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CONSIDERING LANDSCAPE AND WATER IN THE DUMREA REGION: CHALLENGES FOR INTEGRATED PLANNING AND SUSTAINABILITY

ABSTRACT

In this paper is presented the Dumrea Lake District, a unique landscape and geographical feature in the central part of Albania. Beside the importance landscapes were neglected, while the current state of affected water bodies is clear indicators of a non sustainable and integrated development. Integration of WFD and Landscape Directive into planning is another aspect of this contribution. An integrated landscape and water management plan can increase the quality of life in particular for the less favored residents of the Dumrea region. The wider European milestones, the WFD and the European landscape directive are considered as tools for the establishment of ground guidelines in landscape and water administration and planning on different spatial scales. Environmental, social and economic incentives have to be integrated to preserve the given qualities and to develop the potentials of the wider Dumrea region. All actors' local, regional and central has to strengthen the integration policy and further develop comprehensive territorial planning and implementation mechanism.

Keywords: *environmental, integrated planning; ecosystem stability; sustainable planning.*

INTRODUCTION

The ecosystem stability and integrity, biodiversity conservation and sustainable planning of a certain area is very much linked with landscape connectivity (Taylor *et al*., 1993), while it has been highlighted as a crucial issue for biodiversity conservation and for the maintenance of natural ecosystems stability and territorial integrity (Taylor *et al*., 1993; With *et al*., 1997; Collinge, 1998; Crist *et al*., 2005). In case of planning mid and long term developments of certain area, the most critical landscape elements (typically habitat components that in case of

Dumrea Lakes are different terrestrial and aquatic ones) would be those whose absence would cause a larger decrease in overall landscape connectivity. In the past several decades due to overuse of resources within wider Dumrea area (forest, pastures, water bodies) several landscape elements were losing their role within regard to connectivity, while agriculture extended areas were dominating. The relative ranking of landscape elements by their contribution to overall landscape connectivity according to a certain index (*I*) can be obtained by calculating the percentage of importance (d*I*) of each individual element (KEITT *et al*., 1997; URBAN and KEITT, 2001; PASCUAL-HORTAL and SAURA, 2006; RAE *et al*., 2007):

$$dI(\%) = \frac{I - I'}{I} \times 100$$

where *I* is the index value when the landscape element is present in the landscape and *I'* is the index value after removal of that landscape element (e.g. after a certain habitat patch loss). Conservation efforts and reserve networks should therefore concentrate in protecting those sites (e.g. habitat elements) with a higher d*I*. However, the results of this analysis may vary largely depending on the selected index (SAURA and PASCUAL-HORTAL, 2007). Therefore, using an adequate landscape-level connectivity index is critical for these purposes.

The purpose of this approach is to encourage the inclusion of proactive wetland management into watershed and regional plans because wetlands play an integral role in the healthy functioning of entire watershed. This approach promotes using a watershed approach that not only protects existing freshwater wetlands but also maximizes opportunities to use restored, enhanced, and created freshwater wetlands of Dumrea Lakes to address watershed problems such as habitat loss, hydrological alteration and water quality impairments. As usual the primary users for the approach are members and staff of watershed managers, local government, organizations and local/state agencies.

Watershed plans are analytic frameworks for protecting and restoring water quality and quantity for various societal purposes. Ideally, they result from implementation of the watershed approach. Plans may focus on watersheds within political or land ownership boundaries for strategic or practical purposes.

Why Include Wetlands in Watershed Planning? It is important to include wetlands in watershed plans because of the important role they play in ecosystem function and watershed dynamics. Wetlands are a product of and have an influence on watershed hydrology and water quality. Wetlands contribute to healthy watersheds by influencing important ecological processes. They recycle nutrients, filter certain pollutants, play a role in climatic processes by absorbing and storing elements such as carbon and sulfur, recharge groundwater, and provide energy production and habitat for fish and wildlife. Wetlands also provide goods and services that have economic value. Some examples of the goods wetlands provide include

habitat conducive to food production, building products, and fresh water. Some examples of the services wetlands provide include the reduction of peak flows and flood damage, water storage, protection of erodible shorelines, water filtration and particulate removal, and recreational opportunities and amenities. Finally, societies value wetlands for their historic and cultural/religious significance.

