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Ecological Aspect of the Analysis of a Project for Economic Development of the Kurshskaya Kosa (Curonian Spit) National Park as a Specially Protected Natural Territory

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Abstract

At the present time, ecological economics is one of the most widely used approaches to the analysis of economic development projects whenever they have bearing on specific eco-systems. This article illustrates possibilities of successfully applying the concepts of ecological economics to the analysis of projects aimed at the economic development of specially protected territories on the example of the economic development of the Kurshskaya Kosa (Curonian Spit) National Park.

From the viewpoint of the ecological-and-economic analysis of the Environment-Society-Economy system, the article investigates the economic, ecological, social aspects of the prospective development of the Kurshskaya Kosa (Curonian Spit) national park; the index of degradation is used as a non-financial integral index of the assessment of the prevailing condition of the national park. Based on conducted research, conclusions reached to the effect that it is necessary to render more precise a methodology for determining the recreational capacity of the national park as a specially protected national territory; evidence is provided for the need to reduce a recreational load on the national park. From the viewpoint of the concepts of ecological economics, the article provides rationale for a system of ecological restrictions and indices to be used in designing and building tourist- and recreation facilities at specially protected natural territories.

In the writing of this article, the authors use comparative analysis methods, induction and synthesis methods and mathematical methods.

The provisions and conclusions of this paper have a direct bearing on the formation of economic policies for the development of the national park as a specially protected territory and, in the final analysis, on the social status of the population living and working within the territory of the national park.

Keywords: ecological economics, ecology, ecosystem, specially protected nature territory, recreation accommodation capacity, national park, degradation

1. Introduction

At the present time, one of the more widely used approaches in the economic science is ecological economics which uses interdisciplinary research and achievements and which integrates the concepts of economics, ecology, other natural and social sciences, philosophy, and ethics. Ecological economics has material distinctions setting it apart as compared both to the science of traditional economics and to traditional ecology. The former emphasizes the economic system tools while ecological economics represents a more holistic approach. At the same time, whenever there is a holistic approach present in the study of ecosystems in traditional economics, the value of life, nature as such, assumes the center stage (Costanza, Cumberland, Daly, Goodland & Norgaard, 1997).

The works of K. E. Boulding (1970, 1978), H. E. Daly (1968, 1992, & 1996), N. Georgescu-Roegen (1971, 1976), C. S. Holling (1973, 1986), H. T. Odum (1971, 1987) affected the development of the main concepts of ecological economics. Also the ideas expressed by such researchers specializing in the area of economics and ecology as K. W. Kapp (1950), S. V. Ciriacy-Wantrup (1952), J. K. Galbraith (1958), P. R. Ehrlich (1968) and others were important for ecological economics theory. The immediate development of the theory itself is associated with such

scientists' names as R. Costanza (1991, 1996, 1997, 1999 & 2007), J. Martinez-Alier (1998), J.C.J.M. van der Bergh (1996, 1998, 1999, and 2001), R. B. Norgaard (1984, 1985 & 1994) and others.

2. Literary Review

At this time, the theories of ecological economics are used in man's practical activity for purposes of successfully finding a solution to the problem of man's sustained existence in the modern ecosystem. Research in this area clarify the role of ecological, social, cultural factors in the economic activity. Thus, D. J. Rapport researched the use of economic principles in sustaining stable ecosystems (Rapport, 1997). In his work "The Ecology of Agrosystems" (2011), J. Vandermeer made use of an interdisciplinary approach by applying methods and principles of social and economic sciences coupled with methods and principles used in biological sciences to analyze and forecast the sustainable development of agroecosystems as applied to the agriculture of the North and South Americas. S. C. Carvalho, F. Alves, U. M. Azeiteiro, P. A. Meira-Cartea (2012) concentrate on investigating the problem of an integrated seaside fishing management based on supplementing economic aspects with socio-cultural and ecological aspects, including the sustainability of ecosystems, for the purposes of ensuring socio-cultural and biological diversity. G. Barry (2014) set himself the task of tracing the specifics of the interaction of ecosystems and the economy on the planetary scale.

