Environmental Consequences of Recreational Vehicle Impact

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Abstract. The article analyzes the environmental problems of recreational areas caused by the impact of road transport. In modern agglomerations, the load on recreational zones is increasing, which leads to a deterioration of the ecological situation in them. The most important factor affecting the environment is motor vehicles, the number of which is constantly growing. The article presents the main aspects of the recreational impact of vehicles and the factors of human activity that aggravate it. A survey of car owners allows us to draw conclusions about the irresponsible and sometimes predatory attitude towards nature of a large number of vacationers in the popular recreational areas of the Leningrad Region. The results obtained allow us to draw conclusions about the lack of awareness of the respondents and the unsatisfactory state of environmental awareness and education in our society, the lack of the necessary infrastructure for environmentally friendly recreation of the population.

1. Introduction

In the conditions of increased motorization, many problems associated with the negative impact of vehicles on the environment have become aggravated. The conditions of the pandemic associated with the spread of the new coronavirus infection have exacerbated another one - a sharp increase in the negative environmental consequences of the recreational impact of vehicles on natural ecosystems [1-5].

In a pandemic, the car turned out to be the safest way of transportation, which provided the necessary isolation from viruses, while maintaining sufficient mobility, allowing you to minimize contact with others and leave in any direction, at any distance, even where “no human has stepped foot”. Consequently, the car turned out to be the most popular way of transportation [6-11].

As indicated in a study conducted in June 2020 by Auto.ru magazine in conjunction with GFK, 94% of motorists and 66.5% of non-motorized survey participants considered a car the most preferred mode of transport. Moreover, the proportion of people planning to abandon their own car during the pandemic fell from 5.3% to 3.7%. All this, in turn, has significantly increased the demand for cars. The constant growth in the number of cars has further increased their negative impact on the environment [12-17].

The conditions of the pandemic further contributed to an increase in the recreational load on the environment with all the negative environmental consequences, since during this period more than 2.5 million people left St. Petersburg, increasing the intensity of the use of territories for the purposes of
suburban living, tourism, recreation, sports, and, respectively, for the purposes of operating and storing their vehicles.

2. Materials and methods

The materials for writing the article were the authors' research on environmental topics, the events of modern reality, the data of a survey conducted by the authors of the article. Research methods were:

- System analysis;
- Comparative analysis;
- Method of generalization;
- Empirical survey method.

3. Results

As you know, recreational activities previously belonged to the most benign types of environmental impact. However, more and more information has appeared recently about the pollution and destruction of natural ecosystems under the influence of intensive recreational use, the culprit of which is directly or indirectly the car.

Within the framework of this study, the authors in two aspects consider the recreational impact of motor transport:

- The impact of the car on ecosystems as a source of increased danger;
- Impact expressed through the activities of people operating a given vehicle in ecosystems.

The direct impact of the car on ecosystems is expressed, first, in the pollution of ecosystems of recreational interest for people, chemical and physical pollution [1; 2; 8].

The chemical pollution of recreational areas can include exhaust gases from car engines, blow-by gases, vapors from a fuel tank, brake fluids, oils, wear products of tires and brake pads. At the same time, regardless of whether the car is standing or moving, it is an intense pollutant of atmospheric air, soil, water sources and, accordingly, the habitat of living organisms in general [1-2].

As shown by numerous studies, the atmospheric air at a distance of 100 m or more from highways and parking lots is polluted with harmful emissions from car engines containing a huge amount of hazardous substances. Soils are contaminated, and the maximum contamination occurs on roadsides and roadside strips up to 20 meters wide. At a distance of 100-200 m from the road, the concentrations of many substances, such as heavy metals, benzopyrene, are still quite high and exceed the background level in soils by almost 4 times. The content of harmful substances approaches the background only at a distance of 1 km. These substances are "absorbed" by both animals and plants, accumulated in organisms, and transmitted along the food chain. This leads to a reduction in the life span of living organisms, and in severe or chronic poisoning - to death [1-2; 5-6].

Physical factors of pollution include the release of heat into the environment during engine operation, noise, vibration, headlights, and electromagnetic radiation. Noise, vibration, and bright headlights coming from vehicles through the air or water environment have a significant impact on living organisms, being the strongest disturbance factor, contributing to the displacement of species from the occupied ecological niche. The effect of electromagnetic fields on living organisms is complex and insufficiently studied. The consequences of exposure to electromagnetic radiation can manifest themselves in various forms - from minor changes in some systems of a living organism to serious disturbances. There is no biological adaptation to noise and electromagnetic radiation [1].