MATERIAL AND METHODS

Site description:
Dumrea Lakes – Current designation: Nature monument: Seferani, Dega Lake
Location: Latitude 40°58'58" N; Longitude 19°54'22" E. The Dumrea Lakes are a complex of about 85 lakes of various sizes (ECBY, 2009), which have in general a circular or oval shape. The biggest lake of the group is Çestija with 94.5 ha surface, followed by Seferani, Merhoja, Dega and Belshi with 87.5, 65.5, 37.4 and 18.1 ha surface respectively. The lake with biggest water volume is Merhoja ($11.3x10^6 m^3$), followed by Çestija, Seferani, Dega and Belshi. The Lakes of Dumrea in general have an average depth of 7 m. Merhoja is exception as its average depth is 17.9 m, while its maximum is 61 m. Some of the lakes have been named after the villages, like the lakes of Seferani, Katundi, Cerragaetj, and some others after persons, like Millosh, Abaz, Todri, Bici. Finally, the names of some lakes are defined by their transparency or the colours of the waters, like Black Lake, the Red Lake.

The average monthly temperature of the surface waters of the lakes of Dumrea in winter is below 7.5°C and goes up to 26°C in summer. The amount of dissolved Oxygen in the surface is 6.5-7.5 mg/l and decreases to 1.5 mg/l at 15 m depth. At bigger depths start to appear the presence of hydrosulfides (H_2S).

Threat class	Major threat	Level of knowledge	Impact	Average impact	Maximum impact
1. Residential & commercial development	1.1. Housing&urban areas	well - known	3	2	3
	1.2. Commercial&industrial areas	moderately known	1		
	1.3. Tourism&recreation areas	well - known	2		
2. Agriculture & aquaculture	2.1 Annual & perennial non-timber crops	less-known	2	2(2.33)	2
	2.2 Wood & pulp plantations	less-known	1		
	2.3 Livestock farming & ranching	well - known	2		
	2.4 Marine & freshwater aquaculture	less-known	2		
3. Energy production&mining	3.1. Oil&gas drilling	well - known	1	2	2
	3.2. Mining&Quarrying	well - known	1		
	3.3. River mining	well - known	1		
	3.4. Renewable energy	well - known	2		
4. Transportation&service corridors	4.1. Road&railroads	well - known	2	1(0.5)	2
	4.2. Utility&servic elines	–	0		
	4.3. Shippiml lanes	–	0		
	4.4. Flight paths	–	0		
5. Biological resource use	5.1. Hunting&Trupping animals	moderately known	2	2(1.5)	3
	5.2. Gathering terrestrial plants	moderately known	1		
	5.3. Logging&wood harvesting	well - known	3		
	5.4. Fishing&harvesting aquatic resources	moderately known	1		
6. Human intrusion&disturbance	6.1. Recreational activities	less-known	1	1(0.66)	1
	6.2. War, civil unrest& military exercises	–	0		
	6.3. Work&other activities	less-known	1		
7. Natural system modifications	7.1. Fire&fire supression	less-known	2	2(2.33)	3
	7.2. Dams & water management/use	moderately known	2		
	7.3. Other ecosystem modifications	less-known	3		
8. Invasive spiecies	8.1. Invasive non-native/alien species	moderately known	2	1(1.33)	2
	8.2. Problematic native species	less-known	0		
	8.3. Introduced genetic material	less-known	2		
9. Pollution	9.1. Domestic & urban waste water	well - known	3	2 (1.83)	3
	9.2. Industrial & military effluents	moderately known	2		
	9.3. Agricultural & forestry effluents	moderately known	2		
	9.4. Garbage & solid waste	well - known	3		
	9.5. Air-borne pollutants	less-known	1		
	9.6. Excess energy	–	0		
10. Geological events	10.1. Volcanoes	–	0	0	0
	10.2. Earthquakes/tsunamis	–	0		
	10.3. Avalanches/landslides	–	0		
11. Climate change&severe weather	11.1. Habitat shifting & alteration	well - known	3	2(2.2)	3
	11.2. Droughts	less-known	3		
	11.3. Temperature extremes	less-known	2		
	11.4. Storms&floodings	less-known	3		
	11.5. Other impacts	–	0		

Table 1. The chart of IUCN threat classification scheme, key threats, current impact and expected future (mid-term) importance in the Vjosa River basin. Four scores ranging from 0 (*no know impact*) through 1 (*slight impact*), 2 (*moderate impact*) to 3 (*severe impact*) were used to assess the current impact according to the scoring scheme provided by GIWA (2001). Average scores were calculated for each threat class and maximum values are also given. The level of knowledge regarding these threats is subjectively estimated.

