

THE POTENTIAL FOR TRANSBOUNDARY COOPERATION TOWARDS THE CONSERVATION OF THE AVIFAUNA IN THE VORAS MOUNTAIN RANGE (GREECE / F.Y.R.O.M)

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ABSTRACT

When it comes to shared natural resources between two countries it is essential to mitigate differences in the management which underpin threats to the conservation of those resources by putting the way forward for coordination of the management of the area as a whole. Shared natural resources are thus a good basis for transboundary cooperation. Additionally, mountain regions, which represent areas that are vital for the conservation of biodiversity, provide an outstanding example of that, as the survival of many species, which move across the national border, depends on the wise treatment of their habitats, as well as the mitigation of pressures, which pose threats on their survival. The fact that such challenges cannot be faced effectively only by one affected party has been recognized and resulted in a steady increase worldwide of transboundary conservation initiatives involving mountains. The present paper aims to examine the above topics by focusing on the mountain region of Tzena/Kozhuf, which extends across the national border between Greece and F.Y.R.O.M. and constitutes an important site for the conservation of raptors. Based on this evaluation of the land uses as far its compatibility with matters of conservation of raptor species are concerned, challenges in matters of sustainable land use management have been recorded. With both parties having made the first steps towards a coordinated management of these shared natural resources there are further measures proposed in order to ensure long term success.

KEYWORDS: transfrontier landscape, Greece, F.Y.R.O.M, collaboration, land uses.

INTRODUCTION

Over the last decades as conservation biologists began to emphasize the importance of larger scale ecosystem based management and regional approaches to biodiversity conservation, political boundaries dividing ecosystems have become problematic (Zbicz, 1999) as international borders are political, not ecological boundaries (van der Linde *et al.*, 2001). Wascher and Pérez-Soba (2004) use the term “transfrontier landscape” to describe such “a piece of land where natural and cultural characteristics form recognisable coherent entities which are divided by national or sub-national administrative boundaries, resulting in two or more areas of sovereignty or jurisdiction”.

Frequently such international border areas contain some of the most intact ecosystems in the world (Westing, 1998). Consequently many key ecological systems and components are dissected by political divisions, which have frequently severed functioning ecosystems and threatened the continued survival of species (Zbicz, 1999). This is because neither animals nor plants recognise political boundaries and species continue to migrate across those borders as they always have, oblivious to customs regulations.

Furthermore key ecological systems and components occurring in two or more nations are often subject to a range of opposing management and land use practices (van der Linde *et al.*, 2001).

Sometimes these practices are incompatible, damaging the resource base (van der Linde *et al.*, 2001) and consequently the habitats of species that occur in the region. The most effective protection of species is only possible through the maintenance of the diversity of habitats and this way finally goes back to the land uses according to which the landscape has been shaped (Cohn and Lerner, 2003; Haber, 2006).

In order to apply a sustainable management on the natural ecosystems it is necessary to record their diversity since it comprises, from ecological point of view, a key factor in the ecosystem stability (Tsitsoni *et al.*, 2002). For decades special focus was set on indicator species, whose presence or absence, population density or dispersion, or reproductive success can indicate habitat conditions that are too difficult to measure for other species. (Federal Interagency Stream restoration Working Group (FISRWG), 1998). It was assumed that if the numbers of these indicator species are well managed, remaining species would be in good shape. In the early 70's attention turned to threatened and endangered species as special indicator species (Randolph, 2004). Birds are probably better researched and monitored than any other group of animals or plants, and are thus well placed to indicate the overall health of our environment (Tucker and Evans, 1997).

Especially raptors are among the bird species considered important for this purpose due to their special ecological role. Eagles and falcons are good indicators of what is happening in the ecosystems. Being at the top of the food chain and often requiring very large areas for survival their conservation status is an indicator of habitat modification and unsustainable land management (Zocchi, 2004). Therefore, birds of prey are good examples of "flagship" species: their conservation implies the protection of large areas of suitable habitat. Birds of prey such as vultures are considered to be key European indicators for the value of large-scale semi-natural landscapes (Schneider-Jacoby, 2004)

The large number of threatened raptor species indicates widespread habitat deterioration. Thus, those birds can help in identifying which habitat types are in greater danger and can help drive broader conservation strategies. Among the birds of prey to which a particular effort has been devoted, vultures have a special position. Cinereous vulture, Griffon vulture, Egyptian vulture and Lammergeier are species that can be found in a complete and healthy European raptor community.

For such species, which have wide-ranging movement patterns that cross political boundaries, transboundary cooperation or even joint management can assure free movement of species between countries. Additionally the diversity and complementary nature of their habitat requirements across borders requires that a landscape level approach to conservation management be undertaken, with adjacent jurisdictions recognising their essential role to harmonize management regimes (Hamilton and McMillan, 2004).