The distinctive trait of economic research based on the concepts of ecological economics is a systemic approach. Having traced interrelations among the environment, human society and the economy, R. Levett (1998) suggested illustrating them using a Russian Doll type of chart (see Fig. 1).

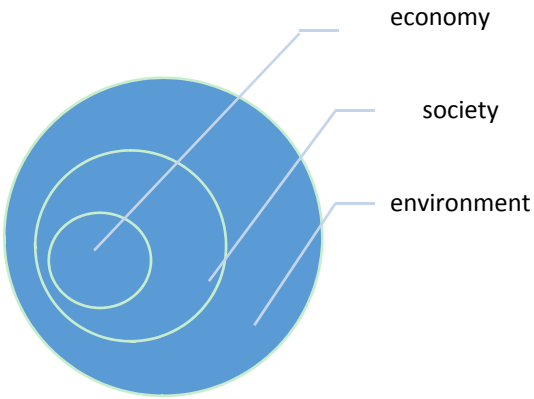

Figure 1. Environment-Society-Economy

The chart in question underlines that society and the economy operate within the framework of nature whilst, in turn, being inseparable therefrom and bringing feedback to bear on it. Continuing to develop the concept, Polovyan (2012) clarified the elements of a complex system of interactions between the environment as an ecosystem and community together with the economy. In his opinion, the environment, as an ecosystem, constitutes a unity of ecotope, biotope and biocenosis. In turn, biocenosis is represented by primary producers, saprotrophs and phagotrophs, to which humankind also belongs. Humankind, as a natural element, develops a community characterized by the communality of social-, economic- and cultural life. In turn, community can be subdivided into three types of social institutions: 1) life continuation (family, marriage), 2) distribution (economy) and 3) regulation (religion, politics). In this way, the existence and development of each of the above-named elements ultimately depends on the development of the system's other elements.

The unbreakable interdependence of the economy, community and the environment determines the need for projects of economic development of various territories, cities or organizations to have a systemic nature and to take into account diverse factors, including ecological factors, natural factors, and socio-cultural factors.

3. Eco-Approach in Projects for Economic Development of Specially Protected Territories as a Component of the Kurshskaya Kosa (Curonian Spit) National Park Development Project

The ecological approach is by necessity present during the preparation and implementation of economic projects providing for the development of specially protected nature territories. According to the Land Code of the Russian

Federation, Article 95, the lands of specially protected (preserved) natural territories include the lands of state natural sanctuaries, in particular, biosphere, state natural reserves, monuments of nature, national parks, nature parks and the lands of health treatment and rehabilitation (recuperation) localities and health resorts. Currently, there are in Russia about 12 thousand various nature protection or preservation zones—federal and regional zones which occupy over 200 million hectares, that is, over 11% of the territory of the Russian Federation.

Some time ago, government decided to use the potential of specially protected nature territories for the development of Russia's regions by creating special economic zones within the confines of such specially protected nature territories. At the present time, there are in Russia a number of ongoing investment projects aimed at creating and developing special economic zones of the tourist-recreation type (Bykov 2010, Starkova 2011). However, these territories are listed as UNESCO World Heritage sites and have a restricted natural resource use regime. In essence, this is then the question of developing such a system of use of natural resources—in this case, of land use—as would make it possible to preserve the social ecological benefits on the global and national levels whilst contributing to the stable economic development of the given region of Russia.

At this time, the concept of common economic value of nature's benefits is widely recognized in the world. Both international organizations (World Bank, the Organization for Economic Cooperation and Development, the Global Environment Fund and others) and many nations use the concept for the purposes of theoretical and practical development. An important advantage of such an approach is the attempt that is made of trying to use within it an integrated approach to the assessment of nature and to account not only for its direct resource functions but also for ecological services / functions, various functions of nature linked to its esthetic, ethic, cultural and other aspects.

