Cement plant;
- assessment of the geoecological state of the soils of the Shetpe Southern Chalk Quarry and the cement plant area;
- database and digital maps of biodiversity, the results of studies of the impact of the Caspian Cement plant on flora and fauna;
- in the area of the Shetpe-Southern Chalk quarry and cement plant, in order to suppress dust, prevent secondary salinization of the soil and prevent corrosion of metal products in arid regions, a mobile solar installation for desalination of groundwater was recommended.

Theoretical and practical significance of research results.

The results of scientifically based environmental monitoring, databases and digital maps of the biodiversity of the Shetpe Southern Chalk Quarry and Cement Plant region can be used by specialists of the Department of Natural Resources and Environmental Management of the Mangystau region. The developed mobile solar desalination plant can be used to desalinate underground salt water to suppress dust in the area of the quarry and the Caspian cement plant and prevent rapid failure of metal products for the technical needs of the plant. This is confirmed by the production test reports.

Author's contribution. In the orientation studies, as well as production experiments, the author directly participated in the process, regulatory parameters and ensured the exact observance of the methodology. His active participation contributed to increasing the reliability of the data obtained and the quality of the conducted research.

Communication of work with other research works. Dissertation work within the framework of the state grant "Young Scientist" of the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan in 2023-2025. No. AP19175489 was implemented as part of the project "Scientific substantiation of ecological aspects of biodiversity conservation on the territory of Shetpe-Southern Chalk quarry using GIS technologies"

Approbation of work. The results of the study were reported at the IV International Scientific and Practical Conference "Industrial Technologies and

Engineering" (M. Auezov South Kazakhstan University on October 26-27, 2018), the III International Conference Book Edition of the countries of the Commonwealth of Independent States "Best young scientist" -2021, (19-23). In addition, the main provisions of the dissertation were widely discussed at the Academic Council of the Faculty of Engineering in 2023-2024, at meetings of the Department of Ecology and Geology.

Publications of research work: based on the materials of the dissertation, 6 works were published, including: 1 publication in journals included in the Scopus database, 3 articles in scientific publications recommended by the Committee for Quality Assurance in Science and Higher Education, the rest of the articles have been published in International scientific and practical conferences and the patent of the Republic of Kazakhstan for utility model No. 9128 dated 05/17/2024 "Basin type water desalination plant" was obtained.

Scope and structure of the dissertation: "The dissertation consists of an introduction, 4 chapters, conclusions, appendices, and a bibliography comprising 114 titles."The work is presented on 133 pages with 27 drawings and 22 tables