This paper deals with the transfrontier landscape that spans the border of Greece with F.Y.R.O.M, where the presence of all 4 raptor species (Tsiakiris, 2002) as well as facts on opposing management goals and their underlying threats to the preservation of the species and their habitats (Kakouros and Papadopoulou, 2007) urge for a coherent system of natural and/or semi-natural landscape elements. Through transboundary cooperation in the management of shared natural resources it can be configured and managed with the objective of maintaining or restoring ecological functions as a means to conserve biodiversity while also providing appropriate opportunities for the sustainable use of natural resources.

The paper aims to explore the potential for transboundary cooperation in the transfrontier landscape of the mountain region Tzena/Kozhuf that lies at the border of Greece with F.Y.R.O.M. For this reason the study briefly highlights the biological resources of the region, it explores its environmental cooperation history and by reviewing some transboundary issues facing the region it discusses the transboundary biodiversity management challenges that pertain to future transboundary collaboration. Finally it provides some recommendations for the regulation and coordination of a sustainable transboundary management of the area aiming at the conservation of the region.

MATERIALS AND METHODS

Study area

The research area was conducted in the mount Tzena/Kozhuf which forms part of the Voras mountain range. The mountainous area of Tzena/Kozhuf lies at the border of Greece with F.Y.R.O.M and it has a total area of 57117,6 ha. 44537,1 ha are in the territory of F.Y.R.O.M while 12580,5 ha

in the territory of Greece. The climate in the region is a transition from Mediterranean to Continental. The influence of the Aegean Sea can be mostly felt in the southern part of the area while the continental influence enters from the north. The average temperature according to Mariolopoulos (1960) is 14-15°C while the average precipitation is 800-1100 mm. The altitude ranges from 200 m in the lowlands up to approximately 2200 m with highest point peak Zelenberg (2171 m) in F.Y.R.O.M and Tzena (2068 m) on the Greek side.

The forest habitats together with the transitional woodlands and shrubs as well as grasslands are the dominant landforms, covering 87,43 % of the area. Broad-leaved forests (47,71%) are the most widespread land cover type in the region. Sclerophyllous vegetation (3%) covers the steeper mountain slopes that are found in the southwest of the area, while agricultural landscapes comprise only 7,75% of the area and they are mainly spread in the lower parts that can be found in the northwest and south.

The mountain region of Tzena/Kozhuf contains a rich ecosystem in terms of biodiversity. Therefore the mountain region of Tzena on the Greek side is included since 1998 in the Natura 2000 Network as a Special Protected Area (SPA) and a Site of Community Importance (SCI). The same area has also been identified as an important site for the conservation of Middle Spotted Woodpecker (*Dendrocopus medius*) and has thereby been included in the broader Important Bird Area (IBA) with the code "GR038: Mounts Tzena and Pinovo" (Heath and Evans, 2000). Furthermore 5006, 9 ha, thereby covering 39, 8% of the area on the Greek side, has been declared as wildlife refuge with Decision 64703-804-1988 of the Ministry of Agriculture, which corresponds to category IV of the IUCN classification (Tsitsoni and Mpatala, 2000).

On the part of the mountain that lies in the territory of F.Y.R.O.M there has been also an area of approximately 20.000 ha characterized as an Important Bird Area with main criterion the conservation of Egyptian vulture (*Neophron percnopterus*) and Eurasian Eagle-owl (*Bubo bubo*) (Heath and Evans, 2000) and there are also actions for the conservation of vultures initiated.

The mountain range is identified as one of the centres of high floristic higher plant group diversity in F.Y.R.O.M. as far as high mountain regions are concerned. The importance of the area as far as rare, Balkan and Greek endemic species is concerned is also mentioned for the Greek part (Trakolis *et al.*, 2000).

The most striking features of the fauna within the area today are its richness and heterogeneity. Mediterranean faunal elements go hand-in-hand with the faunal species of the Euro-Siberian regions, while the high mountain belts are the natural habitats of the indigenous Oro-Mediterranean fauna (UNEP/UNFCCC, 2005).

