

Nationalpark Unteres Odertal (Hrsg.)

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**Daten vom Fluss: Wissenschaftliche Untersuchungen
und aktuelle Anwendungsaspekte in Auenlandschaften**

Unter der Schirmherrschaft der Ministerin für Wissenschaft, Forschung und Kultur des Landes Brandenburg, Frau Dr. Münch

Nationalpark
Unteres Odertal



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11 Protection of alluvial wetlands in the mouth of the Warta river valley

Lesław Wołejko

Abstract

The Paper discusses selected management and protection measures of an alluvial wetland of international importance for birds, situated at the confluence of Warta and Odra rivers (Western Poland). Special attention is paid to the protection of alluvial vegetation and habitats, in relation to major controlling factors, possible drawbacks and applied and planned conservation measures.

Keywords: alluvial vegetation, Natura 2000, nature management, Warta river valley

Introduction

A large wetland area situated in the mouth of the Warta river valley is internationally recognized as a “birds’ paradise”, ranking high on the European list of natural areas. In the course of time the botanical, mycological and environmental studies carried out in the Warta Mouth have expanded our knowledge about the ecosystems and groups of species other than birds. A high conservation value of the area is reflected in the overlap of several types of nature protection areas established in the valley: the “Warta Mouth” National Park (8074 ha), Landscape Park (20534.46 ha), the Natura 2000 site (code PLCo80001, area 33297.37 ha), a few nature reserves and a Ramsar Convention site (7956 ha). On the international level the region plays an important role at the crossroads of main European ecological corridors, the main axis of which is formed by the Odra river valley.

The unique features of the Warta Mouth area have resulted from the peculiar history of its development (Czarnuch 2008), due to both natural and human-induced causes. After a major regulation of the course of Warta river large parts of the valley bottom have been embanked and reclaimed, mainly as agricultural land. Surface water levels have been regulated there with the use of pumps. However, a relatively large piece of land, situated to the south from the main river course has remained unbanked, and now constitutes one of the largest inland alluvial plains of Central Europe, exposed to spontaneous, regular flooding. This area is at present situated in the heart of the National Park and the Natura 2000 site. As such it is supposed to be managed entirely for the sake of nature, in accor-

dance with the integrated management plans, as demanded by the national and European legislation. In several cases the conflicting protection and land use goals call for a complex, and sometimes compromising, management measures. Within a framework of preparation of the management plans in the years 2012-2014 a nature inventory and mapping took place in the area of the “Warta Mouth” National Park and Natura 2000 site PLCo80001. In the area of the Natura 2000 site the detailed study and mapping concerned mostly the rare and protected species of plants and birds, as well as the natural habitats listed by EU Natura 2000 directives (Jermaczek et al. 2013). The coordination and implementation of the plans is a responsibility of the “Warta Mouth” National Park.

While, for instance, the ornithological values of the area have been relatively well known already for a longer period of time (e.g. Majewski 1983; Jermaczek & Maciantowicz 2005; Wilk et al. 2010), the precise data on the flora and vegetation of the area are rather scarce (e.g. Borysiak 1994; Chmiel et al. 2000) and they usually miss the spatial relevance. Therefore, this paper will focus on the issues related to the protection of the phytocenotical values of the alluvial ecosystems in relation to the major land-use and management problems.

Material and Methods

The original data collection regarding the inventory and status of all plant, fungi and animal species was performed in the years 2011-2013. In the whole area of the Natura 2000 site Mouth of Warta River localities and status of habitats and species listed in the Annexes for the Bird and Habitats Di-

Table 1: Higher syntaxonomic units in the vegetation of the „Warta Mouth” National Park (after Wołejko et al. 2014).

Vegetation class	No of alliances	No of plant communities
<i>Lemnetea minoris</i> (R. Tx. 1955) de Bolós et Masclans 1955	2	8
<i>Potametea</i> Klika in Klika et Novák 1941	3	10
<i>Phragmitetea australis</i> (Klika in Klika et Novák 1941) R. Tx. et Preising 1942	5	24
<i>Isoëto durieui-Juncetea bufonii</i> (Br.-Bl. et R. Tx. 1943 ex Westhoff et al. 1946) Rivas-Martinez 1988 (Syn.: <i>Isoëto-Nanojuncetea</i> Br.-Bl. et R. Tx. 1943)	2	2
<i>Bidentetea tripartitae</i> R. Tx. et al. in R. Tx. 1950	2	6
<i>Molinio-Arrhenatheretea</i> R. Tx. 1937 em. 1970	6	28
<i>Koelerio-Corynephoretea</i> Klika in Klika et Novák 1941	2	5
<i>Festuco-Brometea</i> Br.-Bl. et R. Tx. 1943	1	1
<i>Artemisietea vulgaris</i> Lohmeyer et al. in R. Tx. 1950	5	18
<i>Alnetea glutinosae</i> Br.-Bl. et R. Tx. 1943	1	1
<i>Salicetea purpureae</i> Moor 1958	1	2
<i>Quercu-Fagetea</i> Br.-Bl. et Vlieger 1937	1	1
Total:	31	106