The next problem is that cars of considerable weight (cars - from 1 to 1.5 tons, SUVs - from 1.7 to 2.5 tons, ATVs - on average 400 kg) form ruts, compact the soil, which leads to their compaction and a significant change in physical properties. As a result - to the death of soil animals, to oppression and death of plants, the disappearance of litter, and, gradually - to soil erosion. When crossing water sources, cars form turbidity and additional chemical and physical pollution [1; 5-6]
The next line of research is related to the impacts associated with the activities of people operating vehicles in ecosystems. The car “allows” to visit not only popular recreational places and routes, but also to penetrate into the most remote and intimate corners of wildlife, therefore, through human activities, it is a “participant” in pollution and destruction of the natural environment. In this direction, we will consider the following groups of problems:

The first group of problems is associated with inept handling of the car. Inattentive, irresponsible driving, lack of operational culture, ignorance of rational driving practices, car washing near natural water sources, oil and fuel spills, etc. All this leads to pollution of ecosystems, to increased emissions of harmful substances, to accidents [1-3; 8].

The second group of problems is associated with the irresponsible behavior of people operating the car in nature. Fascinated by their idea, people strive to drive their car as deep as possible into the forest, as close to the lake as possible, leaving ruts behind them, which will overgrow only after a few years. They trample the grass, pick flowers that are not brought home, break bushes, make notches in trees, cut wood for fires, turn on loud music, frighten forest and field inhabitants, leave mountains of garbage and unfired fires with cigarette butts, crush a huge number of small animals, get into an accident with large animals [3-7]

Are motorists themselves aware of the consequences of their activities? Do they know what kind of danger their car poses in nature? In this regard, in the summer of 2020, several surveys of drivers were carried out in some popular directions of the Leningrad region: Vyborgsky, Vsevolozhsky and Gatchinsky districts.

In general, all respondents are aware of the environmental danger cars can pose, 95% of motorists know that a car is a source of increased environmental pollution, 90% have an idea of what danger a car poses to human health, however, 95% believe that their car does not damage recreational ecosystems.

The bulk of the respondents, namely 97%, did not know and did not think about the dangers of driving a car on natural soils, about the consequences of chemical and physical pollution for natural ecosystems did not know and did not think that their car could be a source of death or shorten the life of forest dwellers.

The bulk of motorists, 87.5%, strive to drive as close as possible to their goal (a place for picking mushrooms or berries, a lake, a beach, etc.), only 22.5% of respondents prefer to leave the car in the parking lot or at a prepared place and walk on foot, 15% of respondents prefer to rest from 2 to 7 days in one place in tents. 80% of the respondents like to light fires, and 40% bring barbecues, 35% use previously prepared places, 25% light fires where it is convenient for them.

When answering the following two questions, many were cunning, since 95% of respondents indicated that they extinguish fires and remove their remains, 95% indicated that they take all the garbage with them, however, a survey of the surveyed territories showed that this is not true. Many people left smoking bonfires, makeshift sinks, and rubbish or trash bags nearby. The abandoned disposable grill will soon be a "symbol" of outdoor recreation.

In general, survey participants drive carefully on forest roads. The survey did not include participants in road accidents with large animals, but 2% knocked foxes, 5% - birds, 3% - dogs, 2% - cats, everyone crushed frogs, saw rodents, etc.

When assessing the readiness of the infrastructure of recreational areas to receive vacationers, the respondents identified the following problems: the lack or insufficient number of organized parking lots for vehicles, camping, catering services, and temporary inexpensive accommodation such as camping, food and service points, and waste collection points.

4. Discussion
In modern Russian science, the problems considered in the article are discussed in two directions. The first of them is devoted to the study of the impact of vehicles on the environment. Among the studies, one can single out the works of V.N. Denisov [8-9], Kirillova N.G. [15-16].
The second direction of research considers the problems of development and ecology of recreational zones, and is presented in the works of M.S. Oborin [12-14], Kolbovskiy E.Yu. [13-14] and other authors. The research novelty of this article lies in the semantic combination of the problems of these scientific areas. The topic of the influence of vehicles on the ecology of recreational areas has been little studied and its discussion seems promising.

5. Conclusion

Thus, the conducted research showed the unwillingness of vacationers to realize the environmental consequences of their recreational activities and consumer attitude to the natural environment. One of the main reasons for this behavior is environmental illiteracy.

Consequently, today the formation of environmental awareness of the population is of particular importance. The main goal is to prepare a person who is environmentally competent and responsible, who takes care of the natural and cultural heritage. Possessing the necessary knowledge, such a person, by his actions, minimizes the negative impact on the environment, which, in turn, will increase the ecological safety of ecosystems and reduce the environmentally hazardous consequences of his recreational activities to a minimum.

The tasks of local authorities responsible for the preservation of recreational areas should not be reduced to the introduction of prohibitions and restrictions, but to the development of the necessary infrastructure that allows the exploitation of recreational areas without damaging the existing ecosystem.

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