The amount of the total economic value of nature is the sum of two aggregate indices: use value (user value) and non-use value (Ekhanurova, 2005):

$$TEV = UV + NV \quad (1)$$

where: TEV is total economic value, Rubles;

UV is use value, Rubles;

NV is non-use value, Rubles.

In turn, use value is the sum of three components:

$$UV = DV + IV + OV \quad (2)$$

where: DV is direct use value, Rubles; IV is indirect use value, Rubles; OV is option value (future / potential value), Rubles.

The non-use value index reflects the social aspects of nature's value to community. It is often determined only by the amount of existence value (EV). Sometimes non-use value also includes inheritance value. Therefore, in theory, the amount of total economic value is determined as the sum of four components: TEV = DV + IV + OV + EV.

The value of the environment's beneficial qualities may be determined with the aid of the index of total (absolute) economic effectiveness, which is conditioned, by the production-and-economic-, ecological- and social results of nature protection measures. The production-and-economic effect (result) of nature protection measures is in preventing economic losses to economic activity in the shape of additional costs or losses, which economic operators may incur, and in the shape of loss of ecosystem elements. At the same time, the ecological effect of nature protection measures lies in reducing negative impacts on the environment and improving its condition and manifests itself in reduced amounts of pollutants ending up in the environment and the environmental pollution level, in increasing the quantity, and improving the quality, of land-, forest- and water resources, etc. suitable for use. The social effect (result) of nature protection measures consists of increasing the population's quality of life, improving work and rest conditions and in preserving the esthetic value of natural landscapes and other protected territories.

In calculating the economic effect of nature protection measures, the result of nature protection measures is taken to be the sum of the following values (Tereshina, 2008):

$$P_{econ} = E_{econ.pr} + \Delta P_l + \Delta D \quad (3)$$

where: P_{econ} is the production-and-economic effect (result) of implementing nature protection measures, Rubles;

$E_{econ.pr.}$ is amount of direct economic effect, Rubles;

ΔP_l is amount of prevented loss, Rubles;

ΔD is increase in the monetary value of products sold which is achieved due to a more complete use of raw material-, fuel-and-energy- and other material resources as a result of implementing a nature protection measure during a specific period (year), Rubles.

It was initially envisaged to develop a special economic zone in the Kaliningrad Region within the specially protected territory of the Kurshskaya Kosa (Curonian Spit) National Park. The goal of the project was to develop favorable conditions for increasing the region's investment attractiveness and to develop ecological tourism in the Kaliningrad Region.

The potential investment attractiveness of the specially protected territory of the Curonian Spit is reasonably high as was shown when a socio-economic assessment was made of natural resources, nature capital and the eco-systemic functions that are performed by them (Potravnyi, Starkova, Tereshina, 2012) (See Table 1).

Table 1. Total economic value of the Kurshskaya Kosa's nature capital

Natural resources and services provided by natural complexes	**Economic value of natural resources and nature capital services (in million US Dollars)**
Economic assessment of forest lands	0.1
Economic assessment of settlement lands	33.1
Recreation services	123.8
Fishing	34.6
Consumption of non-wood resources (picking mushrooms, berries, medicine plants)	17.2
Carbon pickup	7.4
Use of wood by households	185.1
Total	401.3

In the event of the project's implementation, it was planned to create up to 1,630 new jobs, modern water networks, gas- and electric power grids, heating distribution systems, to put in place new housing and transportation facilities. The economic development of the national park's specially protected territory is most preferable in the form of a tourist and recreation zone.

In planning to develop a tourist-and-recreation zone in the Kurshskaya Kosa (Curonian Spit) national park, it is necessary to take into consideration the strong and weak points of the project (See Table 2).

