



albanian water frog



SPECIES ACTION PLAN

*“Measures for Protection of Albanian Frog
(Pelophylax Shqipericus)
In the Bay of Vlora”*



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“MEASURES FOR PROTECTION OF ALBANIAN FROG *(Pelophylax shqipericus)* IN THE BAY OF VLORA”

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TABLE OF CONTENTS:

LIST OF ABBREVIATIONS	6
1. Introduction.....	9
2. The importance of the species in the ecosystem	13
3. Biology and status	15
3.1. Description of the species.....	15
3.1.1. Morphological description of the endemic frog of Albania (Pelophylax shqipericus)	16
3.2. Reproduction.....	18
3.3. Geographical distribution – Areal.....	18
3.4. Habitat	18
4. Status of the population.....	21
4.1. Actual status of species at international level.....	21
4.2. Actual status of species an national level	22
5. Threats.....	29
6. Case Study – Bay of Vlora	31
6.1. Area of study.....	31
6.1.1. Wetland Complex of Narta	31
6.1.2. Wetland Complex of Orikum	33
6.2. Methodology	34
6.2.1. Monitoring plan (scheme)	34
6.2.2. Methodology used for the case study	36
6.3. Results.....	39
6.4. Distribution (maps).....	41
6.5. Threats.....	46
7. Plan of measures for the conservation of species.....	49
7.1. Goal	49
7.2. Objectives.....	49
7.3. Measures proposed for the conservation of the species	50
7.4. List of actors and their participation.....	55
7.5. Other species that may benefit from the plan	56
8. Results and Recommendations	59
9. Monitoring and review	63
10. Monitoring and review	63
11. Bibliography.....	68



LIST OF FIGURES

Figure 1: Demonstration scheme of monitoring trasects: a) linear transect along the banks of a river, canal etc.; b) circular transect along the banks of a lake, reservoir, pond. 35

LIST OF PHOTOGRAPHS

Photo 1: Some distinctive morphological features between cohabitation species of frogs, *P. shqipericus* and *P. kurtmuelleri* 17

Photo 2: Moments from the field: a) identification of the endemic frog of Albania from expert Dr. Enerit Saçdanaku; b) *Pelophylax shqipericus* identified in the wetland complex of Orikum. 39

Photo 3: Typical habitats where we encounter *Pelophylax shqipericus* species (Photography: E. Saçdanaku) 41

LIST OF MAPS

Map 1: Known map of the geographical distribution of Albanian frog (*Pelophylax shqipericus*). 19

Map 2: Locations (sites) previously identified for monitoring *P. shqipericus* in the wetland complex of Narta (sites 1-8). 37

Map 3: Locations previously identified for monitoring *P. shqipericus* in the wetland complex of Orikum (sites 9-12). 38

Map 4: Localities (sites) where the presence of *Pelophylax shqipericus* has been identified on the region of Bay of Vlora (sites: 1 – 12). 40

Map 5: Map of habitats of *P. shqipericus* in the wetland complex Vjosa – Narta. 42

Map 6: Description of habitats in the wetland complex of Orikum. 43

Map 7: Map of pressors for the Albanian frog (*Pelophylax shqipericus*) in the wetland complex of Orikum. 43

Map 8: Map of pressors for the Albaina frog (*Pelophylacs shqipericus*) in the wetland complex Vjosa-Narta. 44

Map 9: Presence of the species *Pelophylacs shqipericus* in the wetland complex Vjosa - Narta. 45



LIST OF TABLES

Table 1: Distinctive morphological characteristics among two coexistent species <i>P. shqipericus</i> and <i>P. kurtmuelleri</i> .	16
Table 2: Data collected for species <i>P. shqipericus</i> in the region of the Bay of Vlora, during the expedition in the field.	47
Table 3: Activities proposed to improve the status of the population and habitats of the endemic Albanian frog (<i>P. shqipericus</i>).	51

LIST OF ABBREVIATIONS

P.	PELOPHYLAX
DCM	DECISION OF THE COUNCIL OF MINISTERS
NEA	NATIONAL ENVIRONMENTAL AGENCY
NAPA	NATIONAL AGENCY OF PROTECTED AREAS
RAPA	REGIONAL ADMINISTRATION OF PROTECTED AREAS
NPA	NATURAL PROTECTED AREA
NGO	NON-PROFIT ORGANIZATION
CSO	CIVIL SOCIETY ORGANIZATION
KBA	KEY BIODIVERSITY AREA (ZONË KYÇE PËR BIDIVERSITETIN)
IBA	INTENSIVE BIODIVERSITY AREA
CITES	CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FLORA AND
FAUNA	
ASCI	AREAS OF SPECIAL CONSERVATION INTEREST (EMERALD NETWORK)
IUCN	INTERNATIONAL UNION FOR CONSERVATION OF NATURE
VES	CASUAL VISUAL SURVEY
IAR	INDEX ABONDANCE RELATIVE
GIS	GEOGRAPHIC INFORMATION SYSTEM







INTRODUCTION



There are about 16 species of amphibians known in Albania, of which 5 species belong to the order Caudata (Amphibians with tail), which includes tritons and salamanders, while the 11 other species belong to the Anura Order (Tailless Amphibians), which includes all species of frogs and toads (Szabolcs *et al.*, 2017)¹.

The endemic frog of Albania, *Pelophylax shqipericus*, (Hotz, Uzzell, Guenther, Tunner & Heppich, 1987) belongs to the genus *Pelophylax* (a group of green frogs) (*Ranidae* family), consisting of about 20 species, with a natural spread throughout the continent of Eurasia. Even though these types of frogs are considered to be quite popular and bear the characteristics of the amphibian class, they are quite difficult to identify. The variability within each of the species is significant (Speybroeck *et al.*, 2016). *Pelophylax shqipericus* is an endemic species of the Balkans, with a natural spread in Albania and Montenegro, starting in the north from Shkodra Lake, continuing along the coastline to the area of Vlora (Orikum) in the south (Speybroeck *et al.*, 2016)².

Very little data exist regarding the origin and ecology of the frog *P. shqipericus* (Uzzell & Crnobrnja-Isailovi, 2009). Recently, this species was reported for the first time in Italy, where it is thought to have been introduced through international frog trade (Domeneghetti *et al.*, 2013)³.

Albania's endemic frog presents a special interest of conservation, because of a concern of international level about its status, due to the fact that this frog population is declining and the degradation of its living habitats. *P. shqipericus* is classified as an endangered species "EN" since 2004, according to the IUCN Red List (Uzzell & Isailovic, 2009)⁴, with a "home range" of about 5.000 km² extending along the Western Lowlands of Albania (Speybroeck *et al.*, 2016), but nevertheless, the population of

1 Szabolcs M., Mizsei E., Jablonski D., Vági B., Mester B., Végvári Z. & Lengyel S., 2017: Distribution and diversity of amphibians in Albania: new data and foundations of a comprehensive database. *Amphibia-Reptilia* 38, 435–448.

2 Speybroeck, J., Beukema, W., Bok, B., Voort Van Der, J., Velikov, I. (2016) *Field Guide to Amphibians and Reptiles of Britain and Europe*. Bloomsbury, London/New York, 432 pp.

3 Domeneghetti D., Bruni G., Fasola M. & Bellati A., 2013: Discovery of alien water frogs (gen. *Pelophylax*) in Umbria, with first report of *P. shqipericus* for Italy. *Acta Herpetologica* 8, 171–176.

4 Uzzell T. & Isailovic J.C., 2009: *Pelophylax shqipericus*. IUCN Red List of Threatened Species. Version 2013.1.



this species is very scarcely studied. Furthermore, the species *Pelophylax shqipericus* is protected by the Berne Convention, Annex III (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).

The habitat loss and fragmentation is considered to be the biggest threatening factor to Albania's endemic frog population. This is a result of interventions in the system of the marsh drainage canals; urbanization and intensification of agriculture, which leads, in turn, to water pollution from numerous pesticides. Another direct threat is the collection without any criteria of this species for commercial purposes (Gratwicke *et al.*, 2010)⁵. In Albania, there is still no management plan, or any special action plan for the conservation of this species. Considering this, as well as the fact that the existing data regarding the distribution, ecology and status of the species are very scarce, we are taking the initiative to draft a document (with protection measures), in order to:

- collect sufficient data on the distribution, ecology and status of the population of the Albania's endemic frog (*P. shqipericus*) in the area of the Bay of Vlora. To achieve this, a study will be conducted, focused on the area of the Bay of Vlora, as it is considered a key biodiversity area (KBA). The data on this species in this area are very scarce but, based on a recent study by Saçdanaku (2017)⁶, it is reported that *P. shqipericus* is present in some of the habitats around this area.
- determine a list of conservation measures for the protection of natural habitats and the population of the *Pelophylax shqipericus* frog population, depending on the status the species will have in the studied area. Also, by taking into account the specific threat factors that will be identified in this area, the measures to be taken will aim to reduce the effect of factors on the population of this species, by improving the status of the species or, in the worst case, avoiding the population loss.

5 Gratwicke B. Evans, M. J., Jenkins P. T., Kusurini M. D., Moore R. D., Sevin J. & Wildt D.E., 2010: Is the international frog legs trade a potential vector for deadly amphibian pathogens? *Frontiers in Ecology and the Environment* 8, 438–442

6 Saçdanaku E. (2017): Studim taksonomik dhe ekologjik i breshkave të ujërave të ëmbla dhe detare (rendi Testudines) të gjirit të Vlorës. Disertacion. Fakulteti i Shkencave të Natyrës, Universiteti i Tiranës. Faqe: 110.





The image shows a natural landscape with tall, thin grasses in the foreground and middle ground. A dirt path or streambed winds through the center. The background features a line of trees and a clear sky. The entire image is covered with a semi-transparent blue gradient, which is darker at the top and lighter at the bottom. Centered over this gradient is the text 'THE IMPORTANCE OF THE SPECIES IN THE ECOSYSTEM' in a white, outlined, sans-serif font.