28 raptor species are present in the area, 11 of which nest there, while for another 9 of them there are indications of nesting. 21 of them are included in ANNEX I of the EU Birds Directive 79/409/EEC. The region constitutes a significant area also for large raptors such as the Golden eagle (*Aquila chrysaetos*) and the Imperial eagle (*Aquila heliaca*). The last one together with the Lesser kestrel (*Falco naumani*) are considered as globally threatened, while 14 species are characterized as endangered or vulnerable according to the Red Data Book of Threatened Vertebrates of Greece. (Trakolis *et al.*, 2000)

The most important faunal elements are however the vultures. According to Tsiakiris (2002) in the region can be found all 4 vulture species, the Griffin Vulture (*Gyps fulvus*), the Egyptian Vulture (*Neophron percnopterus*), the the Lammergeier or Bearded Vulture (*Gypaetus barbatus*) and the European black vulture (*Aegypius monachus*). All 4 species are included in ANNEX I of the EU Birds Directive 79/409/EEC.

Methods

The paper puts under its scope the potential of transboundary cooperation in the mountain region of Tzena/Kozhuf. In order to explore the present status of cooperation in the transfrontier landscape of Tzena/Kozhuf the ranking by Zbicz (2001) was used (Table 1). According to this ranking the procedure of achieving cooperation is a step-by-step procedure, which is carried out on different levels of cooperation and by different actors.

In order to identify the challenges the area is confronted with and achieve threat abatement strategies through transboundary collaboration there were the results from the Interreg project "Recording of the applied conservation practices in the area of mountain Tzena" used. The above

project focused on a thorough analysis of the land uses and management practices on both sides of the border and identified conflicts that arise through opposing land use practices, which pose threats to the conservation of raptors in the region.

Table 1. Increasing levels of transboundary cooperation (Zbicz, 2001)

Level 0:	No cooperation
Level 1:	Communication—Information-sharing
Level 2:	Consultation—Notification of actions
Level 3:	Collaboration—Active collaboration on several activities and frequent communication and meetings.
Level 4:	Coordination of planning—Planning for the two protected areas as a single ecological unit, sometimes even planning jointly.
Level 5:	Full cooperation—Fully integrated, ecosystem-based planning, with common goals and joint decision-making by a transboundary committee, sometimes even involving joint management.

Finally based upon bibliographic research on initiatives that have appeared in mountain regions that are characterized by similarities to Tzena/Kozhuf, measures are proposed on how to proceed in the study area.

RESULTS AND DISCUSSION

Status of cooperation between Greece and F.Y.R.O.M. in the mountain region of Tzena/Kozhuf

Implementing the goals of preserving the biodiversity of the region depends on networks and on cooperation on all levels, both horizontally (e.g. cooperation among farmers) and vertically (e.g. cooperation of hunters with NG nature conservation organizations). In the transboundary context, cooperation becomes even more important and can become quite complex. Bilateral cooperation is dealt with on different levels and in different sectors, which for the region of Tzena/Kozhuf are described in Table 2.

As responsibility for cooperation across national borders is not clear, various International Conventions promote cross border cooperation (e.g. Ramsar, Bonn Convention, and EU Birds and Habitats Directive). Both Greece and F.Y.R.O.M. have ratified such conventions, which act as an incentive to initiate transboundary cooperation. Policy support in this field is also expressed through the Memorandum of Understanding that the 2 countries have signed.

On a local level there has been made use of the existing and developing regional economic opportunities that provide incentives to invest in transboundary natural resource management activities. The municipality of Exaplatanos on the Greek side and the Municipality of Gevgelija on the side of F.Y.R.O.M. which maintain friendly relationships that have been fostered by previous initiatives related to other sectors, such as infrastructural projects, cooperated to initiate activities which mostly refer to the conservation of raptor populations in the area. They worked on a common proposal and achieved the initiation of the project “Actions for the conservation of raptors at mount Tzena” as part of the INTERREG III/ CARDS Greece – F.Y.R.O.M.

Cooperation in the non-governmental sector is also present. Information sharing between the 2 countries on a NGO level takes place but also mostly as far as vulture conservation is concerned. The NGO (Non-Governmental Organization) “Chrysaetos” has implemented together with FWFF Macedonia (Fund of the Wild Flora and Fauna) the project “Transboundary Public Awareness and Monitoring Actions for the Four Vulture Species in the Mountain Range of Aridea (GR) and Kavartzi (F.Y.R.O.M.)” in 2005. Its goal was the continuation of crossborder cooperation for the conservation of the four vulture species completing the preliminary study of the vulture status, habitat use and important areas, advanced monitoring scheme, GPS use and public awareness.

Another NGO involved in the area is the Macedonian Ecological Society which also provides significant research in the conservation of raptors in the area, but also in several matters concerning the fauna and flora in the area and maintains informal cooperation with “Chrysaetos”.