Table 2. Comparative description of strong and weak points of tourist and recreation zone development in the Kurshskaya Kosa national park

Strong points	**Weak points**
Preferable natural and climatic conditions. Unique natural objects.	Underdeveloped tourist infrastructure. Environment under threat.
Suburb-type location of the area not far from Kaliningrad, easy transport accessibility.	Worn-out infrastructure of Zelenogradsk, unsatisfactory roads and transportation assets.
Airport, including an international airport, in the vicinity.	Unavoidable transit of visitors through territories of neighbor states.
Vicinity of developed European nations.	Difficulties of agreeing a common infrastructure policy with other nations
Certain elements of tourist infrastructure are already in place at the Park, tourists can access information from booklets or a website	Infrastructure is insufficient, few treks, few architectural forms, car parks, picnicking spots
Attractiveness of the Park's territory for various scientific research	No buffer (security) zone around the park

As comparative analysis presented in Table 2 shows, in the event of possible implementation of the economic project for the development of the specially protected territory in question—the Kurshskaya Kosa (Curonian Spit) national park—its developers must take into account all components of the Environment-Community-Economy system. The attractive advantages of the national park's economic development are the development of a tourist-and-recreation infrastructure as a whole, raising the park's status on the national Russian and international levels with developing trends towards the growth of ecological tourism, providing additional jobs for the local population. However, we also should identify possible threats to the stable existence of the national park ecosystem should. The development of a tourist-and-recreation zone without providing for ecological factors may destroy the nature of the Kurshskaya Kosa and may undermine the image of a pristine nature locale so attractive to the potential tourist. It is also potentially possible that the stability of the park's ecosystems will be reduced because of intensive use of natural resources. In preparing project solutions for the development of the Kurshskaya Kosa national park, it is therefore necessary to observe not only the internal laws of Russia or the region's acts and statutes. In particular, it is also necessary to take into consideration such international treaties of the Russian Federation as the Convention on Environmental Impact Assessment in a Transboundary Context, signed in Espoo, in 1991; the Convention on Biological Diversity, signed in Rio de Janeiro, in 1992; and also the Convention Concerning the Protection of the World Cultural and Natural Heritage, signed in Paris, in 1972.

4. Description of the Kurshskaya Kosa National Park as an Ecosystem

The Kurshskaya Kosa (Curonian Spit), where the specially protected natural territory is located, is a narrow strip of land that separates the Curonian Lagoon from the Baltic Sea, with a length of 98 kilometers, whose width varies from 400 meters (in the area of Lesnoye Settlement) to 3.8 kilometers. Part of the Curonian Spit belongs to the Kaliningrad Region of the Russian Federation; the other part belongs to Lithuania.

The most characteristic element of the Kurshskaya Kosa (Curonian Spit) landscape is giant sand dunes constituting a unique natural phenomenon. The biological value of the national park territory is determined by the presence of species entered in the Red Books of the International Union for Conservation of Nature and Europe and the Red Book of Russia.

In planning the use of natural resources as applied to the Kurshskaya Kosa landscape, enduring value of the preservation of rare ecosystems, some of which are unique even in the Baltic Sea area and in Russia as whole, should be recognized. In using natural resources, priority should be given to their preservation in their current state while strictly restricting or even excluding visits by the holidaying public (Boldyrev, 2005). Following are rare ecosystems with high biological diversity indices located beyond the protected zone:

- lower Palve plain broadleaved black alder bush forests on the meadow soils of the south-western part of the spit with large populations of Red Book-protected species (Perennial honesty).
- dark coniferous forests with inclusion of broadleaved species and planted exotic trees (King's Wood).
- "Morennyi Island" mesophytic and aquatic meadows (vicinity of Rybachyi Settlement) with a unique history of nature use.
- gigantic active moving and semi-anchored dunes.
- active dune edges with psammophytic vegetation open livery on unformed soils with increased concentrations of rare and Red-Book species (Eryngium).

Sand, peat, oil and others represent the mineral resources of the Curonian Spit; however, the extraction of such deposits within the territory of the spit is not ongoing as per the Federal Law of the Russian Federation "On Specially Protected Nature Territories" (Fomenko G., & Fomenko M. 2010).