rectives were recorded and mapped in the scale 1:10 000. Their locations were pin-pointed with the use of a GPS and afterwards processed by the GIS programs. Within the National Park borders additionally a complete floristic study was performed. The analytical tabular work was based on several hundreds of phytosociological relevés. They were also used for ground proofing of aerial photographs, used as a base for mapping of the real vegetation and protected habitats. The vegetation data were used for classification of plant communities and higher syntaxonomic units, as well as for identification of the protected Natura 2000 habitats. The indicative values of plant communities for identifying Natura 2000 habitats were adapted after Ratyńska et al. (2010). The new floristic data, obtained during the present study, have supplemented the earlier existing database for vascular plants (Wojciechowska 2010, mscr.).

Results

Vegetation cover of the “Warta Mouth” National Park consists of over 100 plant communities representing 12 vegetation classes (Tab. 1). These are mainly wetland communities, but typically differentiated area of the river valley contains also drier ecosystems, situated on “mineral islands”, upper terraces and valley margins, as well as different anthropogenic structures. They support several meadow communities, fringe and anthropogenic communities and even xerothermic grasslands.

The alluvial vegetation complex is composed of a mosaic of open water ecosystems: relic lakes and oxbows, temporal water-courses, muddy river banks and bottoms - all supporting both the herbaceous and ligneous vegetation (alluvial forests).

Tall rush and sedge communities (class *Phragmitetea*) constitute a dominant component of the alluvial vegetation complex. Besides several associations more typical for eutrophic waters (alliances *Phragmition communis* W. Koch 1926 and *Magnocaricion elatae* W. Koch 1926) the major spatial role is played by large patches of the

associations belonging to the alliances *Oenanthion aquaticae* Hejný ex Neuhäusl 1959 and *Sparganio-Glycerion fluitantis* Br.-Bl. et Sissingh in Boer 1942 (such as relatively rare *Leersietum oryzoidis* Krause in R. Tx. 1955 ex Pass. 1957). The key association of this group is *Oenanthon aquaticae-Rorippetum amphibiae* Lohmeyer 1950, occupying a large area in the southern, flooded basin of the National Park. Other communities of this group are easily identified by their dominant species, such as *Butomus umbellatus*, *Eleocharis palustris* and *Hippuris vulgaris*. Under the influence of occasional grazing the floristic composition of the *Oenanthon aquaticae* communities is gradually modified and enriched by floral elements of poor pastures (*Potentillion anserinae* alliance).

Phytocoenoses dominated by *Phalaris arundinacea* are the major component of alluvial vegetation in the Warta Mouth area. According to the concept of Ratyńska et al. (2010), such vegetation plots have been classified as rush vegetation and included in the alliance *Phalaridion Kopecký* 1961. In the southern, flooded part of the National Park the floristic composition of these phytocoenoses differs from commonly found meadow-like types of *Phalaridetum* by a strongly pronounced presence of the indicative „mud-bottom“ species.



Figure 1: Vast expanses of alluvial vegetation that re-establish each year after mid-season floods. Foto: A. Szafnagel-Wolejko

Plant communities representing natural, alluvial, herbaceous vegetation belong mainly to two vegetation classes: Isoëto durieui-Juncetea bufonii (with one association belonging to the alliance Nanocyperion flavescens W. Koch 1926 ex Aichinger 1933 em. Rivas-Goday 1961) and Bidentetea tripartitae (one association belonging to the alliance Elatino-Elleocharition ovatae (Pietsch et Müller-Stoll 1968) Pietsch 1973). The physiognomy of the association, developing fast on muddy substrates exposed after receding of the flood (including bottoms of temporary creeks) is dominated by some tall herbs (like *Rorippa* spp., *Polygonum* spp., *Rumex* spp. and *Bidens* spp.). Apart from such, rather common floral elements, a number of protected and endangered plant species are found in these communities.

