O 2. NATURA 2000 POTENTIAL SITES IN ALBANIA – A CONTRIBUTION OF FISH SPECIES OF COMMUNITY INTEREST

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ABSTRACT: The aim of this presentation is to address the Fish Species of Community Interest (FSCI) revealed through a three years identification process in selected sites all over Albania. At the European scale fishing was pointed out as one of the major threats to the both marine and freshwater environment. Based on FSCI populations presence in different sites of Albania (including freshwater, coastal marine and lagoon), their variation under qualitative and quantitative aspects, relations with their ecological needs and the presence of different human impact through the NATURA 2000 Al project were highlighted the main management directions which should create the framework for the actual and future management plan for the selected areas with protected status.

The fish species present in the Annex II of the Habitats Directive (92/43/EEC) of the potential Natura 2000 sites in Albania management elements include: *Acipenser naccarii, Acipenser sturio, Alosa falax, Alosa sp. nov. 'Scadar',Cottus gobio, Misgurnus fosilis, Alburnoides prespensis, Alburnus belvica, Pelasgus prespensis, Rutilus prespensis, Rhodeus amarus, Telestes montenegrinus, Telestes pleurobipunctatus, Aphanius fasciatus, Knipowitschia montenegrina, Eudontomyzon stankokaramani, Petromyzon marinus, Lampetra planeri, Lampetra fluviatilis, Salmo marmoratus, Salmo peristericus,Valencia letourneuxi.*

The identified and delivered conservation goal for fish species of community interest is focused on: Maintain and restore viable populations of existing fish species as an integral part of the NATURA 2000 site ecosystems. In order to reach this goal, it is necessary to identify and mitigate or remove threats to the fish populations and their habitat.

Keywords: Fish species, freshwater, lagoon system, marine environment, conservation goal

1. INTRODUCTION

For aquatic livings it is unclear if terrestrial hypotheses (species-area, species-energy, environment-energy, terrestrial primary productivity, environmental spatial heterogeneity, and climatic heterogeneity) that are known to explain species richness patterns of terrestrial organisms, especially when they are combined can be useful to explain the species richness pattern (Hawkins and Porter, 2003; Maceda-Veiga *et al*., 2017; Veiera *et al*., 2018). The locally tested hypotheses separately in Vjosa River confirm that the temporal heterogeneity best explains the distribution of fish species richness. However, a multiple-hypotheses approach, as water-energy, productivity and temporal heterogeneity hypotheses together might best describe the richness distribution with Albanian territory.

The fish data are part of the Biodiversity National Network of Albania (BioNNA) database that has been created. In the site surveys are given the fish distribution and diversity as direct authors observation and references existing so far from different authors without discussions of current taxonomic accuracy, but data network readers will be able to view through records and authors in different time periods. The more than 1020 records are also referring to current conservation status and conservation needs in line with side designations (See Table 1).

The considerations for the protection of this fish species of conservative interest populations in Albania from the initial start is based on its environment protection through integrated management which should solve the following identified problems: large areas of riparian zones have been reduced or eliminated by the agriculture expansion, alterations and detrimental agriculture practices, resulting the diminishing river shading and rising aquatic habitat temperatures; extreme sedimentations problems due to erosion with specific intensity in central Albania (Devolli/Osumi/Semani basin, and not only), channel incisions and storm water runoff increased by the absence of riparian vegetation; constant inputs of pollutants at significant levels (with different origin including lack of the waste water, solid waste, etc); erosion (due to historical reasons and not only) and sedimentation problems result from a lack of riparian vegetation

along long sectors of river corridors and can lead to siltation of gravel beds critical to this (aquatic) insectivorous species; human disturbed hydrologic regime become the most serious impacting activity through intensive hydropower plant construction; the artificial stream barrier (present from '60/'70 in large rivers and rapidly progressing within small rivers) which influence the fish migrations; habitat loss induced native fish species decline and the appearance of no native fish species that are more tolerant of different types of human affected habitats (specific species as *Pseudorasbora parva, Lepomis gibosuss, Carasius* spp.,*Gambiisia holbroki*, etc); the riverine flood plains important at least for the cyprinids species have been radical reduced; the habitat loss facilitate overcrowded situations which lead to appearance and eruptions of diseases; over canalizations, many stream sectors were channelized and isolated from their natural floodplains, etc.