The Curonian Spit landscape created under the impact of not only natural processes but also of man's economic activity constitutes an example of harmonic influence of both man and nature. It illustrates the evolution of society and, in particular, of anglers' settlements (Teplyakov & Boldyrev 2003). Up until now, the Curonian Spit has been a continuous cultural landscape maintaining its social role in modern society related to the traditional way of life where evolutionary processes are continuing. The Kurshskaya Kosa (Curonian Spit) National Park was created in 1987 to effect nature preservation jobs on the Russian-southern-part of the spit. The main task of ecological and educational activity of the Kurshskaya Kosa (Curonian Spit) National Park is supporting the ideas of preserving biological, landscape diversity and historical and cultural heritage, also fostering a careful and loving attitude to nature, and sharing economic culture with visitors to the National Park. On the Northern-Lithuanian-part of the territory, a national park was organized in 1991. In 2000, the Curonian Spit was entered in the List of UNESCO World Natural and Cultural Heritage Sites (Efremov, Titov, & Trenin, 2012).

5. Recreation Component of the Kurshskaya Kosa (Curonian Spit) Social and Economic Development Project and Ecological Requirements to its Implementation

The national park territory is extremely attractive from the point of view of developing tourism and recreation activities. The economic effect may be obtained in the following areas: increasing funding invested in the region; increasing contributions to state budgets of all levels; attracting tourists with money to spend; creating additional jobs in the area of tourism and in related sectors. What's more, the park is important for the Kaliningrad Region in the following aspects: normalizing the ecological situation; social orientation of the park's activity; creating the potential for the development of the tourist sector as one of the most promising in the region's economy.

Despite the attractiveness of the Curonian Spit's economic development prospects, the inherent contradiction between attracting tourists to ensure the profitability of the tourist-recreation zone and preserving the natural balance of the territory (Krasnov, 1998) may become a threatening factor.

In distributing recreation loads within the territory of the Kurshskaya Kosa (the Curonian Spit), it is necessary to take into consideration the stability of ecosystems in their current state, trends for their development, an assessment of the typicality / rareness of ecosystems on the scale of the national park and the region as a whole, risks of adverse processes arising and destroying the landscape's lithogenic base as a result of natural and anthropogenic events, the influence of adjacent ecosystems on one another.

Central decisions on a project for planning a special economic zone of the tourist-recreation type within the territory of the Kurshskaya Kosa national park must be made while taking into account planning restrictions in areas of the Kurshskaya Kosa economic zone. Any project must be based on the principle of minimizing damage done to the environment. Specifically, as regards the territory of the Kurshskaya Kosa national park, they are the following ecological restrictions:

1) Water protection zones of the Baltic Sea, the Curonian Lagoon, and the Chaika Lake. In accordance with paragraph 15, Article 65, of the Water Code of the Russian Federation, it is prohibited here: a) to use waste water to fertilize soils; b) to organize places for burying industrial or consumer waste; c) to use aircraft for purposes of combatting pests or plant diseases.

2) The coastal protection belt of the Baltic Sea and the Curonian Spit. According to Article 65 of the Water Code of the Russian Federation, along with restrictions set out in Section 15, within the boundaries of coastal protection belts, it is also prohibited: a) to plow the land; b) to dump wash soils; c) to organize cattle ranging.

4) Underground drinking water intake systems. Here it is not allowed to plant forest trees, to carry out construction; it is not allowed to live here or to use pest control preparations or fertilizers.

Among the most important problems of the use of the territory for recreation purposes is determining the permissible loads on the nature complexes. In particular, it is believed that such impact should be limited by the level of pressure below which the ecosystem is able to maintain a relative stability and its esthetic benefits. One of the subjects of ecological research must become the so-called recreation capacity of the territory, that is, the maximum number of people who may simultaneously be located within the territory while not causing degradation of biogeocenosis and not experiencing any psychological discomfort themselves.

6. Analysis of Recreation Capacity of the Kurshskaya Kosa National Park

To the concept of recreation capacity are related the concepts of degradation and territory stability. It is obvious that the more stable a territory is under the pressure of ongoing recreational activity the higher is its potential recreation capacity; and likewise the higher is the degradation of a territory the lower is its recreation capacity (Karlov, Mnatzakanyan, & Kharin, 2011).

