czasopismo geograficzne

POLSKIE TOWARZYSTWO GEOGRAFICZNE · POLISH GEOGRAPHICAL SOCIETY

geographical journal

SPIS RZECZY

Artykuły

PÓŁROCZNIK
TOM VOLUME **LXXXVIII**
ZESZYT PART **1-2**
WARSZAWA 2017

Kronika

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Papers

DETERMINING THE BOUNDARIES OF THE NORTH-WESTERN PRYAZOVIA REGION AS A COASTAL ZONE FOR FURTHER STUDYING AND MANAGING IT

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Vorovka V., Hryshko S., 2017, *Determining the boundaries of the North-Western Pryazovia Region as a coastal zone for further studying and managing it*, „Czasopismo Geograficzne", 88(1-2): 21-30.

Summary

The problem of determining the integral boundaries for various types of investigations (scientific, administrative, managing) is urgent. They enable to plan a many-sided scientific investigation of the coastal areas and to determine prospects of their further development. Coordinated ness of the boundaries will enable to study the natural life and economy of the coastal areas integratedly with the purpose of further managing them. The basin approach is suggested in using for determining the boundaries in this work. The boundaries of the North-Western Pryazovia region as a coastal area of the Sea of Azov are established. The paradynamic connections between the contrasting (the land-the sea) environments are revealed. The map scheme of the land and sea boundaries of the North-Western Pryazovia region as a system is mode.

Keywords: the North-Western Pryazovia region, coastal zone, boundary, basin approach, paradynamic system

Putting a problem

A considerable part of the productive resources with great natural, cultural, historic and economic significance is localized in the coastal areas. As a matter of fact, the coastal zone of the land and the sea is a unique natural and economic complex, formed by the variety of environments, conditions and resources. The high indicators of biological variety and bioproductivity the diverse resource base and the considerable recreational potential have always attracted people for living and working. The increased anthropogenic loadings and the excessive changes in the natural life and economy, which must be regularly studied. For scientific investiga-

tions as well as with the purpose of further managing, it is necessary to mark clearly the boundaries of the area taking into account its seaside position.

Determining the boundaries of the coastal areas is a problem of a world scale. Its solving depends on the level of investigations (global, regional, local), the themes (climatic, hydrological, recreational, etc.) or the complexity (landscape, planning). With the purpose of further developing a balanced system of managing the coastal zone of the Sea of Azov, it is reasonable to lean towards the landscape and planning character of determining the boundaries. The necessity is caused not only by other forms of scientific investigations (geological, botanical, zoological, ecological), and it is also necessary to carry out applied operations (the planning and development of the economy, social sphere and nature protection). Coordinated ness of the boundaries will enable to study the natural life and economy of the coastal areas integratedly with the purpose of further managing them.

Determining the distinct boundaries enables to plan a further many-sided scientific investigation of the coastal areas and to determine prospects of their development. The important and long-term direction is territorial planning of the integral development of the coastal zone of the Sea of Azov.

Objects and methods

The object of the investigation is the North-Western Pryazovia region as a coastal area of the Sea of Azov. For determining its boundaries the basin approach is suggested in using. In this work the materials of scientific articles, the cartographic analysis of the area, the results of distance studying the surface and field verifying investigations, carried out by the authors within the considered region and the area of water, are used.

In geographical publications the notion of the North-Western Pryazovia region emerged in the fifties-sixties of the 20th century. The area, adjoining the northwestern coast of the Sea of Azov, was meant (fig. 1). In spite of the unity of scientists in understanding the essence, there is neither a name and a similar opinion concerning its geographical location nor a common approach to determining the boundaries of the North-Western Pryazovia region. Our own vision of the boundaries, taking into consideration already published versions, is suggested.