Approach

The threat assessment carried out in this paper is based on the guidelines provided by both the International Union for Conservation of Nature (IUCN) and the Global International Waters Assessment (GIWA). The IUCN threat classification scheme was used to assess key threats to species. They involve past, ongoing and future threats, using a time frame of three generations or ten years, whichever is the longer (not exceeding 100 years in the future) as required by the Red List Criteria (IUCN, 2001). Environmental impacts were assessed using the scoring scheme provided by GIWA, which is more ecosystem oriented. Four impact scores ranging from 0 (impact unknown) through 1 (slight impact), 2 (moderate impact) to 3 (severe impact) were used to quantify the importance of each key issue (Tab. 1). Details on determining impact scores can be found in the GIWA Methodology

handbook for scaling and scoping (GIWA, 2001). Average scores were calculated for each threat class and maximum values are given.

RESULTS AND DISCUSSIONS

Following Novitzki *et al*. (1997) and Sheldon *et al*. (2005) the wetland functions relate to a process or series of processes (the physical, biological, chemical, and geologic interactions) that take place within a wetland. Major wetland functions include those that change the water regime in a watershed (hydrologic function), improve water quality (biochemical function), and provide habitat for plants and animals (food web and habitat functions). Values are generally associated with goods and services that society recognizes. Wetlands can have ecological, economic, and social values. It is important to note that not all environmental processes are recognized or valued. In case of Dumrea Lakes the analyses show the data provided in Table 1.

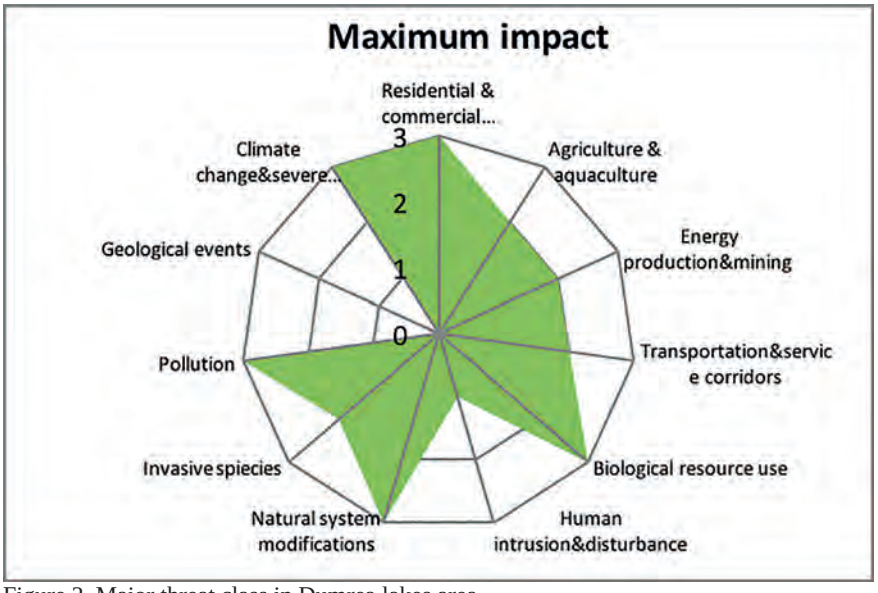

Figure 2. Major threat class in Dumrea lakes area.

The amount of different and partly interacting threats results in a number of conservation concerns related to Dumrea Lakes: (1) watershed impacts, (2) agriculture and forestry, (3) tourism and population growth, (4) non-indigenous species, (5) habitat alteration or loss, (6) unsustainable exploitation of fisheries, and (7) global climate change. These concerns may include direct threats or may cause more indirect effects on both species and habitats.

Amongst 11 different threats analyzed within this paper (Tab. 1; Fig. 1), habitat modifications remain one of the most serious. With intensive conversion of land use to agriculture oriented use and lakes modifications it seems the habitat modification will seriously threaten the ecosystem functioning. The alteration or even loss of habitats as one of the best understood conservation concerns is an ongoing