Table 2. Stakeholder groups in the mountain region of Tzena/Kozhuf

Countries	Greece	F.Y.R.O.M
Administrative scale		
Governmental	<ul style="list-style-type: none"> - Ministry for the Environment, Physical Planning & Public Works - Ministry of Rural Development and Food 	<ul style="list-style-type: none"> - Ministry of Environment and Physical Planning - Ministry of Agriculture, Forestry and Water Management - Public Enterprise "Macedonian Forests" - Public Enterprise for Pastures
Regional	<ul style="list-style-type: none"> - Region of Central Macedonia 	<ul style="list-style-type: none"> - Vardar Region - Southeastern Region
Prefectural	<ul style="list-style-type: none"> - Prefecture of Pella 	
Local	<ul style="list-style-type: none"> - Municipality of Exaplatanos - Forest Department - NGO "Chrysaetos" - Hunting Association - Local people 	<ul style="list-style-type: none"> - Municipalities of: <ul style="list-style-type: none"> ▪ Demir Kapija ▪ Kavadarci ▪ Gevjelija - NGO Macedonian Ecological Society (MES) - Local People

The level of cooperation between the 2 countries according to the ranking of Zbicz (1999) is in an initial phase. It is certainly above level 0, somewhere between levels 1 and 2, mostly approaching the level of communication. Thus, it is evident that there is potential of enhancing the present situation by strengthening relations between the two sides. From the current position there are measures that go up to Level 5 "Full co-operation" where a joint committee for management and advice on the specific area is in place. It is not easy, neither feasible to swift development or immediately transform the area into a designated and fully functioning transboundary protected area rather there is work towards a gradual elevation of status.

The existing agreement between the two governments as such is not sufficient and until such a specific Convention for the broader Balkan region will be set up there is a need of additional practical and administrative tools in order to strengthen the co-operation in the field of nature protection and sustainable development of the area.

Challenges of sustainable land use management on mountain Tzena/Kozhuf

An assessment of the land uses by Kakouros & Papadopoulou (2007) on both sides of the border has identified the main land uses in the region as well as divergences as far as management goals are concerned as a result of the administrative division of the region. According to what extent such land use practices affect or even conflict with the conservation of the avifauna or their habitats in the region there were such negative impacts identified that constitute threats to birds.

Based on this evaluation of the land uses as far its compatibility with matters of conservation of raptor species are concerned it is evident that the study area faces challenges in matters of sustainable land use management some of which are common for the Greek as well as the part of the study area on the side of F.Y.R.O.M. while others are restricted to only one side of the border. However some general trends that have been distinguished through the identification of the above threats help to identify fields that require strengthening (Table 3).

These have been identified in the fields of governance including policy development, financial instruments, institutional and legal matters. It is considered important to integrate environmental concerns as well as traditional knowledge into policies, develop incentive mechanisms to induce land users to follow sustainable land management practices as well as to strengthen institutional weaknesses. Legal aspects would include implementation of signed and ratified conventions and harmonization of legislation of F.Y.R.O.M. with that of EU.

Table 3. Challenges of sustainable land use management related to Tzena/Kozhuf

Fields		Challenges
Governance	Policy	<ul style="list-style-type: none"> Integrating environmental concerns into policies e.g. agri-environmental measures Integrating the different processes and instruments now determining land use in the region Incorporating traditional knowledge in policy development
	Financial Instruments	<ul style="list-style-type: none"> Developing incentive mechanisms to induce land users to follow sustainable land use practices e.g. environmental payments
	Institutional	<ul style="list-style-type: none"> Strengthen institutional weaknesses e.g. increasing effectiveness in surveillance mechanisms against illegal hunting
	Legal	<ul style="list-style-type: none"> Harmonization of legislation of F.Y.R.O.M. with that of EU Implementation of the provisions of the signed and ratified conventions
Knowledge		<ul style="list-style-type: none"> Cultivation of knowledge patterns for implementation of sustainable land use practices and policies Maintaining and applying traditional knowledge in diverse land uses
Operations		<ul style="list-style-type: none"> Increasing effectiveness in communication and information systems e.g. GIS
Empowerment		<ul style="list-style-type: none"> Building capacity, responsibility of institutions and individuals to manage and conserve natural resources sustainably

The cultivation, integration and dissemination of knowledge patterns for the implementation of sustainable land use patterns constitutes another cornerstone for achieving sustainable land use practices, especially by maintaining traditional knowledge. For the effective delivery and use of knowledge effective operations including information and communication systems have to be introduced as well as empowerment through building capacity and enhancing responsibility of institutions and individuals to manage and conserve natural resources in an equitable manner.