Beside that knowledge and understanding of the diversity and distribution patterns of freshwater fishes in most of the European Mediterranean has increased considerably, in general the freshwater fish of Albania is still poorly known. Whereas for the surrounding areas updated information exists (Mrakovčić *et al.*, 2006; Economou *et al.*, 2007) such data on Albanian species are missing, apart from recent publications on loaches (Cobitidae and Nemacheilidae) (Šanda *et al.*, 2008), salmonids (Snoj *et al.*, 2009) and barbels (genus *Barbus*; Cyprinidae) (Marková *et al.*, 2010). The only available sources of information are the general works of Poljakov *et al.*, (1958) who included 36 freshwater species and Rakaj (1995) listing 77 species. The difference between the coverage in these two publications is probably in part due to inclusion of newly introduced species, but more so by changes in the taxonomic status of many species. The deficiency in the knowledge of the diversity of freshwater fishes of Albania has been confirmed by recent descriptions of many new species from the area (Economidis *et al.*, 2001, Kovačić & Šanda 2007, Miller & Šanda 2008, Zupančič *et al.*, 2010, Bogutskaya *et al.*, 2010, Shumka *et al.*, 2008, Shumka *et al.*, 2010, Shumka *et al.*, 2013, Shumka, 2015).

2. MATERIAL AND METHODS
Referring to the fish species of community interest the site assessment criteria are based on aggregation and interpretation of available literature and/or field data. Proposed site for habitat types of community interest, the following are the criteria listed in Annex III of the Habitats Directive (stage I) that should be applied: the habitat identified in the site should be representative of the habitat type described in the Habitats Interpretation Manual; the area covered by the habitat type in the site should be large enough for the long-term maintenance of the habitat; the degree of conservation of structure and functions and possibilities of restoration should be considered; the value of the site for the long-term maintenance of the habitat should be assessed

Other important criteria are: proportionality: rarer and more localized species need a larger coverage by the network; priority species need in general larger coverage by the network; sites for a given species should reflect its genetic variation within the bio-geographical region; no need to propose sites for introduced populations outside the historical range of the species; sites must be proposed for reintroduced populations within the historical range; sites must cover all essential parts of the annual cycle or life cycle of a species;

3. RESULTS AND DISSCUSIONS
Based on the above detailed analyses the current situations the native fish populations and particularly identifies fish species of community interest in Albania (both freshwater and lagoon systems) are threatened by several anthropogenic activities and factors like: (i) rapid development of hydropower plants, damming and other related interventions; (ii) Water pollution and lack of integrated management approaches; (iii) Unregulated fishery practices and illegal fishing; (iv) Overfishing; (v) rapid spread of the non native fish species; (vi) Impacts on specific spawning grounds for specific species and (vii) poor integration of fishery management practices into entire management of protected areas in both continental and coastal areas.