The above described alluvial vegetation elements belong to a dynamic circle of riparian forest that in the past occupied a major part of alluvial Warta River valley. The forests were first to go when valleys were substituted with meadows and pastures. At present spectacular recovery of riparian forest is observed in the mouth of Warta valley. In the alluvial valley part these are tall willow forests and thickets of the alliance Salicion albae. On the rarely flooded valley margins some secondary patches of black alder woods (alliance Fraxino-Ulmion) have developed.

The alluvial vegetation complex is supplemented with a few semi-natural and anthropogenic com-



Figure 2: Nature and agriculture co-exist in alluvial wetlands of the “Warta Mouth” National Park. Phot. A. Szafnagel-Wolejko

munities. Fringe communities with tall herbs and vines are a typical element in the river valleys, but in the study area they are scattered and do not form large patches. The only meadow community worth mentioning is *Viola persicifoliae*-*Cnidietum dubii* Walther in R. Tx. 1954 ex Philippi 1960. The patches of this only occasionally flooded community are found in the northern part of the National Park. They are rather poor in characteristic species and potentially endangered by a change or intensification of agricultural land use.

The major values of the alluvial elements in the Warta Mouth area are the extent and the degree of naturalness. Considering the spatial relationship between the size of the study area and the elements of the vegetation mosaic, the extent and differentiation of the alluvial system are best reflected on the habitats map (exemplary section in Figure 3). The figures for the area occupied by the protected Natura 2000 habitat types are given in Table 2.

By far the most important biocenotical role of the wetlands in the area is their support for varied and numerous populations of the avifauna. However, it is worth mentioning that at the same time the area hosts a considerable population of more than 50 rare and protected plant species.

Table 2: Natura 2000 habitats in the „Warta Mouth” National Park (after Wołejko et al. 2014).

Habitat type	Natura 2000 Code	Area [ha]
Habitats of the alluvial complex		
occasionally emergent shorelines; with amphibious/submerse shoreweed communities (<i>Littorelletea</i>) and/or annual dwarf rush communities (<i>Isoëto-Nanojuncetea</i>)	3130	20,56
Natural eutrophic lakes with their swamp and aquatic vegetation	3150	135,67
Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation	3270	2755,69
Alluvial forests (<i>Alno-Padion</i> , <i>Salicion albae</i>)	*91E0	504,12
Hydrophilous tall herb fringe communities	6430	0,26
Alluvial meadows of river valleys of the <i>Cnidion dubii</i>	6440	58,87
Other habitats		
Xeric sand calcareous grasslands (<i>Koelerion glaucae</i>)	*6120	15,15
Semi-natural dry grasslands	6210	1,16
Extensively managed hay meadows (<i>Arrhenatherion elatioris</i>)	6510	41,87
91F0 Riparian mixed along the great rivers (<i>Ficario-Ulmetum</i>)	91F0	2,01
Total:		3534,8

Management problems

For several years the focus of managerial activity was on the protection of the ornithological values of the area. It was realized in association with other functions of the area, such as agricultural land use, water retention and flood protection, as well as the transportation along the main water courses. At the same time new developments in the nature protection system of the area – establishing of the national park and implementation of the Natura 2000 system - brought the necessity for adequate protection of all important nature components, including species, natural habitats and ecological processes. Proposals how to cope with these problems have been elaborated and are contained in the management plans.

Changes in economy brought the abandonment of agricultural activity in certain areas and the intensification of the land-use in others. In the southern part of the National Park several thousands of cattle and horses are freely roaming the wetlands. It has been considered beneficial for birds, e.g. by controlling the expansion of wet forest vegetation.

Continuation of agricultural practice is also a cultural and sociological artifact, forming a foundation for social acceptance of nature protection in the area. However, a certain arbitrary measures have to be taken to safeguard also well developed wet forests. This can be done by restricting the average population of large herbivores, and selecting adequate strict protection zones.

A long lasting negligence of the river management has strongly reduced the water transportation possibilities. At the same time changing hydrologic conditions affected the hydrological regime of the flood-dependent parts of the Warta valley. Several species and ecosystems have adapted to the new situation

and utilized it for their own benefit. For instance, high water levels are necessary to safeguard several bird species during critical parts of their life cycle. An important role to secure these conditions is played by a network of inflows and temporary watercourses distributing river water from its upper course across the alluvial ecosystem (Figure 4). Recent trials of “improvement” of the technical parameters of the Warta river by, among others, blocking the inflows to the alluvial zone, have to be considered a major threat to several protected natural elements. One of the reasons for such activities seems to be lack of communication between several institutions about their competences, and about the realistic ranking of their goals.

Conclusions

Implementation of European law has imposed new responsibilities for nature managers. It calls for a more balanced approach to all different components of the natural environment that often have different (and sometimes contrasting) needs.