CONCLUSION AND PROPOSALS

Recommendations for future transboundary cooperation

Successful experiences in transborder conservation areas have some common characteristics (Hamilton *et al.*, 1996). These may not all be in place before cooperation is formalized, but their absence may undermine long-term coordination efforts. A collaborative transborder approach between Greece and F.Y.R.O.M. might be enhanced by attention to these characteristics. Based on these issues, on the guidelines provided by Sandwith *et al.* (2001) and backed by experience from several transboundary initiatives over the world it can be recommended that in the region of Tzena/Kozhuf action could take place in several fields, a short analysis of which is given below. An overview of these fields of action together with the proposed measures and expected outputs are given in Table 4.

As responsibility for cooperation across national borders is not clear, various International Conventions promote cross border cooperation (e.g. Ramsar, Bonn Convention, and EU Birds and Habitats Directive). Both Greece and F.Y.R.O.M. have ratified such conventions, which act as an incentive to initiate transboundary cooperation. Policy support in this field is also expressed through the Memorandum of Understanding that the 2 countries have signed.

On a local level there has been made use of the existing and developing regional economic opportunities that provide incentives to invest in transboundary natural resource management activities. The municipality of Exaplatanos on the Greek side and the Municipality of Gevgelija on the side of F.Y.R.O.M. which maintain friendly relationships that have been fostered by previous initiatives related to other sectors, such as infrastructural projects, cooperated to initiate activities which mostly refer to the conservation of raptor populations in the area. They worked on a common proposal and achieved the initiation of the project "Actions for the conservation of raptors at mount Tzena" as part of the INTERREG III/ CARDS Greece – F.Y.R.O.M.

Table 4. Fields of action and accompanying measures for collaborative management in the mountain region of Tzena/Kozhuf

Fields of Action		Proposed Measures	Expected Output
Institutional Aspects		<ul style="list-style-type: none"> Coalition between management authorities 	<ul style="list-style-type: none"> Attaining common vision for the region Sustainable development of the area Promotion of decentralisation and good governance
Learning from other initiatives		<ul style="list-style-type: none"> Information exchange & cooperation with <ul style="list-style-type: none"> - Alpine/Carpathian Convention and - Network of TBPA's 	<ul style="list-style-type: none"> Learn from/adopt best practice lessons Tailor appropriate structure for transboundary protected area
Support from decision makers		<ul style="list-style-type: none"> Consultation and involvement of government departments 	<ul style="list-style-type: none"> Official endorsement of "on the ground activities"
Coordinated and cooperative activities on the ground	Participation	<ul style="list-style-type: none"> Establishment of transboundary coordination body e.g. through rotating system 	<ul style="list-style-type: none"> Involvement of stakeholder groups of both countries Facilitation of implementation of joint projects Strengthening of local democracy
	Joint meetings	<ul style="list-style-type: none"> Consultations/workshops including all stakeholders 	<ul style="list-style-type: none"> Local participation Transparency and openness
	Identifying a common theme	<ul style="list-style-type: none"> Identification of joint strategic priorities Identification of flagship species or logo 	<ul style="list-style-type: none"> Building a sense of joint ownership Promotion of common values and mutual vision Gaining easier support
	Working towards funding sustainability	<ul style="list-style-type: none"> Donor funding for start up costs Trust funds 	<ul style="list-style-type: none"> Ensure long-term cooperation beyond project deadlines/ financial sustainability Independence on external interventions
	Information exchange- Staff development	<ul style="list-style-type: none"> Collection and analysis of relevant data on national, subnational and regional level Regular access to updated information from all stakeholders Staff training and exchange 	<ul style="list-style-type: none"> Transparency in cooperation Effective preparation and observance of projects
	Education- Capacity building	<ul style="list-style-type: none"> Joint education and awareness activities Production of education and teaching materials 	<ul style="list-style-type: none"> Awareness raising on transboundary aspects Gaining support of local communities
Coordinated planning and protected area development		<ul style="list-style-type: none"> Implement joint monitoring programme Compatible Environmental Impact Assessment (EIA) procedures 	<ul style="list-style-type: none"> Risk reduction on biodiversity matters Increased effectiveness in threat abatement

Cooperation in the non-governmental sector is also present. Information sharing between the 2 countries on a NGO level takes place but also mostly as far as vulture conservation is concerned. The NGO (Non-Governmental Organization) “Chrysaetos” has implemented together with FWFF Macedonia (Fund of the Wild Flora and Fauna) the project “Transboundary Public Awareness and Monitoring Actions for the Four Vulture Species in the Mountain Range of Aridea (GR) and Kavadartzi (F.Y.R.O.M.)” in 2005. Its goal was the continuation of crossborder cooperation for the conservation of the four vulture species completing the preliminary study of the vulture status, habitat use and important areas, advanced monitoring scheme, GPS use and public awareness.

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