THE IMPORTANCE
OF THE SPECIES IN
THE ECOSYSTEM



The endemic frog of Albania, *Pelophylax shqipericus*, like all other amphibians, plays a very important role in the environment (ecosystem), where it is worth mentioning the indisputable role in the **food web** (its predatory-prey role). It feeds (in its role as a predator) with various invertebrates (mainly aquatic and terrestrial insects, gastropods, arthropods, spiders, crustaceans, etc.) keeping under control their populations, while it helps the agricultural sector in preserving agricultural crops from populations of pest invertebrates (mainly insects). It serves sldo as food (in its role as a prey) for larger animals such as snakes, various birds, etc., (Haxhiu, 1994)⁷.

The larvae of this frog, like those of all other amphibians, play a very important role in the **circulation of nutrients** in freshwater habitats. They are herbivores (feeding mainly on algae or other aquatic plants) and, on the other hand, they serve as food (prey) for both invertebrates and vertebrates (Hayes *et. al.*, 2002)⁸. Amphibians play also an important role in the ecosystem, as they are considered as **indicative species** (sensitive to polluting factors in the environment where they live, as they have a thin and penetrable skin toward pollutants) (Martin & Hine, 2000)⁹. In this way, the presence or absence of these amphibians in a given habitat also indicates the state of the ecosystem. In this way, the presence or absence of these amphibians in a given habitat indicates the state of the ecosystem, too (Burger & Snodgrass, 1998)¹⁰.

7 Haxhiu I., 1994: *The herpetofauna of Albania: amphibia: species composition, distribution, habitats*. Zoologisches Jahrbuch für Systematik 121, 109–115.

8 Hayes T., Haston K., Tsui M., Hoang A., Haeffele C., Vonk A. (2002): *Feminization of male frogs in the wild*. Nature, 419, 895 – 896

9 Martin E., Hine R. (Editors). 2000: *A Dictionary of Biology*. Oxford University Press Inc., New York.

10 Burger J., Snodgrass J. (1998): *Heavy metals in bullfrog (Rana catesbeiana) tadpoles: effects of depuration before analysis*. Environmental Toxicology and Chemistry, 17, 2203-2209.





BIOLOGY AND
STATUS



Due to the importance of amphibians in the ecosystem, the decline or extinction of the population of a certain species will also affect other organisms that are related to them. The action plan for the Albanian frog (*P. shqipericus*) is very important, because it aims to reduce the threatening factors for the population and habitats of the species, thus preventing the decline or even extinction of this population.

3.1 DESCRIPTION OF THE SPECIES

Taxonomy:

Class: Amphibia

Order: Anura

Family: Ranidae

Genus: *Pelophylax*

Species: *shqipericus*

The species of *Pelophylax* genus of frogs (green frogs), are morphologically extremely difficult to differentiate from each other. Their identification is even more difficult due to the fact that these species usually share the same habitat, and, as a result, crossbreeding can occur between them, giving rise to hybrid offspring (very difficult to identify). In our country (Albania), in addition to *Pelophylax shqipericus*, there are two other species of green frogs, *Pelophylax kurtmuelleri* / *ridibundus* and *Pelophylax epeiroticus*. The latter is a sub-endemic species, found in the western part of Greece, Corfu and, in Albania, in the area of Saranda only, as it is the northernmost border of its distribution (Arnold & Ovenden, 2002). Meanwhile, the other type *P. kurtmuelleri* / *ridibundus*, which was previously known as *Rana balcanica*, is very common and with a fairly wide spread in our country, ranging from low coastal areas to high altitudes, above 2000 m above sea level (Haxhiu, 1994).

There has been recently a long discussion among various scholars about the spread of the species *Pelophylax ridibundus* in Albania and beyond, in the Balkans. It is accepted that the *Pelophylax kurtmueller* species has a natural distribution in Albania and Greece (it is endemic to the Balkans), but is not considered a separate species from the *Pelophylax ridibundus*, which has a distribution throughout Central and Eastern Europe, including the Balkan Peninsula (Arnold & Ovenden, 2002)¹¹.

¹¹ Arnold N., Ovenden D., 2002: A Field Guide to the Reptiles and Amphibians of Britain and Europe, 2nd Edition. London, UK, Harper Collins Publishers, pp. 288.



However, in a recent study on the analysis of the genetic material of the species of the genus *Pelophylax*, Dufresnes et al. (2017)¹² managed to identify, among others, two separate species of this genus: i) Balkan Frog (*P. kurtmuelleri*), a native species of Greece and Albania, and ii) a similar species (*P. ridibundus*), widely distributed throughout Central and Eastern Europe. Referring to this study, we can say that the species *Pelophylax shqipericus* in the area of the Bay of Vlora shares the same habitat with the species *Pelophylax kurtmuelleri*. Both species have very similar morphological features and, as a result, the identification of *P. shqipericus* becomes increasingly difficult. Based on the literature and recent studies, there is no set methodology to identify these types from each other, with the exception of genetic studies.

3.1.1 Morphological description of the endemic frog of Albania (*Pelophylax shqipericus*)

Adults

The endemic frog of Albania is described as a species with an average body size, ranging up to 7.5 cm (in adults) and a dark green or often light brown color on the back. A usual presence is a thin longitudinal line along its back (Fig. 1).

The frontal part of the body and the head of male exemplars take up a yellow tinge during the reproductive period. The vocal sac of males has a gray or olive green color. Juvenile and female individuals usually have a brown tint. They have characteristic large dark brown spots, present on their back and legs. Also, a typical trait of this species of frog is the presence of a yellow tinge on the thighs and waist (Fig. 1). The following table (Tab. 1) compares the morphological features that can be used to identify and distinguish the species *P. shqipericus* from the other species, *P. kurtmuelleri*, with which it divides the habitat,

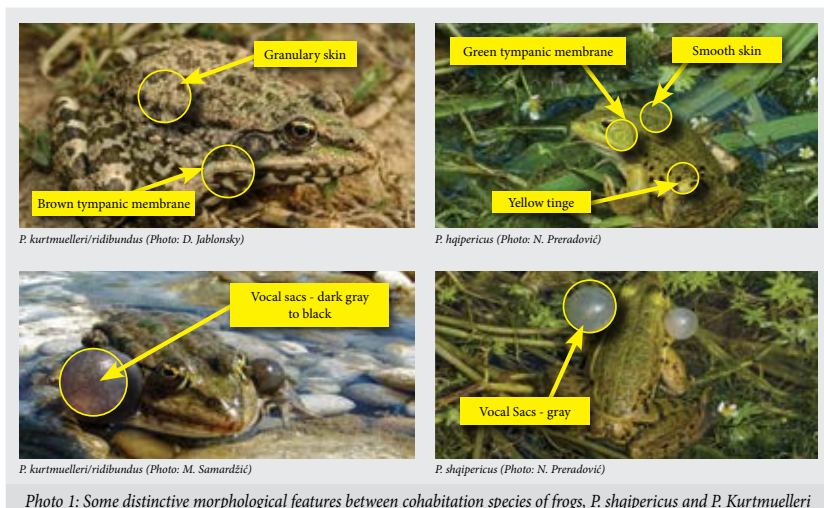
Feature	<i>Pelophylax shqipericus</i>	<i>Pelophylax kurtmuelleri</i>
Overall body size	Small to medium	Big
Skin	Smooth	Rough and granular
Tinge (reproduction period)	Yellow	Gray with white spots, very rarely yellow
Color of tympanic membrane	Green, sometimes dark green to bronze.	Brown
Vocal sacs (males)	Gray – olive green	Dark gray to black
Males croacks (songs)	Long, loud, continuous and hoarse song	Loud song, with separate and noisy calls

Table 1: Distinctive morphological characteristics among two coexistent species *P. shqipericus* and *P. kurtmuelleri*

¹² Dufresnes C., Denoël M., di Santo L. & Dubey S., 2017: Multiple uprising invasions of *Pelophylax* water frogs, potentially inducing a new hybridogenetic complex. *Scientific Reports* 7: 6506.



Identification becomes very difficult when, between these two species, crossbreedings occur and hybrid offspring with common traits are born. For this reason, it is recommended the monitoring to be done mainly during the reproductive period, in order to have a more accurate identification using the songs (croacks) of frogs. The song of these two cohabitation species in the same habitat (*P. shqipericus*¹³ and *P. kurtmuelleri*¹⁴) is different and easily distinguishable from one species to the other one (see Tab. 1)



- Larvae

All amphibians have larvae living in aquatic environment only. They are equipped with external gills and their body is divided into head and tail, making them completely different from the adult shape. Identifying larvae of the species of genus *Pelophylax* is very difficult, as they are very similar to each other. For this reason, a description of the larvae of the species *Pelophylax shqipericus* cannot be given.

3.2 Reproduction

The endemic frog of Albania (*P. shqipericus*), like all other amphibians of the Anura Order, is reproduced by laying eggs. Fertilization and egg development is external (occurs in the aquatic environment). As a result, males are not equipped with a copulation organ. The reproductive period of the species

¹³ Song of *P. shqipericus*

¹⁴ Song of *P. shqipericus*



P. shqipericus begins in late spring to early summer, a period in which the calls (songs) of males are very intense (Speybroeck et al., 2016). Because this species is little known and studies on it are very scarce, data on its life cycle remain scanty. There is a need for detailed studies to be conducted in the laboratory, in order to know the life cycle of the species.

3.3 Geographical distribution – Areal

Detailed data on the exact distribution map of the endemic frog of Albania (*P. shqipericus*) are still lacking, but based on the existing literature, it is known that this species has a natural distribution in Albania and Montenegro, starting from Lake Shkodra in the north, continuing along the coast to the area of Vlora (Orikum) in the south (Speybroeck et al., 2016) (Fig. 2).