Methods for determining the natural recreation capacity of a territory (Abdullina, Maltzeva, & Potravny, 2008) require adaptation to the conditions of the national park in question.

$$(4)\ \sum_T = \frac{M_{load}}{S_{area}} * k * f * g * j * q$$

Where: $\mathbf{\Sigma_T}$ is an index of the natural recreation capacity of a territory, people /ha;

$\mathbf{M_{load}}$ is an index of the maximum load of the territory related to the impact of the anthropogenic factor (number of people), people;

$\mathbf{S_{area}}$ is total area of the territory in question, ha;

k, f, g, j, q are a system of corrective equalizing coefficients to allow for the degree of development of an

ecological infrastructure and a level of recreation territory development.

And, in trying to calculate the pressure on recreation facilities, it is suggested that not only the number of visitors making use of such facilities while allowing for the seasonal factor should be taken into account but also the number of permanent residents within the territory.

It is proposed that degradation of a natural complex be viewed as a non-financial integral index to be used in the assessment of the ecological condition of the Kurshskaya Kosa national park. The deterioration of the condition of a recreation natural complex under the impact of recreation factors has come to be known as "recreation degradation".

Shaplygina uses the index of digression in obtaining an integral aggregated assessment of the condition of territorial natural complexes as a whole (Shaplygina, 2010). The problem of obtaining an ecological and economic assessment of an investment project requires the adaptation of previously used approaches to the application of the index of degradation of natural complexes. In view of this, these authors have compiled a classification of natural and anthropogenic factors of impact on the natural complex of the Kurshskaya Kosa National Park whose influence was taken into account in calculating the value of the degradation index (See Fig. 2) and also propose an own degradation stage gradation.