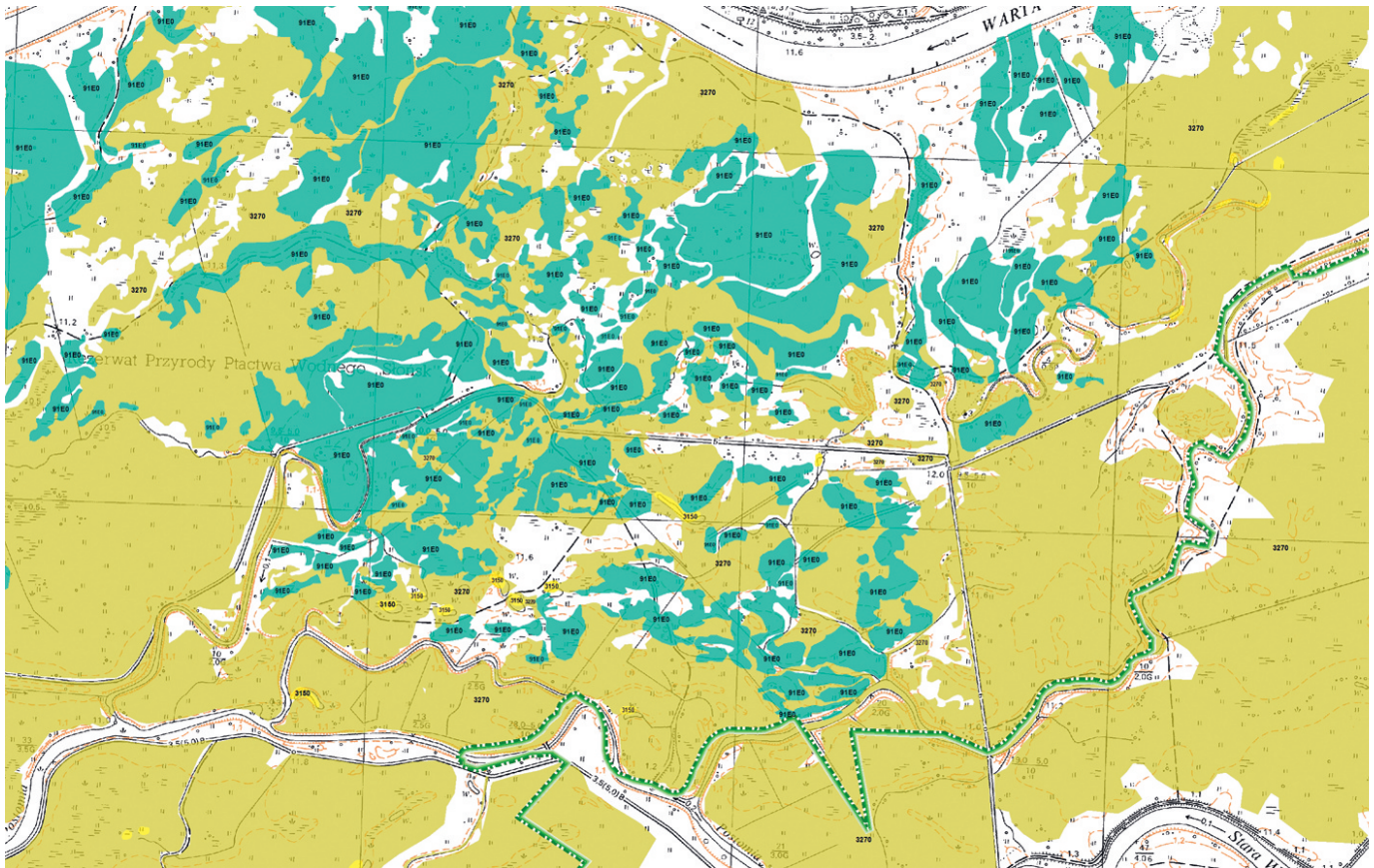


Figure 3: Natura 2000 habitats in the central part of the “Warta Mouth” National Park. Numerical codes for habitat types are given in Table 2.



Figure 4: System of old oxbow lakes and temporary watercourses connected with Warta River controlling water conditions of protected alluvial ecosystems.

Integration and co-ordination of activities is the role of different organs responsible for nature management. Even though the practices of finding a consensus among the real and potential stakeholders in sensitive nature areas are obligatory, they often fail in solving particular managerial problems. In such cases the spatial isolation of contrasting land-use functions seems to be the most effective. It is well applicable, where large areas of valuable ecosystems are given a status of strong forms of protection, such as a national park or a nature reserve.

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