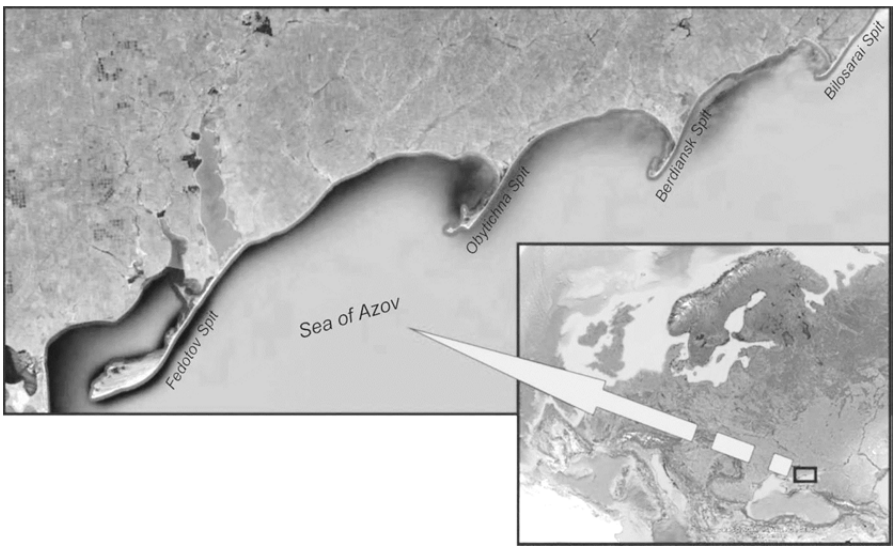

Fig. **1**. Geographical location of the North-Western Pryazovia region
Ryc. **1**. Położenie geograficzne Przyazowia Północno-Zachodniego

The research results and discussions

As a matter of fact, the North-Western Pryazovia region is a coastal zone of the Sea of Azov, a most remote from the World Ocean and exclusive water body. The ecological, social and economic condition of the coastal sea area of water – biodiversity, biological productivity, carrying out solids and polluters, migration of living organisms, recreational activities, economic state of local population – depends on its ecological condition in many respects.

The notion of a «coastal zone» in varied sources (legislative, scientific, administrative) is characterized by various reading and is understood in different ways. The unity of all the definitions consists in the fact that the coastal zone spreads along a seaboard and includes a part of a coastal land a coastal area of water in their interaction. In other respects the definitions of the coastal zone differ.

The Law of Ukraine «On confirmation of the Nation-wide programme of the protection and reproduction of the Sea of Azov and the Black Sea environments» determines the coastal zone as interacting natural complexes of the shore and the adjoining sea area of water [*The Law of Ukraine «On confirmation of the Nationwide programme of the protection and reproduction of the Sea of Azov and the Black Sea environment»* 2001]. But the

interpretation of the coastal zone as exclusively natural complexes is wrong. The peculiarity of coastal zones and their difference from other geographic areas are determined not only by natural specific features but also by a strong interaction of all landscape components – natural, social and economic. This contact zone, in connection with intensive anthropogenic activities, has its own economic specific character as well. Such an interpretation is close to the definition of the coastal zone by the International Union of Nature Protection and by the Law on the Coastal Zone, proposed by the Union of Europe in 1999 [*Model Law on Sustainable Management of Coastal Zones and European Code of Conduct for Coastal Zones* 2000].

In the published works of administrative content, dedicated to studying the coastal areas, the coastal zone is often distinguished according to the administrative principle (administrative regions) [*The environment condition of the Black Sea* 2002, Studennikov, Diakov 2005]. For working out a system of managing the areas it would be an ideal version, but for natural investigations the administrative approach is applicable only in the case when administrative boundaries coincide with natural ones. The extent of administrative units, bordering on the sea, does not enable to establish a common regime of the management of nature in all the area of a region as a components of the coastal zone [Karamushka 2009].

The geographical peculiarities of the coastal zone of the seas (river basis, mountain systems, deltas and lagoons) does not enable to establish at will a chosen width of the coastal zone parallelly to be shore at a certain distance from it. The Water Code of Ukraine determines just the two-kilometre coastal zone as a water protection one [*The Water Code of Ukraine* 1995].