Table 1. Fish Species of Community Interest in Albania

SPECIES	IUCN RED LIST CATEGORY	EUR HAB DIR ANNEXES	SITES PRESENCE ALBANIA	MULTY-IMPACT SENSITIVITY
ACIPENSERIDAE *ACIPENSER NACCARII*	CR	II	BUNA	VERY HIGH
CLUPEIDAE *ALOSA FALLAX* *ALOSA SP. NOV. 'SKADAR'*	LC VU	II II	BUNA, SHKODRA, NARTA BUNA, SHKODRA	MODERATED MODERATED
COBITIDAE *MISGURNUS FOSSILIS*		II	VJOSA	MODERATED
COTTIDAE *COTTUS GOBIO*	LC	II	ALBANIAN ALPS	VERY HIGH
CYPRINIDAE *ALBURNOIDES PRESPENSIS* *ALBURNUS BELVICA* *PELASGUS PRESPENSIS* *RUTILUS PRESEPENSIS* *RHODEUS AMARUS* *TELESTES MONTENEGRINUS* *TELESTES PLEUROBIPUNCTATUS*	VU VU EN VU LC LC LC	II II II II II II II	PRESPA PRESPA, GJANC PRESPA PRESPA SHKODRA, DRINI, OHRI, PRESPA SHKODRA, BUNA BUTRINT	LOW-MODERATE LOW-MODERATE LOW LOW LOW MODERATE MODERATE
CYPRINODONTIDAE *APHANIUS FASCIATUS*	LC	II	ORIKUM,NARTA, BUTRINT, VELIPOJA	LOW
GOBIDAE *KNIPOWITSCHIA MONTENEGRINA*	VU	II	SHKODRA, BUNA, TIRANA ARTIFICIAL LAKE	MODERATED
PETROMYZONTIDAE *EUDONTOMYZON STANKOKARAMANI* *LAMPETRA SP.*	LC LC	II II	DRINI (KORAB-KORITNIK) BUNA, PEROI IZVORIT, BISTRICA	HIGH HIGH
SALMONIDAE *SALMO MARMARATUS* *SALMO PERISTERICUS*	LC EN	II II	ALBANIAN ALPS PRESPA, BISTRICA	VERY HIGH HIGH
VALENCIIDAE *VALENCIA LETOURNEUX*		II	BUTRINT	VERY HIGH

During the year 2019, based on the biological and ecological characteristics of the fish species of conservative interest of the Llogara-Karaburrun potential Natura 2000 sites were identified problems in relation with species present and highlighted different conservation and management directions and needs, with the goals to preserve a good conservation status of the local fish populations and the associated biota, and to induce good conditions for the fish natural populations growth. Following the analyses it has been revealed the actual not general compliance with the requirements for the waste water and solid waste management and the lack of sufficient capacities appeared to be the main reason of some of the studied area areas and sectors (Coastal water, Lagoon of Orikumi, adjacent streams, etc).
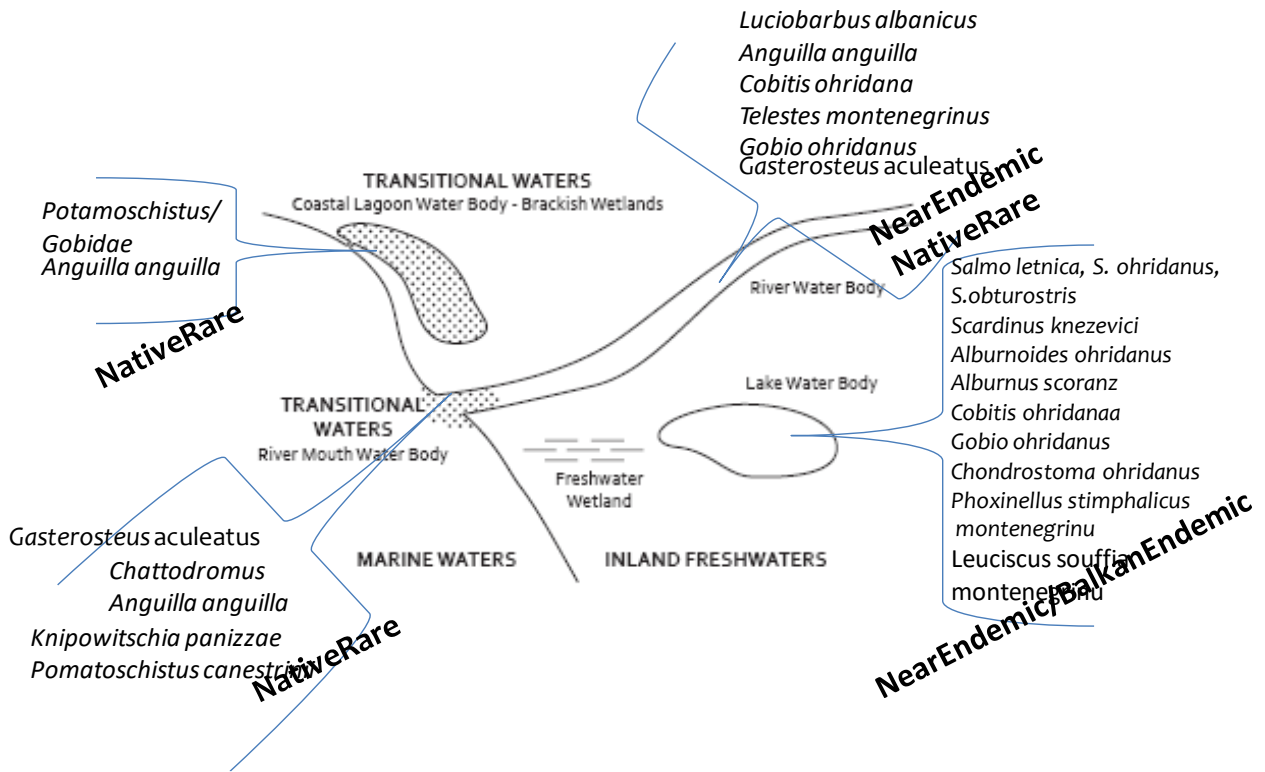
Figure 1. Habitats and relevant species of interest in Albania