3.4 Habitat


Pelophylax shqipericus, like other species of the genus *Pelophylax*, is a species closely related to the aquatic environment and is found in habitats such as: freshwater drainage channels with rich vegetation, swamps, wetlands with vegetation, ponds and shores of lakes, reservoirs and rivers rich in vegetation. It can often be observed basking in the sun's heat and singing over aquatic plants partially submerged in water (Jablonski, 2011; Speybroeck et al., 2016).





Map 1: Known map of the geographical distribution of Albanian frog (*Pelophylax shqipericus*).





STATUS OF THE POPULATION



4.1 Actual status at international level

Pelophylax shqipericus is a very little known species in Albania, because the interest for its study has been very low by both foreign and local researchers. Only in recent years, after the taxonomic status of the species has become clearer, the interest in it has started to grow. Studies have been few and sporadic, more focused on species distribution rather than detailed population studies. In the area of Bay of Vlora, where this document was planned to be drafted, there are no data on the species, except for the fact that it is present in some of its habitats (Saçdanaku, 2017).

The Republic of Albania has ratified all international agreements related to nature conservation, joining thus the European Community in its efforts towards global protection of the nature. Among them, it is worth noting:

- **Convention on Biological Diversity:** it is one of the basic provisions ratified by our country, the main objectives of which are the protection and improvement of existing biological diversity and the sustainable use of its components.
- **Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention):** ratified by Albania in 1999. This Convention determines the necessary measures that European countries must adopt, in order to ensure the sustainability of wild flora and fauna populations and their habitats, in particular the measures for the species found in the Annexes of the Convention. The endemic frog of Albania (*Pelophylax shqipericus*) is found in the Annex III of the Bern Convention, which specifies the protected species of wild fauna, the use of which must be in accordance with the regulation of this Convention.
- **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** where Albania was signatory in 2003 and, as such, is obliged to control the international trade of endangered species by means of a system that allows their certified import, export and re-export. Although Albania's endemic frog is not yet listed in any of the annexes of this convention, it is considered since 2004 an endangered species "EN" according to the IUCN Red List (Uzzel & Isailovic, 2009) and should be included in this protective structure.



4.2 Actual status of the species at national level

At the national level, there is still no specific document (action plan, management plan or regulation) for the preservation of the *Pelophylax shqipericus* frog. However, there are some national legal documents (acts and provisions) regulating the management and protection of the species, such as:

A. The Document of Strategic Policies on Biodiversity Protection (2016) approved by the DCM no. 31 “On the Approval of the Document of Strategic Policies on Biodiversity Protection”. In line with global objectives (Aichi) of biodiversity, by 2020 and in a broader framework of the United Nations Decade on Biodiversity (2011-2020), the Document of Strategic Policies on Biodiversity Protection (2016) has identified the priorities, goals and specific national biodiversity objectives as follows:

- By the end of 2015, revision and approval of a strategic document on biodiversity (DPSMB) - in accordance with the objective (Aichi 17);
- By 2020, approximation and implementation of the EU acquis in the field of nature’s protection;
- By 2020, creation of a target of conservation of 17% of interior water-land areas and 5% of maritime, coastal areas. Establishment of the National Ecological Network of Albania, as an integral part of the Pan-European Ecological Network (PEEN) - in accordance with the objective (Aichi 11);
- Rehabilitation of at least 15% of degraded areas through conservation and restoration activities - in line with biodiversity objectives (Aichi). This action will be achieved through the implementation of management plans for protected areas and through the implementation of action plans in particular for species and habitats;
- More sustainable agriculture and forestry, in line with biodiversity objectives;
- Implementation of the Nagoya Protocol, on accessing and sharing the benefit of genetic resources and the benefits arising from their use - in accordance with the objective (Aichi 16);
- Awareness of biodiversity - in line with the objective (Aichi 1).

Regarding the harmonization of the legislation on nature conservation and biodiversity, Albania has made progress, which is highly valued. One of the main obligations, that of harmonizing the national legislation with European legislation in the field of biodiversity conservation, is almost complete.



B. Legal acts on nature conservation and biodiversity

- **Law no. 9587, “On biodiversity protection”, amended (2006)**
 - Law no. 37/2013 “For some changes and additions to the Law no. 9587, date 20.7.2006 “On biodiversity protection”.
 - Law no. 68/ “For some additions and changes to the Law no. 9587, date 20.7.2006 “On biodiversity protection”, amended.”
 - Law no. 41/2020, date 23.04.2020 “For some changes and additions to the Law no. 9587, date 20.7.2006 “On biodiversity protection”, amended.”
 - (This law is partly harmonized with the European legislation regarding the compliance measures of users by the Nagoya Protocol on the access to genetic resources and the fair and equal sharing of the benefits of their use in the Union).

- **Law no. 10 “On protection of wild fauna”, amended (2008)**
 - Law no.10 137, date 11.5.2009 “For some changes in the legislation in force on licenses, authorizations and permits in the Republic of Albania”.
 - Law no. 41/2013 “For some changes and additions to the Law no. 10 006, date 23.10.2008 “On protection of wild fauna”, amended”.
 - Law no. 46/2019 “For some changes and additions to the Law no. 10 006, date 23.10.2008 “On protection of wild fauna”, amended”.
 - (Article 1, Title of the law is changed to: “On protection and conservation of wild fauna”).

- **Law no. 9867, “On rules and procedures for international trade of endangered species of flora and fauna”, amended (2008)**
 - Law no. 40/2013, date 14.02.2013 “For some changes to the Law no. 9867, date 31.1.2008 “On the definition of rules and procedures on international trade of endangered species of wild flora and fauna”.
 - Law no. 5/2015, date 12.02.2015 “For a change to the Law no. 9867, date 31.1.2008, “On the definition of rules and procedures on international trade of endangered species of wild flora and fauna”, amended.
 - Law no. 15/2018, date 05.04.2018 “For a change to the Law no. 9867, date 31.1.2008 “On the definition of rules and procedures on international trade of endangered species of wild flora and fauna”, amended.

- **Law no. 81 “On protected areas” (2017)**

It represents the harmonization to a large extent of national biodiversity



conservation legislation with that of the EU. This law comprises a special section (section V) dedicated to protected areas of international interest and, in particular, to “Natura 2000” areas.

C. Legal acts on management and practices used in agricultural sector

- **Law no. 9244, “On protection of agricultural land”, amended (2004)**
It determines the implementation of a good agricultural practice. It states that the owners of agricultural land and other legal possessors have the duty, through a good agricultural practice, to ensure: administration, use and maintenance, within the territory of the land owned by them, of drainage system, irrigation system, works of art and the protection of agricultural land from floods, according to the provisions set out by the Law no. 24/2017 “On the administration of irrigation and drainage”.
- **Law no. 24 “On the administration of irrigation and drainage” (2017)**
The Ministry of Agriculture has, among other things, the following duties and responsibilities: it advises and guides irrigation and drainage directorates, municipalities and organizations on legal, technical and financial issues; performs technical and physical control of irrigation and drainage systems and of flood protection works; monitors the quality of irrigation and drainage waters and that of soils under the system of these waters, etc. (This monitoring is performed through the Institution of Dependance, Agricultural Technology Transfer Center in Fushë-Kruja, which has scientific research laboratories.)
- **Law no. 10 390, “On fertilizers used in agriculture”, amended, (2011)**
Its objectives are to protect the lives and health of humans and animals, to protect the consumers, as well as to help preserve the land and protect the environment; therefore, according to this law, controlled and environmentally friendly fertilizers should be used.
- **Law no. 105/ “On protection of plants”, (2016)**
It aims to ensure the reduction of risks and impacts of Plant Protection Products (PPPs) on the health of users, consumers, animals and the environment, as well as the integrated control of parasites, through their sustainable use. Very poisonous PPPs are used only by professionals, who are graduates in the field of agronomy or persons who have completed suitable



trainings for the use of very dangerous PPPs and are equipped with special skills certificates for their use. Treatments with PPPs should be done with tools and machinery according to the legislation in force for the machinery, the legislation that includes machinery for the use of PPPs, to ensure the safety of the health of users, environment, plants and plant products where they are used.

D. Institutions and organs responsible for nature protection and biodiversity

▪ *Ministry of Tourism and Environment*

In the territory of the Republic of Albania, this ministry is the highest policy-making and regulatory institution for the protection, use and sustainable development of natural resources. In fulfilling the role it represents, it is engaged through the coordination and cooperation of responsible structures such as institutions, directorates and departments under its dependence, such as:

- National Agency of Protected Areas (NAPA - AKZM) and Regional Administrations of Protected Areas (RAPA - AdZM);
- National Environmental Agency (NEA - KTA) and Regional Directorates of Environment (RDE - DRM) and inspection structures in the field of environment;
- National Forests Agency.

In the field of nature protection, the Ministry of Tourism and Environment cooperates with international and national institutions, at central and local level, such as:

- ***The Ministry of Agriculture and Rural Development***
- ***The Ministry of Infrastructure and Energy***
- ***The Ministry of Interior***
- ***The Agency for the Support of Local Self-Government***
- ***The General Directorate of Customs***
- ***Educational, research and scientific institutions***
- ***International and national organizations***
- ***Different associations and NGOs***

The Law on Biodiversity Protection, in support of the provisions of the Bern Convention, defines two categories of protected species, which are named



strictly protected species and protected species. The category of strictly protected species includes wild species that are endangered by extinction in the Republic of Albania. The use of these species is prohibited or strictly controlled. Protected species are those that enjoy legal protection, and the possibility of using their population is provided by legal provisions.

It is worth mentioning that, a significant part of the habitats of *P. shqipericus* is included within the territories of protected areas, which are managed and controlled by the National Agency of Protected Areas (NAPA - AKZM) since 2015.

Albania's endemic frog, due to its unclear taxonomic status, has not yet been included in the Red List of endangered species of Albanian flora and fauna (2013).







