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D. T.1.1.2 Conservation Plan of habitat and species

LASPEH Project

Partner: Management Body of the Regional Natural Reserves of the Eastern Coast of Taranto

Bittern (Botaurus Stellaris) protection plan

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Editor: Mr. Marco Dadamo

1 PREMISE

The LASPEH project aims to address the issue of biodiversity loss, defining a common strategy to preserve the natural heritage and landscape in the southern Adriatic regions. The project focuses its attention on the protected species present in the annexes of the HABITAT 92/43 / EEC Directives and BIRD DIRECTIVE 79/409 / EEC, threatened by environmental variations, caused by climate change and / or anthropogenic impacts. Finally, the project aims to create a cross-border conservation network between protected area management bodies that cooperate for the conservation of biodiversity and the improvement of Natura 2000 sites, exchanging best practices and developing a common transnational strategy to preserve species and habitats common.

The cross-border partnership of the LASPEH project is constituted in the following ways:

Lead Partner

- Consorzio di gestione provvisoria del Parco Naturale Regionale "Dune costiere da Torre Canne a Torre S. Leonardo" (IT)

Partner di progetto

- Agjencia Kombëtare e Zonave të Mbrojtura (AL)
- Javno preduzeće za nacionalne parkove Crne Gore (ME)
- Ente di Gestione delle Riserve Naturali Regionali Orientate (RNRO) del Litorale Tarantino Orientale (IT)
- Comune di Ugento (IT)
- Comune di Guardiaregia (IT)

One of the most relevant activities foreseen by the LASPEH project is the drafting, in each protected area involved, of a protection plan addressed to a single species protected by EU Directives and at risk of extinction, with the aim of identifying objectives, strategies and useful actions to its safeguard.

The RNRO Management Authority of the Eastern Tarantino Coast has identified among the species to which the protection plan is to be assigned, that of the Bittern "Botaurus stellaris", a large bird belonging to the Ardeidae (herons) family, identified in the red list IUCN with the

category "In danger (EN) due to the small size of the population (presence of few individuals) - criterion D".

The general objective of this plan is to implement strategies and protection actions aimed at the conservation of the Bittern specimens present in the wetlands of the Reserves and the improvement of the ecological and faunal conditions useful to determine an increase in the consistency and distribution of the species of interest.

2 REGULATORY FRAMEWORK

The Bittern appears in Appendix II of the "Convention on the Conservation of Migratory Species of Wild Animals" (also known as CMS or Bonn Convention) which has the aim of protecting land, sea and avian migratory species in all their movements . The Bonn Convention is the only global convention specializing in the conservation of migratory species, their habitats and migration routes. It is an intergovernmental treaty, concluded under the auspices of the United Nations Environment Program, which concerns the conservation of wildlife and habitats on a global scale.

The Bonn Convention provides for the conclusion of international agreements aimed at the reconstitution and maintenance of populations and habitats of migratory species in poor conservation status. Currently one of these important international agreements is represented by the African-Eurasian Migratory Water Bird Agreement (AEWA), an agreement for migratory bird species that are ecologically dependent on wetlands where Bittern is also present. The agreement was concluded on 18 June 1995 in The Hague in the Netherlands, and entered into force on 1 November 1999. The treaty covers 119 European states, parts of Asia and Canada, the Middle East and Africa. Italy formally adhered to the treaty with law n.66 of 6 February 2006, "Accession of the Italian Republic to the Agreement on the conservation of migratory water birds of Africa - EURASIA". The Bittern is also present in Appendix II of the "Convention on the Conservation of European Wildlife and Natural Habitats" (Bern Convention). The Bern Convention is a binding international legal instrument in the field of nature conservation, which covers a large part of the natural heritage of the European continent and extends to some African states. Its objectives are the conservation of wild flora and fauna and their natural habitats and the promotion of European cooperation in this area. The Convention pays particular attention to the need to protect threatened and vulnerable natural habitats and endangered species, including migratory ones. The Parties that signed the Bern Convention undertake to take all appropriate measures to ensure the conservation of the habitats of the flora and

fauna. Italy ratified the agreement with law no. 503 of 5 August 1981. The European Union has adopted its principles and the reference framework through the Habitats and Birds Directives.

The Bittern is a protected species according to Article 2 of Law 157/92, and is present in Annex I of Directive 79/409 / EEC concerning the conservation of wild birds. This Directive represents the first regulatory act of the European Union aimed at the conservation of nature and, in particular, the conservation of wild birds. Together with the Habitats Directive, it is one of the main regulatory tools for the protection of biodiversity in all EU countries.

The Bittern is also present in the list of aquatic birds used to identify wetlands of international importance pursuant to the Ramsar Convention and is considered a fauna heritage by the Puglia Region pursuant to and for the purposes of art. 2 paragraph 2 lett. b) of the L.R. n.59 of 20/12/2017 "Rules for the protection of homeothermic wildlife, for the protection and programming of faunal-environmental resources and for hunting", published in the Official Bulletin of the Puglia Region n.144 of 21 / 12/2017.