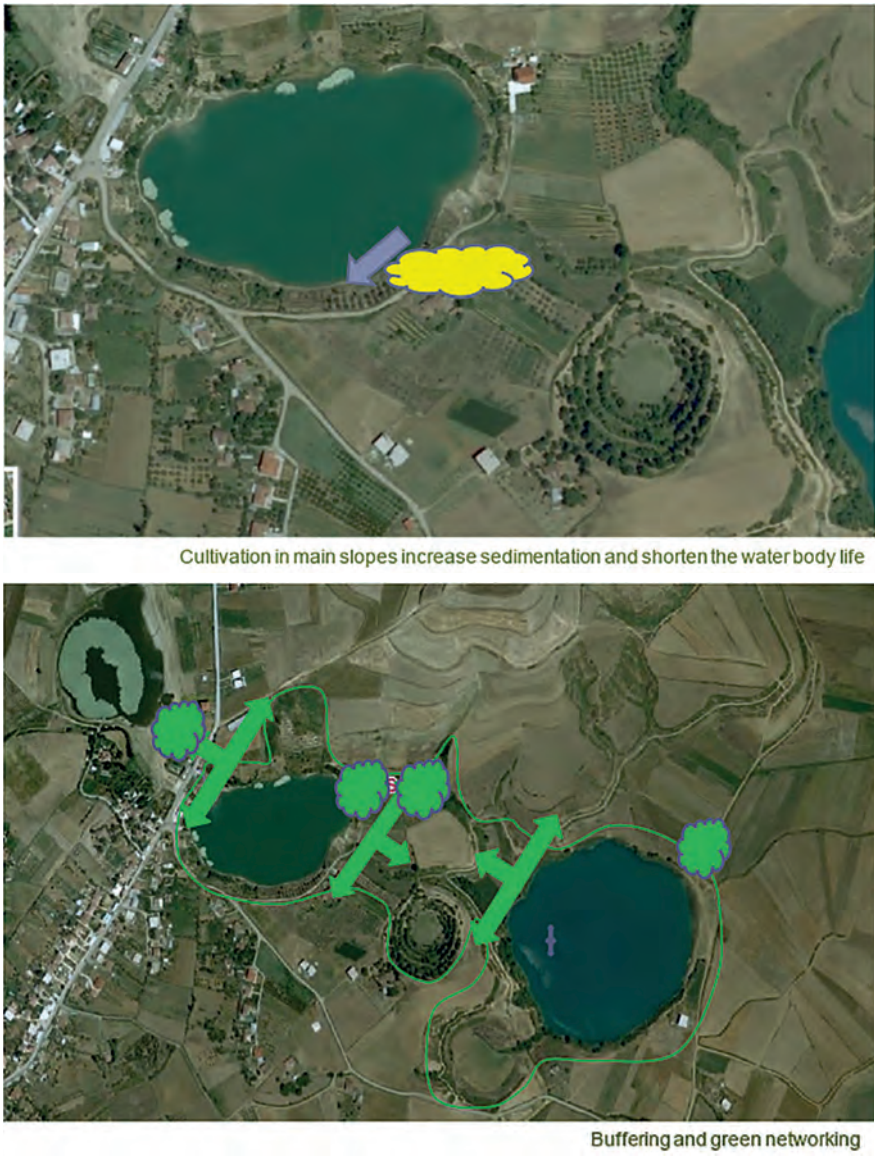

Figure 2. Proposed matrix for securing connectivity with Dumrea area.

problem in wider Dumrea area system, along with expansion of agriculture cultivations (average impact 2.33).

The analyses of state (Tab. 1) and current rapid expansion of quantitative methods in landscape ecology and the increasing need of objective methods for measuring connectivity have stimulated the development of a wide set of connectivity-related indices that are now available for land managers (Saura *et al*., 2007). The proposed measures and analyses at the current state are in line with territorial planning and objective of the local municipality for revitalizing entire area. However, their properties, behavior and adequacy for landscape conservation planning have not been sufficiently evaluated and the risk of potential misuse is evident through this approach.

CONCLUSION

Following analyses the proposed principles on sustainable development planning in Belshi Municipality with regard to wetlands considerations are: (i) In every local or regional plan there is a need for recognizing the role and significance of the wetlands (lakes) in spatial long term planning; vision should be centered on water ecosystems and peoples economy; (ii) Ensuring full awareness of the values and functions of wetlands in the Belshi Municipality; this is fundamental in designing mid-term and long term objectives for balancing development and conservation; (iii) Using mechanisms for securing the conservation and sustainable use of wetlands in the wider Dumrea Lakes area. The conservation principle is fundamental one and must be used as key stone in all steps and (iv) Addressing the integration of the conservation and sustainable use of wetlands in broad-scale integrated ecosystem management.

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