THREATS



On a global scale, amphibians are considered one of the most threatened taxonomic groups (Gibbons et. al., 2000; Alroy, 2015), with almost half of the species in a steady decline of their populations (Stuart et. al., 2004). Based on the existing literature, the biggest threatening factors for the population and habitats of the endemic frog of Albania are considered as following (Gratwicke et. al., 2010; Barrios et.al, 2012):

- ***Loss, fragmentation and degradation of habitats:***

Referring to the studied area, it is defined as an interurban area, where development activities in the agricultural sector are practiced. The area has property owners who operate in the agricultural sector. Among the main directions showing an impact on the species are:

- erroneous practices followed in the management of the irrigation canal system (their periodically cleaning);
- the process of drainage, in order to dry the marshes for deriving new agricultural lands; urbanization, industrialization and intensification of agriculture.

- ***Significant population decline / mortality, wich may derive from:***

- lack of water passage from one habitat to another, due to road infrastructure, which brings also the killing of frogs on road;
- pollution of water by pesticides (due to intensification of agriculture) or by other pollutants;
- alien species introduced in water basins, which are mainly fish feeding on frog larvae;
- various diseases caused by bacteria, fungi or viruses, which affect both larvae and adults, causing massive deaths.

- ***Illegal hunting and gathering***

The development of agritourism around the area favors malicious initiatives for many species (specifically for frogs) by defining as a direct threat the illegal actions of frogs' collection for trading purposes (within the country, in various restaurants, but also to be exported abroad).





CASE STUDY - BAY
OF VLORA



To design the draft of conservation measures for the species (an action plan), it is very important to first collect data on the status of the population of the species in the area.

In order to collect data in the field, a study visit was planned, which was conducted on 22 - 25 July, 2019.

6.1 Area of study

During the first visit to the study area, important data were collected on the presence and abundance of the species *Pelophylax shqipericus*, its habitat and threats. The monitoring was focused on two main areas within the Bay of Vlora: the wetland complex of Narta and the wetland of Orikum (Figs. 3, 4). These two areas have been selected, because they offer a wide variety of suitable habitats for *Pelophylax* frog (numerous freshwater and saltwater canals and marshes, rich in dense vegetation) (Miho *et. al.*, 2013¹⁵ ; Saçdanaku, 2017). Below is presented a short description of each of these areas:

6.1.1 Wetland complex of Narta

It is positioned in the north-west of the city of Vlora, in the Adriatic Sea, with central geographical coordinates 40° 32' N latitude, 19° 28' E longitude. The main water surface of the complex, with an average depth of 0.8 m, is one of the largest lagoons in Albania (the second after that one of Karavasta), with an area of 3,500 ha (saltworks not included) (Pano, 1984). In the northern part, there is the Skrofotina saltworks with an area of 1,500 ha, which is separated from the lagoon by a 5.5 km long seawall. To the west of the seawall, the saltwater supply channel from the lagoon is found. On the eastern shores, there is the Pana-ja drainage collector. Through this drainage collector, the continental waters of the eastern basin of this lagoon are collected and discharged into the lagoon. In the northwestern part, there is the Akernia drainage

¹⁵ Miho A., Kashta L., Beqiraj S. (2013): *Between the Land and the Sea - Ecoguide to discover the transitional waters of Albania*. Julvin 2, Tiranë. 1 – 462. ISBN 978-9928-137-27-2.



collector, which serves to discharge the in the sea the continental waters coming from the northern part of the lagoon watershed.

The lagoon communicates with the sea through two artificial canals: the Great Dajlan in the north, 660 m long and 30 m wide, and the Little Dajlan in the south, about 70 m long and 16 m wide. Through these canals, the process of water exchange with the sea takes place during periods of high and low tides, but both canals are often blocked due to sediment deposits (Pano *et al.*, 2007).

Due to the low water exchange rate of water between the lagoon and the Adriatic Sea, low depth and high evaporation rate, the total surface area of the lagoon during the hot season is reduced by 30%. (Shehu *et al.*, 2010)¹⁶

The complex around the lagoon includes various types of habitats, such as: uncultivated saline soils, agricultural lands in the eastern part of the lagoon, quite sizable sand dunes in the mouth of Vjosa River, the Mediterranean forest of Pische Poro, the old riverbed and the coastal wetlands.

Geographical position and climatic conditions have favored the area to be frequented by a large variety of organisms, causing the area to be included in the network of areas with a protected status.

• ***The status of the protected area:***

- *Protected landscape “Vjosa-Narta”, category V of IUCN - approved with the DCM no. 680, date 22.10.2004, “For the proclamation of the wetland system Vjosa-Narta as a protected water/ground landscape”.*
- *Important Birds Area (IBA) as a habitat for migratory birds, approved by the Order the Environment Minister no. 283, date 10.04.2013, “For the approval of the list of wetland coastal areas, which serve as habitats for migratory birds”, amended.*
- *Area of the EMERALD network – The EMERALD network includes Areas of Special Conservation Interest (ASCI) identified in countries that have ratified the Bern Convention to meet the obligations arising from the latter and are sisterlike countries of the European Union’s Natura 2000 ecological network. (In Albania there are 25 areas included in the EMERALD Network, approved by the Bern Convention, in December 2012.)*

¹⁶ Shehu M., Shabani L., (2010): Identification of Pollution Level of Coastal Waters in the Lagoons of Narta and Orikum, Through the Physical-Chemical and Bacteriological Indicators. Proceedings of 4th International Scientific Conference on Water Observation and Information System for Decision Support (BALWOIS), Ohrid, Republic of Macedonia, 25-28 May. Pp. 1 – 9.



6.1.2 Wetland complex of Orikum

It is located in the south-western area of the district of Vlora, with central geographical coordinates 40° 19' N latitude; 19° 25' E longitude. This wetland is presented today with a very reduced part of about 4 km² because in this zone took place at the same time the interventions of deforesting the area and its enrichment with organic materials (woods, trees and snags) and the application of drainage canals system, which drastically changed the character of the area, because most of its surface, since 1970, has been turned into agricultural land, thus losing its natural values (Miho *et. Al.*, 2013)¹⁷

The Orikum lagoon is an integral part of this wetland, positioned at the southernmost edge of the Dukati Bay. The lagoon originated from a coastal depression, it is located mainly on the alluvial deposits of the Dukati River and is separated by the sea by a littoral ridge. It has an area of 1,500 ha. Its maximum depth goes up to 3.5 m while the average depth is 2.5 m (Phare, 2002). The lagoon is connected to the sea through two canals, one of them is artificially opened. This canal is located in the eastern part of the lagoon, almost adjacent to the Pashaliman Military Base checkpoint. The canal is short (Dajlan canal) and has a very low water flow.

The water capacity of the canal is insufficient, as a result of the reduction of inflows, therefore, in certain periods, there are changes in the water level of the lagoon. This makes possible to notice frequent changes in its hydrology. The chemical composition of lagoon waters varies according to the amount of water in the lagoon, according to the different seasons and different periods of tidal waves in the sea. Also, due to the flowing of fresh water to the lagoon from the waters of the Dukati area, the salinity of the water in different parts presents great variations, ranging from 15 to 27 ‰ (Tirana Hydrometeorological Institute, 2001).

- **Status of the protected area** – in the territory of the natural complex of Orikum two protected areas are defined:

¹⁷ Miho A., Kashta L., Beqiraj S., (2013): *Between the Land and the Sea - Ecoguide to discover the transitional waters of Albania*. Julvin 2, Tiranë. 1 – 462. ISBN 978-9928-137-27-2.



- **National Park Llogara (1010 ha) - (Category II, IUCN).**
- **Managed Natural Reservation Karaburun (20000 ha) - (Category IV, IUCN).**
- **Area of the EMERALD network** - The EMERALD network includes Areas of Special Conservation Interest (ASCI) identified in countries that have ratified the Bern Convention to meet the obligations arising from the latter and are sisterlike countries of the European Union's Natura 2000 ecological network. (*In Albania there are 25 areas included in the EMERALD Network, approved by the Bern Convention, in December 2012.*)
- **Maritime National Park Karaburun-Sazan (12,428 ha) - (Category II, IUCN).** With DCM no. 289, date 28.4.2010, "On the proclamation as "National Park" of the natural marine ecosystem near the Karaburun Peninsula and Sazan Island" (amended), the protected area has been added inside the boundaries of this natural complex.

6.2 METHODOLOGY

6.2.1 Monitoring plan (scheme)

For the monitoring of *P. shqipericus* species, it is recommended to apply the occasional visual surveillance method. This method is easily applicable, inexpensive, very effective, in several habitats and has a low disturbance scale (does not include capture and direct interaction with the animal) and, therefore, a low death scale (Manley, al. 2004).

This method is applied in the field through linear transects where the species is encountered. A transect is considered to be a linear or circular segment (depending on the type of habitat), where an individual walks from point A to point B along a certain path (Fig 3). The person (s) (it is recommended to be at least two people in the field) who will carry out the monitoring, will count along the transect the number of individual animals encountered (for example x number of individuals in a longitude transect 100 , from point A to point B (Fig. 3)



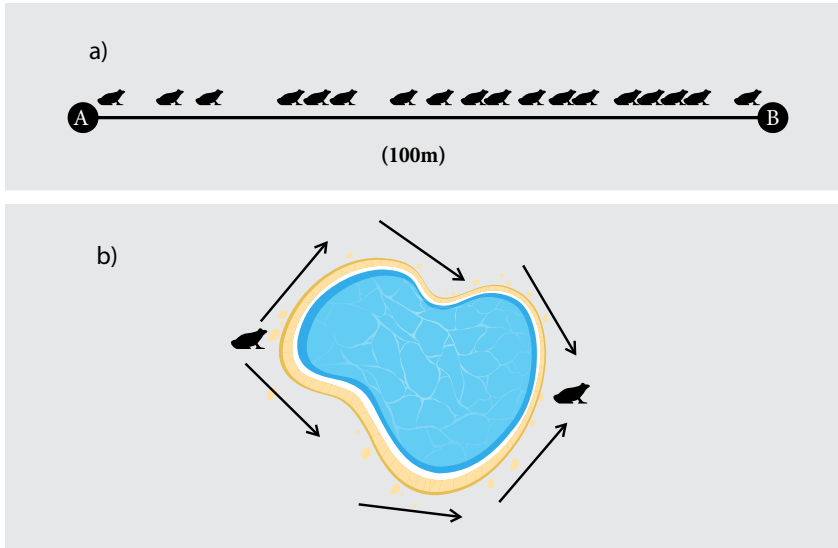


Figure 1: Demonstration scheme of monitoring trasects: a) linear transect along the banks of a river, canal etc.; b) circular transect along the banks of a lake, reservoir, pond.

