Wet grasslands and biodiversity: a case study from Greece

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Abstract

Wet grasslands host a rich biodiversity. Many of the Natura 2000 areas in Greece include or consist of wet grasslands habitats. One of these areas is the "Epanomi Lagoon", North Greece - Thessaloniki, which is designated as a Special Areas of Conservation (SAC) and Special Protection Area under the Bird and Habitats Directives (Natura 2000 EU Protected Area Network). The Hellenic Ornithological Society (HOS)/ BirdLife Greece has been monitoring Epanomi's biodiversity status (particularly birds) since the 1980s, and since 2008, intense and methodical bird monitoring has being carried out by volunteers. The monitoring protocol registers birds' presence and behavior, habitat threats and human activities. The scope of this paper is to publish the most recent methodical monitoring results of HOS regarding the biodiversity status of typical Greek wet grasslands and to connect these results to current human activities. The protected area covers nine wet grasslands habitat types hosting almost 120 different bird species. The wet grasslands host 20 different species of waders. It seems that the core factors for high biodiversity in such types of protected areas are the presence of water and habitat heterogeneity. Human activities that could have negative effects on biodiversity were illegal waste disposal and traffic. HOS has proposed several versions of a management plan since 1998, in which key issues have been water presence and sustainable human activities.

Keywords: birds, waders, human activities, Natura 2000 Areas, Epanomi lagoon

Introduction

Grasslands provide highly valued diverse habitats and offer an enormous range of ecosystem services that benefit the overall population. They support a huge range of biodiversity, act as barriers to forest fires, protect water resources and store carbon (Reynolds and Frame 2005). For carbon storage especially, it is estimated that grasslands store around 34% of the global stock in terrestrial ecosystems (European Commission 2008). Wet Grassland is defined as "Periodically inundated pasture or meadow with ditches, which maintain the water levels containing standing brackish or fresh water. Almost all areas are grazed and some areas are cut for hay. Sites may contain seasonal water-filled hollows and permanent ponds with tall fen species such as reeds, but not extensive areas" (Treweek et al. 1997). The Tayside Biodiversity Partnership (2009) categorized wet grasslands into the following types: Semi-natural floodplain grassland, Water meadows, Wet grassland with intensive water level management on

drained soils and Lochside wet grassland. Joyce and Wade (1998) used a simpler classification for wet grasslands, since they included under wet grasslands "floodplain meadows and coastal grazing marshes or pastures, which landscape was been formulated through traditional low-intensity farming".

Most of the wet grasslands in Greece have been incorporated into the EU Network of Protected Areas Natura 2000. However, the designation of a protected area is not enough to ensure a good conservation status for species and habitat types. A recent assessment has shown that only 7% of Natura 2000 grasslands sites are in favorable condition (European Commission 2009), so they could also be considered as threatened habitat types, mainly due to land use changes of the last 50 years (eg. overgrazing, land abandonment, urban development, illegal waste disposal, flood defense, land drainage, etc.) (Joyce & Wade 1998).

Regarding bird species and their habitats, the Hellenic Ornithological Society (HOS)/ BirdLife Greece maintains a monitoring scheme the Important Bird Areas (IBA) Network of Greece for more than 25 years now. Most of the Gr-IBAs have been designated as Natura2000 Areas. Since there is a long-time monitoring of birds and their habitats (Portolou et al. 2009), while birds are considered as a trustworthy indicator for surveying the biodiversity status of an area (it has been used as one of the main EU environmental indicator for evaluating the existing CAP/ Rural Development Regulation Program), it is safe to state that HOS IBA's monitoring is providing a rather good picture of the trends of the Greek fauna and their habitat status. Unfortunately, during the last three decades, the conservation status of Greek birds is a general decline, trend that seems to apply to the majority of species, from common (Kominos et. al 2009) to threatened (Legakis & Maragou 2009). Moreover, the monitoring of certain bird species groups (such as the waders which prefer wet grasslands for nesting and feeding), has shown that bird species whose habitat requirements include a dependence on the presence of water, have been declining more rapidly (HOS 2012) and their threats are connected mainly to human activities (Korbeti & Deli 2011).

Material and methods

As a case study, "Epanomi Lagoon", North Greece - Thessaloniki was selected as a typical natural wet grassland area of Greece (figure 1). This lagoon is included in the Natura 2000 EU Protected Area Network as a Site of Special Areas of Conservation (GR1220012) and a Special Protection Area (GR1220011) under the Bird and Habitats Directives. It is also a Wildlife

Refuge under the national protected areas network. The majority of the wetland is semi-stated owned.
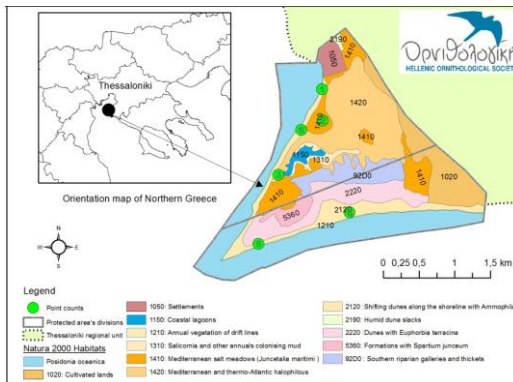
Figure 1. Epanomi lagoon map, divided into parts (north/south) & Natura 2000 habitat types.