Following specific approach developed in Llogara-Karaburun area the observed distribution of *A. fasciatus*, *A. anguilla*, etc in the Orikumi Lagoon shallow waters is in accordance with the findings of studies in other Mediterranean brackish areas. The results of the one year's approach indicate the marginal salt marsh areas in the Orikumi Lagoon as important habitats for these species, thus suggesting their suitability as areas of conservation of the species, as required by the Habitat Directive (92/43/EEC). The identified and delivered conservation goal for fish species of community interest is focused on: Maintain and restore viable populations of existing fish species as an integral part of the Natura 2000 site ecosystems. In order to reach this goal, it is necessary to identify and mitigate or remove threats to the fish populations and their habitat.

Following the Habitats Directive, based fish species conservation objectives of a specific site were presented in the light of the importance of the site for the maintenance or restoration, at a favorable conservation status, of natural habitat types in Annex I or species in Annex II. Defined conservation objectives were regarded in line to the morphological, chemical and biological processes within different aquatic bodies. The ecological functions of rivers, lakes, estuaries und coastal waters were recognized, such as hydrological functions, function as spawning area, nursery or seasonal habitats for migratory species (mentioned widely in above sections of this abstract). Further on the conservation objectives and measures for Natura 2000 sites should be based on the assessment of the local conservation status of protected habitats and species, and with these regard specific objectives has to be drawn. The actual conservation status at the date of designation must be used as a reference value for evaluating the integrity of the site or its deterioration. With this regard the already completed Standard Data Form (SDF) with NATURA 2000 project also remains an important reference document with this regard.

4. CONCLUSIONS

This study shows that fish fauna in Albanian rivers, lakes and coastal lagoons is at risk by multiple impacting factors. Different indicators of fish conservation value are related to different sets of impacting factors, but restoring water quality and natural flow regimes were considered as management priorities for the national and local authorities. It will directly help the conservation of aquatic diversity and further on ensure survival of the quality of freshwater resources.

Along with recovery and conservation measures, we propose proper monitoring and further abetment of introduced and alien species in various water bodies as current native fish diversity refugees are concerned.

More specifically it has been concluded: (i) Conservation of the aquatic natural habitats and habitats of fish species, their populations and distribution within the Natura2000 site, in order to achieve and maintain their favorable conservation status; (ii) Improving where necessary, the status of the described types of natural aquatic habitats and fish species; (iii) Restoration, where necessary, of the aquatic types of natural habitats and species habitats.

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