The longitude of the transect depends on the habitat where monitoring will be carried out, but it can mainly vary from 50 m (minimum) to 300 m (maximum).

Using this method, the total number of individuals per unit of transect can be determined and in this way the Relative Abundance Index (RAI) is calculated, as a ratio between the number of individuals monitored and the longitude of the transect (m):

$$\text{RAI} = \text{Number of individuals} / \text{longitude of the transect (m)}$$

This calculated index will then be used to compare the abundance of *P. shqipericus* individuals monitored in different habitats within the study area.

During the trasect monitoring process, each individual monitored (with free eyes or binoculars) or heard (by song) will be recorded in the data card (monitoring protocol).

The monitoring will be done during the day, in hot and sunny weather,



with a very light wind or no wind at all, mainly between 10.00 - 18.00, period during which the frogs, as ectothermic animals, are expected to be active and present (Manley et al., 2006)

It is recommended that, the endemic Albanian frog be monitored four times during the breeding period, after a regular monthly interval in spring, from late March to mid-June or late June. In this way, a follow-up process will be carried out four times during the season, each month (March, April, May, June).

The following devices are required to perform monitoring according to the above mentioned protocol:

- Notebook (data sheets)
- Mobile GPS
- Binoculars
- Boots
- Photographic camera
- Water and air thermometer
- Voice recording device (smart phone)

6.2.2 Methodology used for the case study

Taking into consideration the fact that data on species *Pelophylax shqipericus* for the studied area in question are scarce or almost missing, as well as time limitations, for the collection of preliminary data during the field trip, the above mentioned methodology was not used (with transects) during the field trip, but general circumstantial data was collected for the species by visiting previously identified habitats as potential ones for the species *P. shqipericus*.

By applying this method, before starting to work in the field, using Google Earth¹⁸, possible monitoring sites were first identified. (Figs 3, 4). These have been identified as suitable areas for the species *Pelophylax shqipericus*, mainly according to the criteria for selection of the habitat of the species itself. During the fieldwork, some of these areas (sites)

¹⁸ <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2a-hUKewjg1Jfv-LnAhUMKMAKHeWKAbQQFjAAegQIDxAH&url=https%3A%2F%2Fwww.google.com%2Fearth%2F&usq=AOvVaw3freuxr1Pi1nUMJOSr2qDm>



were excluded from the monitoring process because there was no water (dry sites) and some were inaccessible due to the dense vegetation.



Map 2: Locations (sites) previously identified for monitoring *P. shqipericus* in the wetland complex of Narta (sites 1-8)





Map 3: Locations previously identified for monitoring *P. shqipericus* in the wetland complex of Orikum (sites 9-12)

For each habitat visited, the presence or absence of the endemic Albanian frog (*P. shqipericus*) was first identified by surveillance with free eye or binoculars. (Fig. 5). Monitoring is carried out mainly in the morning (between 08:00 - 12:00) and in the afternoon (16:00 - 19:00), period during which the activity is high. In order to make an accurate identification of the species *P. shqipericus*, some of the individuals are fished with a simple hand net and examined closely. Apart from the identification based on morphological particularities (see table 1 and fig. 1), during the monitoring process, special care was taken to listen (record) the voice (songs) of the frogs. As mentioned above, the songs of the two species of frogs that share the same habitat (*P. shqipericus* and *P. kurtmuelleri*) are totally different and easily identifiable. For this reason, surveillance of certain habitats is carried out at night, during which time vocal activities (calls) are more important. Each individual captured is photographed and released into the habitat. In addition, data are collected for the type of habitat and its situation, threatening factors, etc. In these habitats, where the presence of the species *P. shqipericus* has been identified, monitoring transects were conducted, in addition to the enumeration of the individuals monitored.





Photo 2: Moment from the field: a) identification of the endemic frog of Albania from expert Dr. Enerit Saçdanaku; b) *Pelophylax shqipericus* identified in the wetland complex of Orikum.

6.3 Results

During the field study, carried out from 22 to 25 July 2019, it was possible to identify around 12 habitats (sites) in which the presence of the endemic Albanian frog (*P. shqipericus*) was identified (Fig. 6).

The following table (tab. 2) provides detailed data on the habitats, the number of individuals observed, the coordinates and the threats identified for the species in each habitat.

In total, around 170 individuals of *P. shqipericus* have been observed, but the population can be very high, because in certain areas, due to the difficulty of access, no surveillance has been carried out. More complete information, on the type abundance of the population in the study area will be provided after the second field visit in March 2020. However, on the basis of these data, we can say that the population of this type *P. shqipericus* appears to be in very good and stable condition in the region of Orikum, the freshwater canal of the church of Marmiro (n° 4 in table 2). In this habitat, the greatest number of individuals (85) compared to all the other habitats was observed. However, more studies are needed to reach a more precise conclusion on the state of the population.





Map 4: Localities (sites) where the presence of *Pelophylax shqipericus* has been identified on the region of Bay of Vlora (sites: 1 – 12).





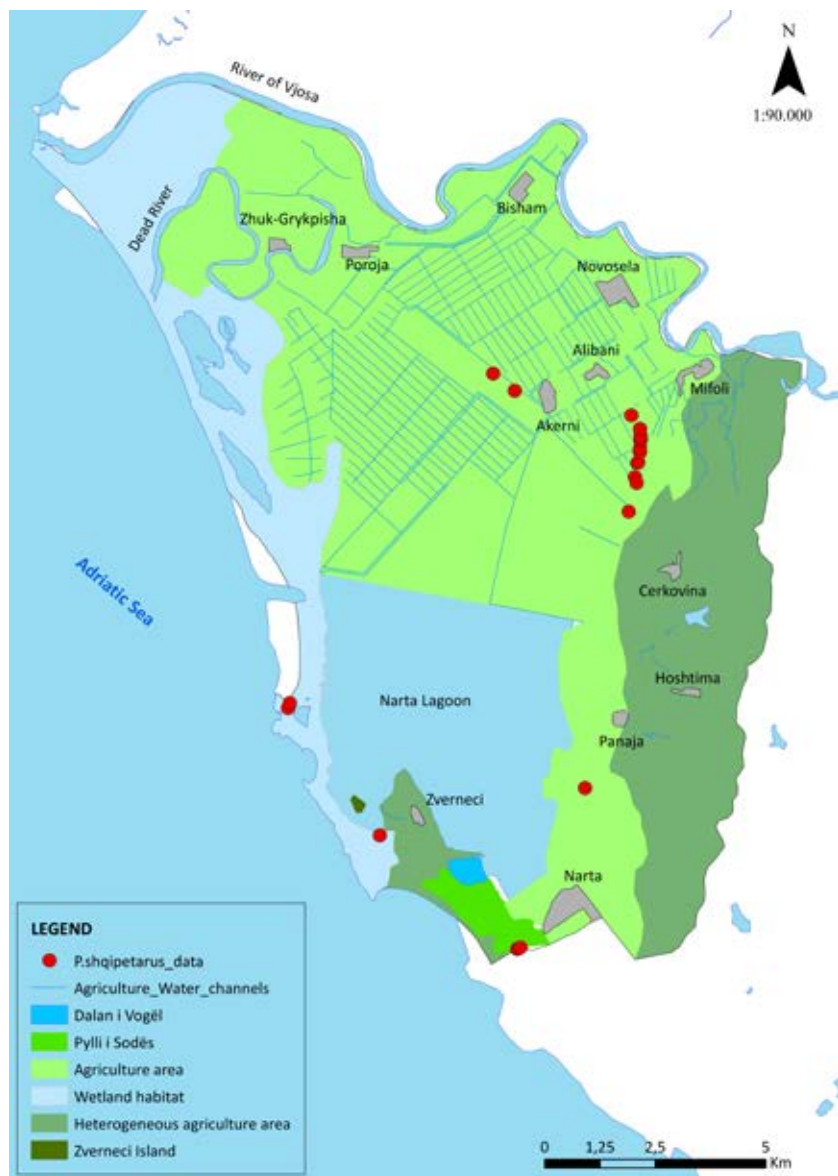
Photo 3: Typical habitats where we encounter *Pelophylax shqipericus* species (Photography: E. Saçdanaku)

With regard to the habitats of the frog *P. shqipericus*, it has been observed that it prefers habitats such as: clear water canals, with a calm flow and much vegetation as well as freshwater ponds covered with vegetation (Fig .7).

6.4 Distribution (maps)

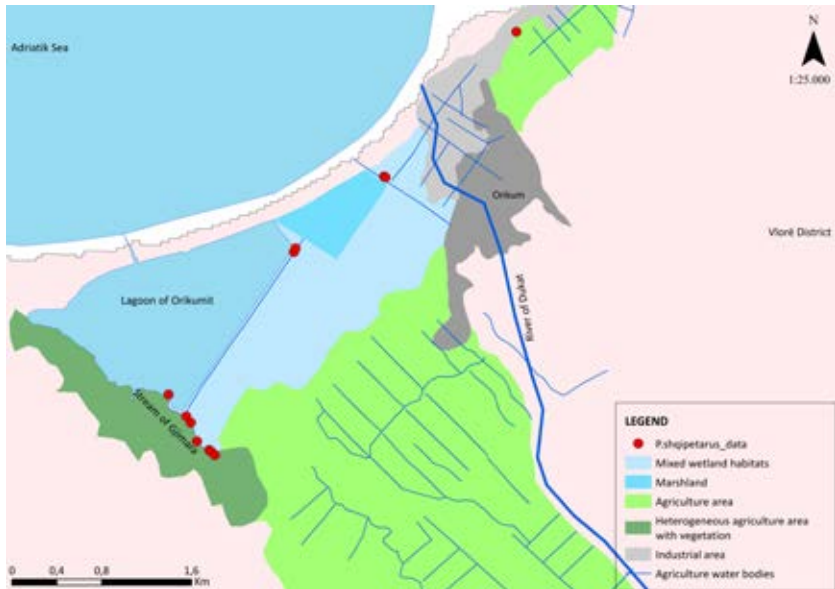
During the expeditions in the area of bay of Vlora, the biodiversity expert collected data on the presence of the Albanian frog, then at a later time, this data was used by the GIS expert to process maps for the area.