HOS is monitoring Epanomi's biodiversity status (focused on birds) from the 80s, and since 2008, intense and methodical bird monitoring has been carried out by volunteers. For the monitor, a protocol has been developed which registers birds' presence and behavior, habitat's threats and human activities and is in line with the old monitoring protocol of the 80s and 90s. The monitoring protocol consists of six panoramic count points dividing the wetland into two parts; north (351ha) and south (339ha). The north part has more habitats compared to the south, as a direct result of water abundance. The threatened bird species have been classified according to two systems; one volunteer (scientific) and one mandatory (EU legislation). The scientific classification groups species into classes accordingly to their rarity and distribution. The threatened species are the ones that are characterized as Species of European Conservation Concern/SPEC grouped to classes 13 (IUCN 2011, BirdLife International 2004). The mandatory classification is based on EU legislation, the Directive 2009/147/EC on the Conservation of Wild birds where the most threatened species are listed in Annexes I and II.

The survey periods were divided into four periods according to bird behavior in the Epanomi region: spring migration (Febr to Mar), breeding period (Apr to Jul), autumn migration (Aug to Oct) and wintering (Nov to Jan). The monitoring is ongoing, but for the purpose of this publication, the

data that was used is from the period 02/2009 – 12/2011 corresponding to six (2009), eight (2010) and seven (2010) field visits per year.

Results and Discussion

The protected area includes twelve terrestrial habitats,of which nine can be considered as wet grasslands (Fig. 1, except 1020, 1050 & 1150). The survey verified that Epanomi lagoon is an important wetland for Greece since it hosts a variety of threatened bird species. Up to now, 119 bird species have been recorded. Forty two percent of the bird species of Epanomi lagoon are Species of European Conservation Concern/ SPEC (SPEC1:1sp.|SPEC2:14sp. |SPEC3:35sp.). Almost half (48%) of Epanomi lagoon's bird species are listed in the Annexes of EU Directive 2009/147/EC (Annex I:30 sp.|Annex II:27 sp.). The rarest species recorded in the area (June 2009) was Audouin's gull (*Larus audouinii*).

Twenty different Wader species are present in the wet grasslands of Epanomi Lagoon (*Actitis hypoleucos, Arenaria interpres, Burhinus oedicnemus, Calidris alpina, C. ferruginea, C. minuta, Charadrius alexandrines, C. dubius, Glareola pratincola, Numenius arquata, Philomachus pugnax, Pluvialis apricaria, P. quatarola, Podiceps cristatus, P. nigricollis, Recurvirostra avosetta, Tringa erythropus, T. nebularia, T. stagnatilis* and *T. totanus*).The majority of birds (individuals) and the greatest variety of species were recorded during the breeding period, especially in April and May. This period has the highest distribution and quantity of water since the lagoon's hydrological balance is based solely on atmospheric precipitation rather than surface run off. May is usually the last "wet" month because in the wetland there are several active channels due to 60'-70' drainage plans.

The distributions of wader species in the north and south parts of the wetland (Table 1) shows that waders preferred mainly the north part of the wetland, probably due to water abundance and the diverse mosaic of wet grassland habitats present there. The south part was highly appreciated by people, especially during the summer period. Among human activities observed in the lagoon, the ones that could have a negative effect on the biodiversity, were illegal waste disposal and high number of cars crossing the wetland (on-off road driving) Similar problems were observed in a neighboring wetland (Kourakli et al. 2011).

Epanomi lagoon doesn't have a management plan, although HOS proposed several versions for it since '98. All of them included enhancement of water presence (more wet areas for more time) and encouraged sustainable activities (fishing, recreation, education, etc.). The

main reasons for this is the wetland it has a rather complicated ownership status, while Greece hasn't set as a priority yet to develop management plans for Natura 2000 Areas.

Table 1. Parts of the lagoon that waders were recorded vs human activities.

Period	Part	Spec ies	Human activities						
			waste disposal	Fish-ing	Husba ndry	cars*	pedestri ans	Swim-ming**	beach bars
Spring migration	North	8		√		√			
	South	2		√		√			
Breeding	North	19				√		√	
	South	3				√		√	√
Autumn migration	North	8	√	√		√		√	
	South	0	√	√		√		√	√
Wintering	North	10	√	√	√	√	√		
	North	0		√		√			

* Cars = on & off road driving/ **Swimming= passing through wet grassland so to go for swimming

Conclusions

Epanomi lagoon is a protected area that has a variety of Natura 2000 terrestrial habitat types of which nine could be consider as wet grasslands. In the lagoon, 119 bird species were recorded of which almost half are under threat of extinction. The wet grasslands of the Epanomi lagoon are important for several bird species; particularly for waders (20 species) and especially during the breeding period. The north part of the wetland attracted more wader species and individuals, probably due to water abundance and the diverse mosaic of the wet grasslands. Human activities that could have negative effects on biodiversity were illegal waste disposal and cars' circulation. Furthermore, there are various drainage constructions that negatively affect the water economy of the area, threatening habitats to permanent drainage.

Acknowledgements

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