In our opinion, the closest to the landscape content of the notion of a «coastal zone» is the definition of the European Commission: «It is a strip of the land and the sea, whose width changes depending on the environment character and administrative tasks. It seldom corresponds to administrative boundaries or units of planning. The natural coastal systems and areas, where man puts his activities, connected with the use of coastal resources, into effect, can exceed the limits of coastal waters and extend for many kilometres into the heart of the land» [*European Commission «Demonstration Programme on integrated management of coastal zones»* 1996].

We determine the boundaries of the North-Western Pryazovia region as a linear (objectively existing, real) boundary or outline whose location can be established unequivocally [Hrodzynskyi 1993] with the purpose of further using in regional investiga-

tions. Such is the line of watershed, since it is the most distinctive manifestation of substance differentiation processes (in this case – the division of water torrents).

Most researches of the boundaries of the North-Western Pryazovia region are based on the basin approach and they were carried out in different years mainly by scientists of Melitopol State Pedagogical Institute (later – Pedagogical University) [Kulyk 1994, Miller 1972, Mulika 1963, Shniukov, Orlovskyi, Usenko 1974, Kaganer 1967, Harkusha 1972]. In most works, the boundaries of the North-Western Pryazovia region are marked according to the basin principle.

The basin approach in determining the boundaries of the North-Western Pryazovia region is the most reasonable. Proceeding from the carried out analysis of the published works and formulated remarks, we have suggested our own vision of the North-Western Pryazovia region boundaries. This geographical area was limited by us before [Vorovka 2008]: from the east – by the watershed line of the Berda and the Kalchyk; from the west and north-west – by the watershed of the Dnieper and the Velykyi Utliuk; in the north – by the watershed line of the Black Sea and the Sea of Azov; from the south – by the Sea of Azov coastal line (fig. 2).

Fig. **2**. The boundaries of the North-Western Pryazovia region [Vorovka V.P. 2008]
Ryc. **2**. Granice Przyazowia Północno-Zachodniego [Vorovka V.P. 2008]

The further, more detailed, investigation showed that the different qualitative composition of terrigenous river and gravity sediments, being formed in the conditions of geologically heterogenous Pryazovia Precambrian crystalline massif and Donetsk fold

structure, gives every reason to revise the eastern boundary of the studied region. It is connected with the fact that the Kalchyk rises in the Pryazovia crystalline massif, and the hard component of its flow, despite the modern regulatedness of all small Pryazovia rivers, is more similar to such rivers as the Berda, the Obytichna, the Lozovatka and the Molochna. It proved correct by geological researches of placer deposits of hard fraction minerals, carried out in the middle of the seventies of the 20th century. As a result of the potassium-argon and isotope analysis of zircon, ilmenite and monazite deposits, geologists came to a conclusion that in the sand and aleurite sediments of the coast and bottom accumulative formations most hard fraction minerals to the east from the Bilosarai Spit are from 320 to 400 million years old, whereas in the western direction both ilmenite and monazite are from 975 to 1600 million years of age [Shniukov 1974]. All the studied varieties of zircon are dated by the Precambrian. It directly indicates their origin from the old crystalline massif. In this connection, it is sensible to displace the eastern boundary of the North-Western Pryazovia region towards the east, to the watershed of the Kalchyk and the Kalmius.

In our firm conviction, the position of the southern boundary of the North-Western Pryazovia region should also be reviewed. Formerly we limited it by the Sea of Azov coastal line (fig. 2) [Vorovka 2008]. However, the use of the principle of the interaction of contrast environment in studying the dynamic processes in the coastal zone, made it possible to regard the coast as a complex paradynamic landscape system, in which its land and sea components interact in the tightest way [Milkov 1980]. Therefore, besides the area peculiarities, mentioned above (distinctions in the geological structure; quantitatively different substance composition of the hard flow, being formed under the influence of the Pryazovia Hills, and the Donetsk Ridge; various intensity of processes in the Sea of Azov coastal strip, caused by the morphological differentiation of the shore; the availability of a clearly expressed break towards the coastline), we should take into account wave processes, taking place on the sea bottom and their result: peculiarities of sedimentation, wave differentiation of terrigenous and biogenous deposits in the coastal strip, longshore drifts, etc. Besides, the existence of climatic and biologic processes of the land and the sea mutual influence was proved long ago.