Map 5: Map of habitats of *P. shqipericus* in the wetland complex Vjosa - Narta



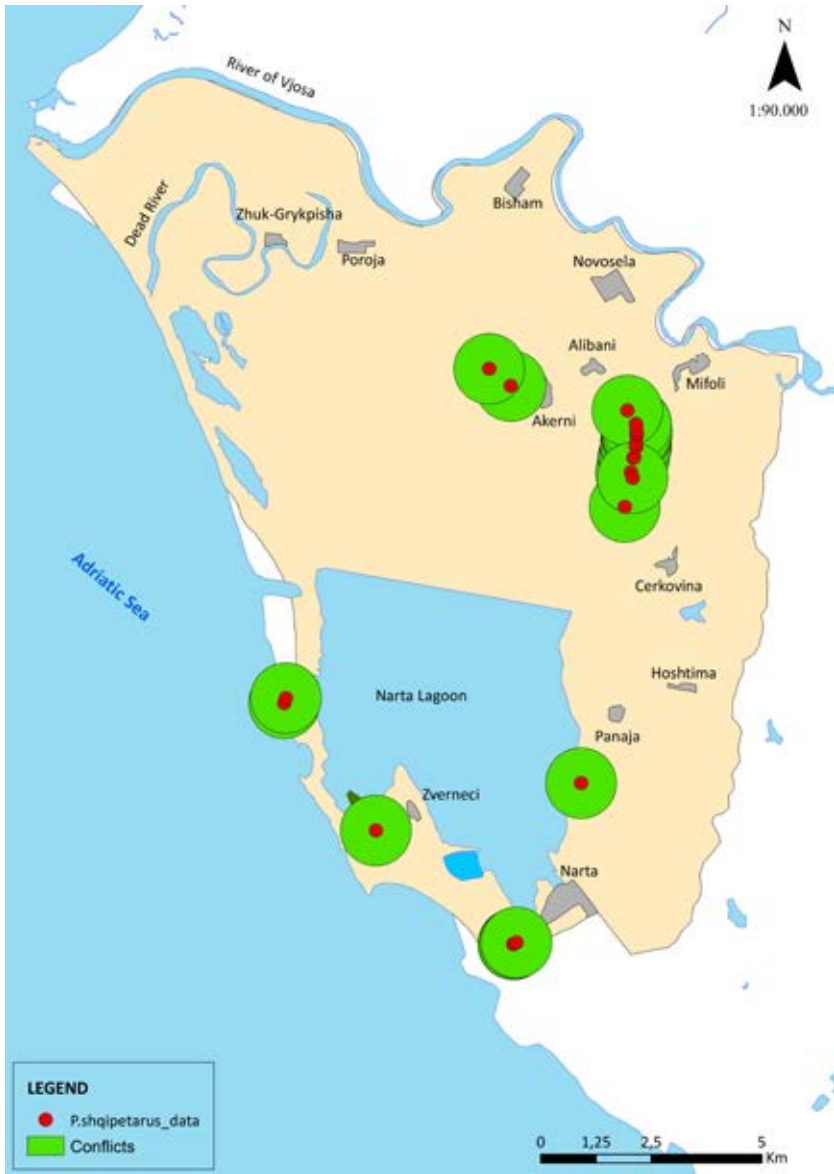


Map 6: Description of habitats in the wetland complex of Orikum



Map 7: Map of pressors for the Albanian frog (*Pelophylax shqipericus*) in the wetland complex of Orikum





Map 8: Map of pressors for the Albaina frog (*Pelophylax shqipericus*) in the wetland complex Vjosa – Narta.





Map 9: Presence of the species *Pelophylax shqipericus* in the wetland complex Vjosa – Narta.



6.5 Threats

In addition, during the first field study carried out in the area of Bay of Vlora, almost the same threat factors were identified. Table 2 shows the threatening factors for each habitat visited, where it is noted that indiscriminate collection of the species for commercial purposes is presented as one of the main factors. In one of the habitats (Saltworks Canal - Bishan: a permanent canal with dense vegetation dominated by *Ph. australis*, *Typha sp.*, *Tamarix sp.*, Aquatic algae *Chara sp.* etc.) the frog collection process was directly observed in the field, from certain individuals who, after collecting them (method of catching using fishing hooks with nylon socks and frog skins), sold them to the Novosele Collection and Export Center. According to the person who collected the frogs, the area where they operated was mainly around the Narta wetland complex, not in Orikum.

Other threatening factors for the *P. shqipericus* population identified in the field during the first study visit were also: interventions, disturbances in the habitat following the cleaning of the canals; drying of the canals due to the use of water for irrigation by the inhabitants of the surrounding villages; heavy pollution from waste dumped by restaurants, or pollution by sewage, etc.

Nr.	Data	ID No.	Coordinates	Region/locality	Habitat	Threats
1	22/07/2019	20	N40° 35.132' E19° 28.380'	Lagoon of Narta (Skrofofotine – close to the Saltworks)	Temporary drainage canal	Fragmentation of the habitat, lack of underpass passages (connecting bridges).
2	22/07/2019	20	N40° 35.30" E19° 28.41"	Lagoon of Narta (Saltworks Canal –Bishan)	Permanent Canal with dense vegetation dominated by <i>Ph. australis</i> , <i>Typha sp.</i> , <i>Tamarix sp.</i> , water alga <i>Chara sp.</i> etc.	Assembly without criteria of the species for commercial purposes (foreign export to Italy as well as food in different restaurants in the interior of the country. Species gathering point in Novosele.
3	23/07/2019	7	N40° 19.32" E19° 27.24"	Orikum (Marsh of Orikum)	Small basin surrounded by vegetation dominated by <i>Ph. australis</i> close to wastewater treatment plant	Water pollution
4	23/07/2019	85	N40° 18.62" E19° 26.47"	Orikum (Canal coming from the church of Marmiroi)	Permanent canal with clean, fresh water with rich vegetation.	Accidental fall in the fishing nets and hooks, due to the high activity of artisanal fishing in this habitat.
5	23/07/2019	10	N40° 19.69" E19° 27.80"	Orikum close to town (The marsh)	Small basin with dense vegetation.	Water pollution
6	23/07/2019	2	N40° 20.39" E19° 28.62"	Orikum	Small canal with little water and dense vegetation along the Orikum - Radhima road.	Water pollution



7	24/07/2019	3	N40° 31.32" E19° 27.66"	Close to village Panaja	Water basin (reservoir) with dense vegetation dominated by <i>Ph. Australis</i> , <i>Typha</i> sp., water algae <i>Chara</i> sp. etc.	Pollution by various waste, collection point of waste from surrounding villages. Collection without criteria of species for commercial purposes.
8	24/07/2019	3	N40° 35.06" E19° 28.40"	Close to village Skrofotine	Permanent freshwater canal stripped of surrounding vegetation, but with a strong presence of algae in water (<i>Chara</i> sp.), as well as covers with underwater plants of the genus <i>Lemna</i> .	Interventions, disturbances of the habitat resulting from the cleaning of the channels. Collection without criteria of the species for commercial purposes.
9	24/07/2019	5	N40° 36.16" E19° 26.42"	Close to village Akërne	Temporary canal with very little water rich in vegetation dominated by <i>Ph. australis</i> .	Interventions, disturbances of the habitat resulting from the cleaning of the channels. Drying of the canal due to the use of water for irrigation by the villagers. Collection without criteria of the species for commercial purposes.
10	25/07/2019	?	N40° 30.69" E19° 24.39"	Lagoon of Narta. Zvërnec (Monastery)	Freshwater basin (marsh) with dense vegetation dominated by <i>Ph. australis</i> , <i>Typha</i> sp., genus of algae <i>Chara</i> .etc.	Drying during the summer due to the use of water for irrigation by the villagers. Collection without criteria of the species for commercial purposes.
11	25/07/2019	5	N40° 32.23" E19° 22.88"	Lagoon, marsh called "Limpu", near the beach of Porto Novo.	Ponds and freshwater canals with dense vegetation dominated by <i>Ph. australis</i> , <i>Typha</i> sp., Algae of the genus <i>Chara</i> . etc.	Collection without criteria of the species for commercial purposes.
12	25/07/2019	10	N40° 29.33" E19° 26.62"	Forest of Soda close to Kavalona parc	Permanent freshwater canal, rich in vegetation dominated by <i>Ph. australis</i> .	Collection without criteria of the species for commercial purposes. Heavy pollution from waste dumped by restaurants.
TO-TAL		170				

Table 2: Data collected for species *P. shqipericus* in the region of the Bay of Vlora, during the expedition in the field.





PLAN OF
MEASURES FOR THE
CONSERVATION OF
SPECIES



A number of conservation measures will be proposed for the species *Pelophylax shqipericus*, in order to mitigate (reduce) the impact of threatening factors and, therefore, prevent the decline of the population of the species in the Bay of Vlora.

The measures proposed in this document will be practical and applicable depending on the existing infrastructure of the responsible institutions that implement them. They will be given taking into account the ecological requirements of the *P. shqipericus* species.

Proposed structure:

7.1 Goal

The overall goal of this document with protective measures (action plan) for the endemic Albanian frog (*P. shqipericus*) is to improve the conservation status of its population in the area of Bay of Vlora.