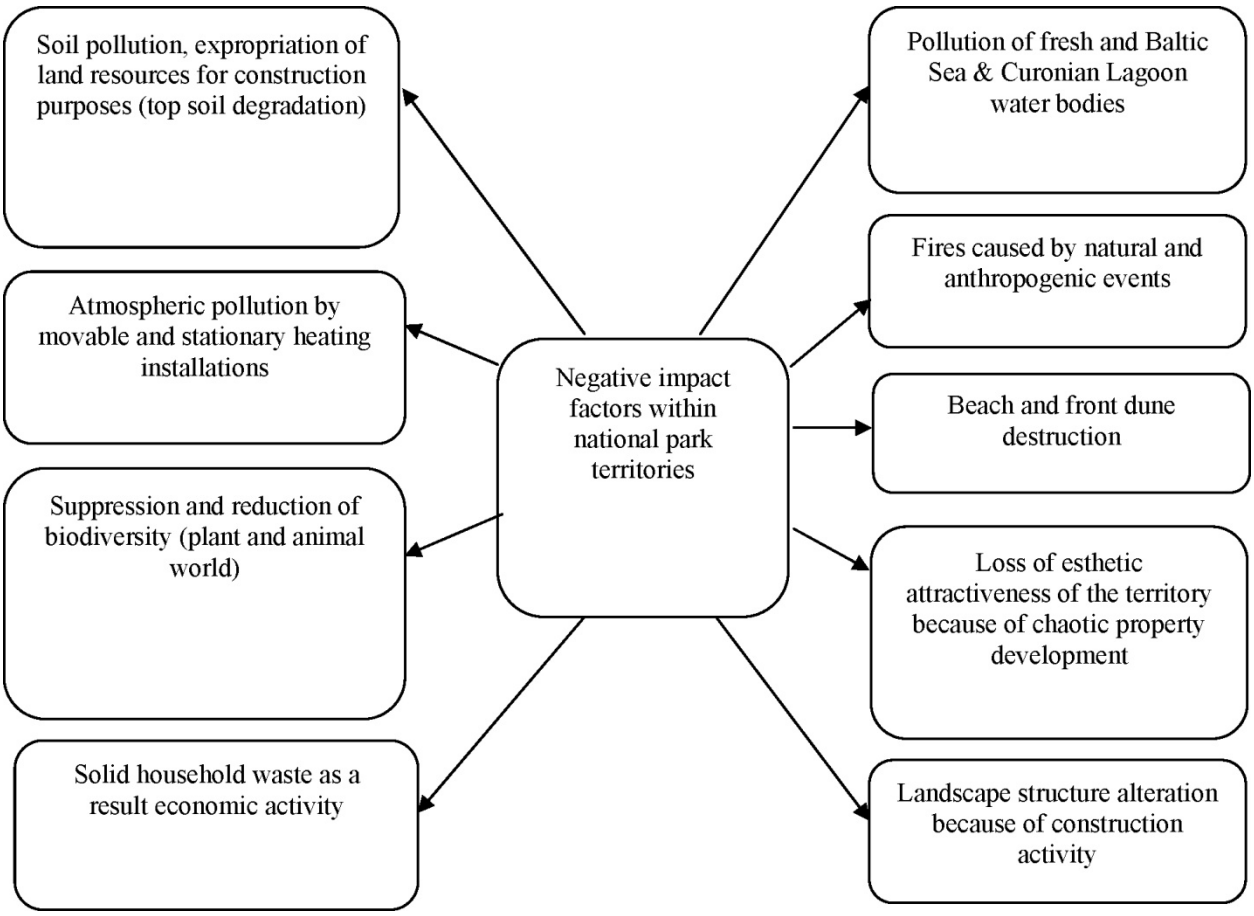

Figure. 2. Classification of factors producing negative impact on the environment within the territory of the national park

Factors producing a negative impact on the condition of the natural complex of the national park areas meant for recreation use are of an anthropogenic nature, overall. Level 1 factors can be identified as follows:

- mechanical damage (trampling) of the top soil;
- mechanical damage to tree- and bush growth;
- pollution of the territory with household waste (domestic refuse);

- increasing risk of fires.

Following are level 2 factors (consequence of the impact of level 1 factors):

- faster processes of top soil destruction (water and wind erosion);
- alteration and simplification of the natural complex structure (landscape);
- reduction in numbers of rare species of plants and animals.

At the same time, in the coastal areas, the natural complex conditions are significantly affected by natural factors also: beach and front dune washaway, dune shifting, coastal area flooding.

To calculate specific degradation indices, we used data from research work referred to earlier in this article (Khodzhaev, & Vasilevich, 2009). Weighted coefficients of specific degradation indices vary rather strongly, thus, for example, coefficients of such index as soil pollution, allocation of land resources for purposes of construction, vary from 0.7 on beaches and dunes without foliage to 0.4 on front dunes and even to 0.1 in forests with areas prepared for planting. (See Table 3).

Table 3. Specific indices of degradation of the natural complex of the Kurshskaya Kosa national park

Indices	Point	Index value, % of park area
Atmospheric pollution by moving (automobiles) and stationary (heating installation) sources	0	<0.1
	1	0.1-1.0
	2	1.0-10
	3	>10
Generation of solid household waste by tourists and local residents, kg / 1,000m	0	<0.1
	1	0.1-1.0
	2	1-2
	3	>2
Destruction of front dunes and beaches as a result of recreational operation, storms	0	<0.1
	1	0.1-1.0
	2	1.0-10
	3	>10
Pollution of fresh water bodies and Baltic Sea and Curonian Lagoon water bodies	0	<0.1
	1	0.1-1.0
	2	1.0-10
	3	>10
Reduced esthetic appeal as a result of chaotic building and unsanctioned tourist activity	0	<3
	1	3-10
	2	10-25
	3	>25
Changes in landscape structure and qualities as a result of building infrastructure facilities	0	<3
	1	3-10
	2	10-25
	3	>25

The value of each particular index is assessed using a four-point scale: 0 – no impact by the factor, 1 point – weak impact, 2 points – average impact, 3 points – strong impact by the factor in question.