The wave factor influence is determined by a line, to which the influence of waves on sorting the bottom deposits extends. Such a limit is a strip of the transition of sandy deposits into silty ones. In this connection, the main type of the deposits of the sea bottom wave field is sands and aleurities, and the main type of the non-wave field is pelites

[Matishov 2006, Matishov 2008, Raspopov 1990]. The width of the coast strip of the Sea of Azov shelf, to which the land influence extends, is limited by the isobath of 10 m. It is accounted for the contact boundary of just sandy-aleurite and pelite deposits.

Another proof of the coastal processes influence on the bottom is the depth, to which sea waves extend their influence. It can be determined by calculating an average length of a water surface wave. Hydrologists ascertained that the depth of the wave influence on the sea bottom is half its average length. For the Sea of Azov conditions, the height of waves under temperate storm winds (4-5 forces) of the north-eastern direction is 16 m, and the largest length of a wave can be 26 m with a 9-force wind storm [Harkusha 1972]. Having taken these dimensions as «a counting point» and taking into consideration the fact that nine-force storms are a rare phenomenon for the water surface, we can, with sufficient part of precision, determine an average length of a wave in the Sea of Azov under the 4-7 force storms in 16-22 m with the average arithmetic index of 19 m. Hence, the influence of waves in the Sea of Azov extends to the depth of 9.5 m, which closely corresponds to the extention of the shelf strip limit. Therefore, the southern boundary of the North-Western Pryazovia region should, with the purpose of studying paradynamic landscape systems, be drawn along the isobath of 10 m, on whose level the influence of the land and coastal processes essentially reduce.

Thus, in drawing boundaries of paradynamic landscape complexes and systems, one should take into account all the complex of processes, taking place on the land and the sea bottom, with accepting the landscape coastline system as an axis part. Proceeding from the above-mentioned, the eastern and southern boundaries of the North-Western Pryazovia region should be drawn according to figure 3.

Conclusion

Determining the boundaries of coastal areas is important for further realizing the scientific, economic and administrative activities with the purpose of their further complex development. Uncertainty of boundaries leads to different understanding, interpretation and perception of an area. The analysis of the world experience showed essential variants in determining the boundaries of coastal zones, proceeding from the main set tasks – scientific, economic or administrative. However, all these tasks are interconnected and must equally be applicable to a precisely certain area.

Substantiating and marking the boundaries of the North-Western Pryazovia region have been put into practice within the methodology and methods of studying coastal

areas as tightly interacting contrast environments with forming some specific complexes. In geography they are called paradynamic landscape systems.

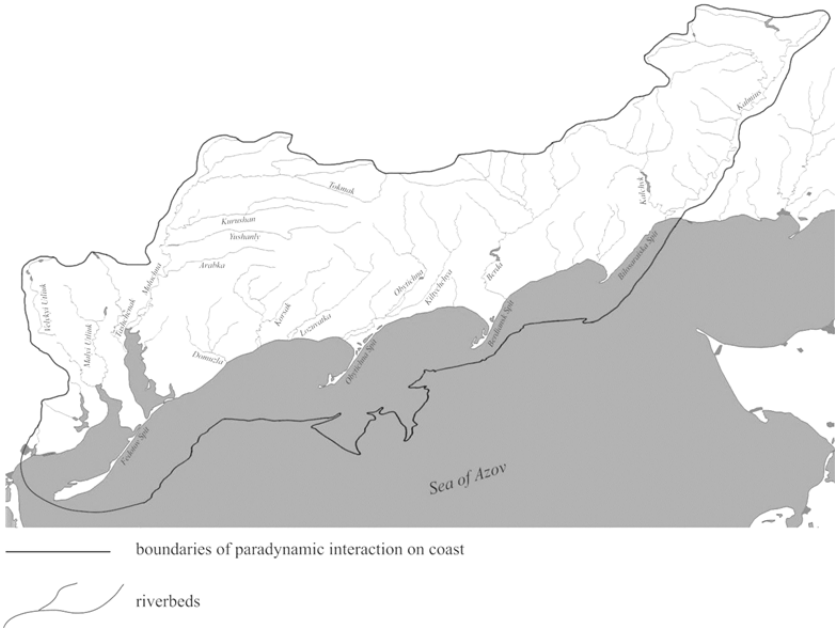

Fig. **3**. Functionally motivated boundaries of the North-Western Pryazovia region
Ryc. **3**. Granice Przyazowia Północno-Zachodniego uzasadnione funkcjonalnie