7.2 Objectives

To achieve this objective, it is necessary that the threats identified for the population and the habitat of the species *P. Shqipericus* in the studied area to be minimized (mitigated, surmounted). Thus, the following objectives are very important to be taken into consideration during the process:

Objective 1: Control of the main threat factors which directly affect the species, such as indiscriminate collection for commercial purposes, deaths caused by various parasitic diseases or road accidents, as well as the hunting (eating) of larvae by other introduced species.

Objective 2: Control the main threatening factors affecting the habitats where the species meets, in particular the loss and degradation of many aquatic spaces (canals, swamps, reservoirs) and other breeding habitats.



7.3 Measures proposed for the conservation of the species

In order to achieve the objectives set out above, a list of conservation measures (activities) is given in the following table (Table 3), where, depending on the threat factors, they are classified into 6 categories as follows:

- Habitat management and improvement
- Reduction or avoidance of habitat fragmentation
- Reduction in species deaths and recovery of the population
- Scientific studies and research
- Cooperation in the implementation of the document with conservation measures (action plan)
- Public awareness, education and information



No.	Activity	Priority ¹	Duration ²	Institution/ Responsible Actors	Suggestions/Proposals
Management and improvement of habitats					
1	Mapping the important areas where the species meets in the study area and identification of new areas where data are lacking.	High	Short term (1-3 years)	Research scientific institutions; Environmental NGO-s.	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
2	Undertake and implement monitoring activities in areas where data are lacking.	High	Short term	Scientific research institutions; Agency of Protected Areas in Vlora; Environmental NGOs.	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
3	Conservation, maintenance and restoration, successful management of existing habitats (canals, swamps, freshwater ponds) that serve as breeding grounds for the species.	High	Permanent	Research scientific institutions, Ministry of Tourism and Environment, Agency of Protected Areas in Vlora; local Authorities.	Taken into consideration by AKZM (National Agency for Protected Zones), for integration into a separate chapter / annex when developing "Protected area management plans" and "Action plans for the conservation of threatened and endemic species". (For example; when writing the new management plan, for PM Vjosa - Narta)
4	Creation of new zones, serving mainly for the reproduction (for example, creation of a pond) around the existing habitats.	Middle	Short term (1-5 years)	Scientific research Institutions, Ministry of Tourism and Environment; Agency for the Protected Zones in Vlora, local Authorities, Community, (land owners).	Inclusion of this activity in the concrete Project- proposal.
5	Preparation of a guide (manual) with information on techniques, methods on how to successfully restore or manage the habitats where the species meets and the criteria which must be met by a new area (habitat) which can be created as a breeding ground for the species.	High	Short-Term	Scientific research institutions; Agency dealing with wildlife conservation or Environmental NGOs.	Inclusion of this activity in the concrete Project- proposal.
6	Urge and promote best agricultural practices friendly to environment (such as: reducing the use of pesticides and the use instead of environmentally more friendly alternatives) in areas where the species is present.	Middle	Long-Term (up to 10 years)	Responsible agricultural institutions (Ministry of Agriculture etc).	Inclusion of other actors, such as: Local Government Authorities (Municipalities).



Reduction and avoidance of habitat fragmentation

7	<p>Construction of connecting bridges between fragmented habitats for various reasons (for example a tunnel which will connect the two canals disconnected by the construction of a road) thus creating the continuity of the habitat and the free movement of individuals <i>P. Shqipericus</i> frogs between two parts of the habitat.</p>	Middle	Mid-Term	<p>Institutions (authorities) responsible for road transport, agencies dealing with wildlife conservation or environmental NGOs.</p>	<p>Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal. AKZM and AdZM should suggest / request the authorities responsible for the design of the project, the construction of these "bridges / connection paths", when their consent is requested for infrastructure projects, in protected areas and should request the implementation entities their application.</p>
8	<p>In cases where there is no possibility of creating bridges, the construction of freshwater ponds and other habitats for species on both sides of the road should be considered as an alternative, in order to reduce the effect of habitat fragmentation and as a result, have as few road deaths as possible for individuals of <i>P. shqipericus</i>.</p>	Middle	Mid-Term	<p>Scientific research institutions; Ministry of Tourism and Environment; Agencies dealing with wildlife conservation or Environmental NGOs.</p>	<p>Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal. AKZM and AdZM should suggest / request the authorities responsible for the design of the project, the construction of these "bridges / connection paths", when their consent is requested for infrastructure projects, in protected areas and should request the implementation entities their application</p>

Reduction of species deaths and recovery of the population.

9	<p>Identification of actors or companies involved in the collection of <i>P. Shqipericus</i> frogs for commercial purposes and conclusion of various agreements with them, in order to minimize the collection without criteria of the species. Here, this can be seen as an opportunity to differentiate the species, to select the trading species target <i>Pelophylax kurtmuelleri</i> and to exclude the collection of the threatened species <i>P. shqipericus</i>. Although the differentiation of the two types is very difficult to make, it must be considered as an opportunity to compensate the actors involved in order to stop the trade of this threatened species for export (abroad) or food in various restaurants in the country.</p>	High	Short-term	<p>Ministry of Tourism and Environment, Agency for Protected Zones in Vlorë, Local Authorities (Municipality), Responsible authorities for food control (AKU), etc.</p>	<p>Inclusion, in addition to the National Food Agency, of the General Directorate of Customs, for export controls or annual quotas set for exports.</p>
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	<p>10</p> <p>Carry out studies, monitoring and the presence of foreign exotic species of fish in the aquatic habitats where <i>P. shqipericus</i> is present, in order to avoid the population decline which would result from the consumption of larvae of fish frogs.</p>	High	Permanent	Scientific Research institutions, Ministry of Tourism and Environment, Agency for Protected Zones in Vlora	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
11	Conduct studies (in real laboratories), monitor the presence of various parasites (bacteria, viruses, fungi, etc.) in individuals of <i>P. shqipericus</i> collected from any habitat in the study area in order to identify them and then take steps to prevent the spread of the disease in the population.	High	Permanent	Scientific Research institutions, Institute of Veterinary Researches, Agricultural University, Ministry of Tourism and Environment	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
12	Adaptation of road infrastructure construction projects near <i>P. shqipericus</i> habitats according to criteria that avoid habitat fragmentation (see activity 7), in order to reduce the number of road fatalities. (road kills).	Middle	Permanent	Responsible Institutions (Authorities) for road transport, (construction companies, Ministry of Transport etc.)	AKZM and AdZM should suggest / request the authorities responsible for the design of the project, the construction of these "bridges / connection paths", when their consent is requested for infrastructure projects, in protected areas and should request the implementation entities their application
Scientific Research Studies					
13	Continuous study and monitoring of the population species trend in the area.	High	Permanent	Scientific research Institutions, (different Universities as well as different research institutions); Ministry of Tourism and Environment; Agency of protected Zones in Vlora.	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
14	Promote detailed studies (in the laboratory) on the biology of the species, the life cycle, food diet, etc.	High	Permanent	Scientific research Institutions, (different Universities as well as different research institutions); Ministry of Tourism and Environment; Agency of protected Zones in Vlora.	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
15	Studies, monitoring for the identification and at the same time the elimination of exotic foreign species of fish from aquatic habitats where the species <i>P. shqipericus</i> is present.	High	Permanent	Scientific research Institutions, (different Universities as well as different research institutions); Ministry of Tourism and Environment; Agency of protected Zones in Vlora.	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
16	Encouragement of detailed laboratory studies on the presence of various parasites (bacteria, viruses, fungi, etc.) in <i>P. shqipericus</i> individuals taken from any habitat in the study area, in order to identify them and then continue the action to prevent the spread of the disease in the entire population.	High	Permanent	Scientific research Institutions, (Institute of Veterinary Researches, Agricultural University etc.), Ministry of Tourism and Environment.	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.



Cooperation for the application of protection measures

17	Creation of a working group composed of experts in various fields, which will provide advice to government authorities, different institutions or other actors involved in this process on how to implement the protection measures given in this document.	Middle	Mid-term	Scientific research institutions; Agencies dealing with wildlife conservation or Environmental NGOs.	Law no. 10 006, of 23.10.2008, "Protection of wild fauna", amended, article 35/1, provides for the creation of the National Wildlife Council, as an advisory and consultative body, which contributes to design: inventory programs, annual breeding plans, wildlife development projects, hunting calendar, list of species subject to hunting, determination of annual quotas for species subject to hunting, as well as facilitation of the implementation of legal provisions for the protection of nature and biodiversity.
18	Identification and finding financial resources for the implementation of the activities listed in this document.	Middle	Mid-term	Scientific Research Institutions, Ministry of Tourism and Agriculture	Write concrete project proposals, to apply to donors (various countries, EU an IPA program funds, various environmental organizations), for the implementation of the activities listed in this document.

Public awareness, education and information

19	Organization of awareness activities with the participation of various groups of interest, such as farmers, school students, community residents, owners and workers of frog collecting factories, owners of various restaurants, etc.	High	Long Term	Minsitry of Tourism and Environment, Agency for the Protected Zones in Vlora, Environmental NGOs	Despite the continuous work that the institutions mentioned should do, I suggest the inclusion of this activity in the concrete Project-proposal.
20	Creation of a website where general information on type <i>P. Shqipericus</i> is launched, habitats, bioecology, etc., as well as guidelines on habitat management and good practices or protocols for researchers regarding the treatment of amphibians, exotic species, etc.	Low	Long-Term	Scientific research Institutions, Ministry of Tourism and Environment; Agency of protected Zones in Vlora, Environmental NGOs	Inclusion of this activity in the concrete Project proposal.
21	Organization of awareness-raising activities and the increase capacities for farmers in order to reduce the use of chemical fertilizers (pesticides, etc.), especially near areas considered to be breeding habitats for the species.	Middle	Long Term	Minsitry of Tourism and Environment, Agency for the Protected Zones in Vlora, Environmental NGOs.	Participation and other actors such as: Ministry of Agriculture and Rural Development (MAFRD) and local Self-government units (municipalities).