Degradation index, D, is calculated according to the following formula:

(5) $D = \sum_{i=1}^{n} a_i * k_i * p_i$

Where: a_i is a value to allow for the impact of the *i*-th natural complex impact factor (0, if the factor impact is not taken into account; 1 – if the factor impact is taken into account);

p_i is the *i*-th specific index (natural complex impact factor) valued in points;

k_i is a weighted coefficient allowing for the impact of the *i*-th specific index (impact factor), $0 \leq k_i \leq 1$; $\Sigma k_i = 1$.

For example, if the share of an area with surface damage is from 3% to 10% of the area of a beach, then a=1 (the factor is taken into account), p=1 point, and the weighted coefficient k = 0.7.

The distribution of the integral natural complex degradation index by stage is calculated. (See Table 4)

Table 4. Degradation stages of natural complexes of the national park

Degradation stage	Degree Description	Integral Degradation Index (D)
I	weak	<0.25
II	medium	0.25-0.50
III	strong	>0.50

7. Discussion and Conclusions

The assessment that the authors were able to obtain leads to the conclusion that, as a whole, the natural complex of the national park is at the medium stage of degradation.

In the summer season the number of tourists, and namely, 5-10 thousand people per day, exceeds the admissible recreation capacity of the national park territory. If present trends of increasing tourist numbers continue at +5-, 10percentage every year as it has been observed for the past 5-10 years and in the presence of such a factor as the seasonality of the tourist flows, the following negative consequences for the ecosystem of the Kurshskaya Kosa national park are expected:

- increasing share of territories with damaged surface;
- increasing share of an area with damaged grasses;
- increasing share of an area without grasses;
- increasing share of tree- and bush vegetation with mechanical damage;
- increasing amount of solid household and industrial waste.

The synergetic impact of these negative factors will send the natural complexes of the national park areas onto the third (strong) degradation stage. Therefore, even if serious investments into the tourist-and-recreation infrastructure are not made, it will still be necessary to take nature protection measures and to bear relevant expenses for the purposes of preserving biodiversity and the condition of the park's natural complexes.

In taking investment decisions on the construction of tourist and recreation infrastructure, it is necessary to consider carefully ecological restrictions, among which we should single out the following ones.

1) The development of a tourist and recreation zone in the Kurshskaya Kosa national park must provide for localization of holidaying public within specific limits. It must provide for rational regulation of tourist flows at the specially protected territories in order to reduce the recreation load which necessitates the need of limiting by area the territory allocated for economic or recreation activity as per its zoning arrangement.

2) Restrictions on water supply require the abandonment of high-rise building construction; while another important condition is water supply using existing and additional artesian wells.

3) Restrictions on the height of buildings is important as it helps preserve one of the elements of the Kurshskaya Kosa ecosystem—populations of migrating birds by ensuring their unhindered migration. These restrictions are also important as they reduce the pressure by buildings on the soils of the Kurshskaya Kosa, if cellular materials are used to pave pedestrian zones and spot drainage is arranged in development areas which will make it possible to preserve the territory's hydrogeological regime unchanged.

4) Restrictions of atmospheric pollutants by maximum amounts. The main sources of atmospheric pollution within

the Kurshskaya Kosa now are discharges by heating installations (there are 10 of them within the territory of the park), individual home ovens and motor transport. Accordingly it is advisable that heating installations be converted to work on liquid fuel or be replaced with electrical installations and it is also advisable to relocate visitor vehicles beyond the national park and confine them to a specially designated parking lot.

5) Restrictions on the amount of soil and water-body pollutants are necessary to preserve the park clean.

6) Restrictions on the impact of economic and recreational activity on the dunes. It is important to keep in mind that dunes are getting destroyed not only because of the impact of human activity but also because of the constant ongoing impact of natural factors – storms, crumbling processes during flooding, ice drifting, sand scatter. For this reason, it is necessary to reinforce dunes using both coast protection structures in the form of wave cancelling facilities and lagoon coast biological defenses by ways of planting, cultivating and reproducing reeds.

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