For determining the boundary of the coastal zone in the north-western part of the Sea of Azov seaboard on the land, taking into account the specific features of the area, we suggested the basin approach. On the one hand, the ecological condition of the coastal ecosystems, their biological diversity and bioproductivity depend, in many respects, on the state of a water supply basin. On the other hand, rivers are ways of migration or temporary stay for many living organismus in the sea.

On the sea bottom, the boundary of the coastal zone is marked according to the isobaths of 10 m. Just to this depth, the influence of the adjoining land on the Sea of Azov area of water and its bottom extends, the wave influence and redistribution of terrigenous sediments along the bottom are observed. Besides, it is the most active and rich in biological respect, which is connected with intensive circulation of waters and high biological productivity of the coastal waters.

The distinguished area of the coastal zone is, one way or another, remote from the coastline proper, and the interaction of the sea and the land reduces with the with-

drawal from it (for example, economic, recreational, microclimatic and other interac-interactions). Therefore, it is subsequently sensible to differentiate the distinguished strip, taking into consideration the changes of the descriptions of natural conditions, with the purpose of long-term economic using the area and resources within its limits.

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Streszczenie

WYZNACZENIE GRANIC PRZYAZOWIA PÓŁNOCNO-ZACHODNIEGO JAKO NADBRZEŻNEJ STREFY MORSKIEJ DLA ZARZĄDZANIA NIĄ I DALSZYCH BADAŃ

Problem wyznaczenia integralnych granic pozostaje aktualnym dla różnych typów badań: naukowych, alternatywnych, związanych z zarządzaniem. Granice pozwalają na zaplanowanie wszechstronnych badań naukowych dotyczących terytoriów przymorskich oraz na wyznaczenie perspektyw ich dalszego rozwoju. Uzgodnienie granic daje możliwość całościowych badań przyrody oraz gospodarstwa terytoriów przymorskich, mających na celu dalsze zarządzanie tymi terytoriami. W danej pracy do wyznaczenia granic zaproponowano podejście basenowe. Wyznaczone są granice Przyazowia Północno-Zachodniego jako terytorium nadbrzeżnego morza Azowskiego. Ujawnione są paradymamiczne relacje pomiędzy kontrastowymi środowiskami (np.: ląd i morze). Sporządzono mapę lądowych oraz morskich granic Przyazowia Północno-Zachodniego jako całościowego systemu przyrodniczo-gospodarczego.

Słowa kluczowe: Przyazowie Północno-Zachodnie, nadbrzeżna strefa morska, granica, podejście basenowe, paradynamiczny system

Publikacja finansowana przez WYDZIAŁ GEOGRAFII I STUDIÓW REGIONALNYCH UW
na 200 lecie UNIWERSYTETU WARSZAWSKIEGO

Adres Redakcji / *Editor's address*

00-927 Warszawa, ul. Krakowskie Przedmieście 30, tel. 22 826 17 94
e-mail: ptg@uw.edu.pl

Prenumerata / *Subscriptions*

Polskie Towarzystwo Geograficzne
00-927 Warszawa, ul. Krakowskie Przedmieście 30

Ilustracja na okładce / *Illustration on the cover*
Garb Pińczowski i Dolina Nidy w pobliżu Skowronna Dolnego
(fotografia: Katarzyna Grabowska)
Pińczów Hummock and Nida Valley near Skowronno Dolne (photo Katarzyna Grabowska)

Druk i oprawa / *Printed and bound by:*
Fabryka Druku sp. z o.o., ul. Zgrupowania AK „Kampinos" 6
05-075 Warszawa, tel. 22 834 92 66
www.fabrykadruku.pl/