Table 3: Activities proposed to improve the status of the population and habitats of the endemic Albanian frog (*P. shqipericus*).



7.4 List of actors and their participation

The actors are groups (individuals, institutions, organizations, etc.) which directly or indirectly have a particular influence on the species (positive or negative) and on the other hand benefit from the species itself or from its conservation policies.

The selection of the relevant actors involved in this process is carried out by considering their interest in the species, the area in which they carry out the activities and how these activities affect the species itself (negatively or positively).

In this way, this document with conservation measures (Action Plan) for the endemic frog of Albania will only succeed if all the actors involved in the process will have cooperation between them and will implement these proposed conservation measures for the protection of the species and its habitats.

It is understood that, the main actors in this process will be Scientific Research Institutions (Scientific Research Centers in the field of the Environment, Wildlife, Universities, etc.), the Ministry of the Environment and Tourism and the environmental organizations (NGOs) that operate in the field of the environment and in particular in the conservation of nature and wild flora and fauna. In addition, the main role in this process will be played by the Regional Protected Zones Agency, in Vlora, since the area in which this document will initially be implemented will be the Bay of Vlora and much of the *P. shqipericus* are located on the territory of protected areas. However, for this document (Action Plan) to be successful, the involvement and cooperation of certain other actors is needed in areas such as:

- **Agriculture**
- **Fishing**
- **Local Authorities (Municipality)**
- **Transportation**
- **Food Control**
- **Owners of frog collection companies**
- **Restaurant owners**
- **Landowners**
- **Representatives from the community, etc.**



7.5 Other species that may benefit from the plan

Other species, which share the same habitat with it, can directly benefit from the preservation of *P. shqipericus* habitats. In this way, during the field visit in the Bay of Vlora, it was noticed that in the habitats where the frog *P. shqipericus* is encountered, other species have been observed, where the closest species to the *P. shqipericus*, which has always been seen nearby, was the other frog *Pelophylax kurtmuelleri*. In addition, other species may benefit from the use of aquatic habitats where *P. shqipericus* is encountered as breeding grounds. Such may be the toads of the genus *Bufo* (*Bufo bufo* and *Bufo viridis*), the tree frog (*Hyla arborea*), the dancing frog (*Rana dalmatina*) and the newts (*Lissotriton vulgaris* or *Triturus macedonicus*).

In addition to amphibians, certain species of aquatic reptiles, which mainly use these habitats for food, such as turtles (*Emys orbicularis* and *Mauremys rivulata*) or aquatic snakes (*Natrix natrix* and *Natrix tessellata*), can also benefit. In addition, many other aquatic organisms such as dragonflies of the order Odonata, other aquatic insects or even aquatic plants can benefit from the maintenance and management of *P. shqipericus* species habitats.







RESULTS AND RECOMMENDATIONS

- Furthermore, taking into account the situation and the concrete factors threatening the population of the Albanian frog species, we recommend the inclusion in the Red Book of endangered species in Albania, in order to improve the status of the species or, in the worst case, to avoid loss of population (tab. 2)
- In recent years, it is noted that legal and institutional efforts have been made in the positive direction of the achievement of European standards, but the problem remains the strengthening of the implementation of the law in force.
- It is worth evaluating the development of training initiatives for management personnel, in particular the IMF, for the identification and treatment of environmental situations and problems that aim to preserve biodiversity, ecosystems, habitats, species and the landscape, by developing and implementing annual plans and action plans to improve the current situation and achieve IMF management standards.
- It is suggested that the proper management of protected areas must be accompanied by training of the personnel concerned in the methods and practices of protection of endangered species which are threatened by the damage of their populations (tab. 2).
- The lack of early involvement of natural resource management structures in national and local policies has led to an activity with harmful consequences for natural landscapes, showing the phenomenon of degradation, division and destruction of natural habitats, and affecting the populations of many organisms.
- The low level of environmental education of the population has been and remains an indicator of the intensive use of biodiversity, including terrestrial, aquatic, forest, pasture, lake-lagoon and mountain ecosystems.
- Establishment and operation of environmental protection management committees ensuring the involvement of local communities and addressing issues related to risk management, information and environmental education through public awareness programs on the importance and promotion of ZMN (Natural Protected Zones).
- Strengthening the effective cooperation of state and local institutions, with scientific research institutions, national CSOs, environmental NGOs and businesses.
- Additional studies should also include the studies of laboratory methods for measuring the quality of the environment, referring to the construction of the



frog skin, which may very well serve as an indicator of the state of the environment.

- Increase of cooperation with state structures and other actors, such as companies involved in the collection of frogs for commercial purposes, etc., so as not to authorize its collection, during the breeding period, as well as for non cleaning of the canals during this period.
- The management of the sanitation network in the area should be in cooperation with ZRAD-Vlora to avoid damaging the species, especially during breeding.
- More specifically, the transfer of powers to the municipality of Vlora for the maintenance and management of the canal network (tabs 4 and 5) requires an institutional responsibility to cooperate with other management agencies such as ZRAD-Vlora, to have good management of the area as much as possible.
- Increase of control over the use of bad practices in the agricultural sector to avoid the risk of damage to species, especially at the time of breeding (tab 2).







MONITORING AND REVIEW

9

MONITORING AND REVIEW



The geographical position and the natural conditions of the region of Vlora bay offer great economic potential still influenced by human activity. These are the factors that always lead to an increase in human activity and in most cases leave a great ecological mark. Given the natural conditions and the economic potential offered by Vlora Bay, the monitoring process and the examination phase should be considered within 10 years.





ANNEXES



MONITORING CARD

Region: _____
 Monitor (Name): _____
 Date _____
 Air temperature _____

Place/station: _____
 Visit 1, Visit 2, Visit 3, Visit 4 (circle)
 Water temperature _____

Codes and weather conditions (circle)

0
1
2

Weather conditions

The sky is clear with few clouds
 Sky partly cloudy (partly cloudy)
 Fully cloudy (cloudy)

Wind Codes (circle)

0
1
2
3
4

Wind speed indicators

No wind, vertical movement of air
 Very little movement of air
 Very light breeze, felt on face
 Light breeze, tree leaves in constant motion
 Moderate breeze, the wind picks up the dust and moves the papers as well as the thin branches of trees are in motion

Transect designation (if possible): _____
 Initial point transect coordinates: _____
 Endpoint transect coordinates: _____
 Time of the beginning of transect (time): _____; Transect completion time (time): _____
 Transect length (m): _____

Total No. of adult individuals (females+males)	No. of males who sing	No. of couples (female male observed in mating)	No. of juvenile individuals	No. of undefined individuals (adults or juveniles)

Specific habitat (circle)

1 Temporary water pond
 2 Reservoir (pond) with permanent water
 3 Marsh (with freshwater)
 4 Others (specify)

Activity (in which individuals are observed doing)

1 Feeding
 2 Resting (heated in the sun) out of the water on the shore
 3 Resting (heated in the sun) on aquatic vegetation
 4 Pairing
 5 Singing (males)

Possible threats: (solid waste pollution, water pollution, urbanization, uncontrolled tourism development, etc.): _____

Other Notes: _____

Annex 1: Field surveillance file for the endemic frog of Albania (Pelophylax shqipericus).



Drainage Board/ VLORE	Municipality	Name of the drainage scheme	Area that drains in hectar	Municipal owned canals		
				First canals	Second canals	Third canals
49	Vlora	Drainage Myzeqe	1 100		1	1
50	Vlora	Drainage Myzeqe with drainage collector. Akerni	4 500		1	1
51	Vlora	Drainage with drainage collector Gorice	1 050		1	1
52	Vlora	Drainage Llakatund VLK 4	1 600		1	1
54	Vlora	Dukat-Tragjas	1 800		1	1

Annex 2: Data in the form of a table for the transfer of drainage infrastructure (according to the drainage schemes) (DCM 1108)



MUNICIPALITY	CODE	DESIGNATION	WATER SOURCE	TRANSFERRED TO THE OWNERSHIP OF MUNICIPALITIES		
				WATER SOURCE	FIRST AND SECOND CANALS (KM)	SECOND CANALS (KM)
Vlora-Selenica	VLU - 3	Llakatund - Selenicë	River Shushica + stp			114
Vlora	VLU - 10	Kallafet Reservoir	Reservoir (Kallafet)	1	34	
Vlora	VLU - 9	Babicë Reservoir	Reservoir (Babicë)	1	43	
Vlora	VLU - 2	Myzeqe of Vlora	Stp. Mifol No.2, Panaja, Zvërnec, Bestrovë	1	85	
Vlora	VLU - 57	Jonufer canal	River (Izvor)	1	8	
Vlora	VLU - 1	Myzeqe of Vlorës	Stp. Mifol No.1	1	208,3	
Vlora	VLU - 6	Dukat - Tragjas	River + stp	1	71,1	
Vlora	VLU - 8	Bunavis Reservoir	Reservoir (Bunavis)	1	7	
Vlora	VLU - 11	Kaninë Reservoir 1	Reservoir (Kaninë 1)	1	3	
Vlora	VLU - 12	Kaninë Reservoir 2	Reservoir (Kaninë 2)	1	2	
Vlora	VLU - 17	Bestrovë	Reservoir	1	9	
Vlora	VLU - 48	Sherisht pumping station	River (Kallafet)	1	6	
Vlora	VLU - 49	Risili pumping station	Canal (Penkov)	1	9	
Vlora	VLU - 52	Izvor pumping station	River (Izvor)	1	2,8	
Vlora	VLU - 53	Jonufer Pumping station 4	Canal (Jonufer)	1	1,2	
Vlora	VLU - V4	Economies		1	25	
Total				15	514,4	114

Annex 3: Transfer of the irrigation system in the Municipality of Vlora (DCM 1108)



B

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albanian water frog



PLAN VEPRIMI PËR SPECIEN

*Masa për ruajtjen e Bretkosës Shqiptare
(Pelophylax Shqipericus)
Në gjirin e Vlorës*