The target species in question is also one of the species worthy of conservation and recovery in the Reserves of the Eastern Tarantino Coast, pursuant to and for the purposes of the Regional Law n. 24 of 23 December 2002, which provides for the management purposes of the protected area pursuant to art. 2 paragraph 1 letter a): "[...] to conserve and recover biocoenoses, with particular reference to the habitats and animal and plant species contained in Council Directives 79/409 / EEC of 2 April 1979 on the conservation of wild birds and 92/43 / EEC of the Council of 21 May 1992 on the conservation of natural and semi-natural habitats and of flora and fauna [...] "

The Reserves of the Litorale Tarantino are characterized by the presence of the Natura 2000 ZSC site "Torre Colimena" code IT9130001, characterized by habitats of conservation value typical of wetlands such as the "Coastal lagoons - code 1150" and the "Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetiea fruticosi) - code 1420 ".

With Regional Regulation n. 6 of 10.05.2016, the Puglia Region approved the conservation measures to be adopted in the SAC sites characterized by the presence of birdlife typical of "FRESHWATER AND CANNETI WET AREAS" such as Bittern. The conservation measures to be taken to protect these species are:

- Prohibition in the period 1 March-15 July (during the reproductive period of the avifauna) of control interventions or management of the arboreal, shrubby and herbaceous vegetation inside the wetlands and the gauzies, through cutting, mowing, shredding, fire, chemical

weeding, surface tillage, without prejudice to extraordinary management interventions subject to authorization by the Managing Authority;

- In the sites where there are reeds of Phragmites australis in Typha sp.pl, but also mixed with hygrophilous bushes dominated by Salix sp.pl. obligation, in the case of cutting operations, to carry out outside the reproductive period while maintaining at least 50% of the surface unaltered;
- Prohibition of mowing, weeding, burning and, in general, intervening on reed beds during the reproductive period (15 mark - 15 August);
- Obligation to maintain water levels of about 30-50 cm in the reeds and wetlands, avoiding the rising of the waters and the drying out of the basins during the reproductive period (for the Bittern from 1 March to 15 August);
- Prohibition of access outside the paths and with boats in the wetlands occupied by the species;
- Ban on the construction of anthropogenic works and infrastructures (for example, buildings, roads, power lines) at a distance of less than 1 km from the wetlands occupied by the species for reproductive purposes;
- Obligation to protect the occupied sites with prohibition of modifications to the environmental structure (vegetational, geomorphological, hydrological), which are not aimed at the conservation of the species;
- Prohibition of access outside the paths and with boats in the wetlands occupied by the species;
- Maintaining hydraulic circulation and replacement in occupied wetlands;
- Careful management of reeds, with rotating mowing, of a maximum area of 30% per year;
- Intensification of hunting controls and surveillance;
- Raising awareness of the importance of conservation and the danger of extinction of the species.

The Puglia Region with Regional Regulation no. 12 of 10.05.2017 defined the conservation objectives for the sites of the NATURA 2000 network of the PUGLIA REGION. The conservation objectives of the SCA "Torre Colimena" are:

1. To regulate fishing and tourist-recreational activities, with particular reference to anchors and trawls, for the conservation of habitats (1120 *, 1170) and marine species of community interest;
2. Guarantee the efficiency of the water circulation inside the bodies of water for the conservation of the habitats 1150 *, 1310, 1410, 1420 and 3260 and of the Amphibians and Reptiles of community interest
3. To regulate the maintenance and infrastructure of the beaches, as well as the tourist-recreational use for the conservation of the dune habitats, with particular reference to the management of the Posidonia oceanica "banquettes"
4. Promote and regulate extensive grazing for habitat conservation 6220 *
5. Contain the phenomena of anthropic disturbance and predation on the colonies of Ardeidae, Recurvirostridae and Sternidae

Bittern protection activities depend directly and indirectly on the achievement of objectives 2 and 5.

3 THE HABITATS OF THE TARABUSO IN THE RONR OF THE EASTERN TARANTINO COAST

With the Regional Law n.24 of 23/12/2002, the Oriented Regional Natural Reserves of the Eastern Tarantino Coast were established whose territory includes a large area of the size of 1,113.22 ha, entirely falling within the municipal territory of Manduria. The Reserves are characterized by two areas with distinct characters: the "Central Zone" which is extended 610 ha and the "Protection Belt" which has a size of 530 ha. They border to the east with the municipal territory of Porto Cesareo, to the west with the inhabited area of the seaside resort San Pietro in Bevagna, to the south they are lapped by the Ionian Sea. The Reserves comprise four natural areas, divided into two distinct territorial nuclei. The first nucleus extends from the "Cuturi" and "Rosa Marina" woods and reaches the coast with the mouth of the "Chidro" river, the second contains the "Salina dei Monaci" and the "Palude del Conte" with the related coastal dunes. The natural environments of the Reserves, not only constitute areas of exceptional landscape value, but take on a high ecological value while preserving extremely fragile ecosystems, which miraculously survived the devastations wrought by man during the course of the 20th century above all. The wetlands of the Reserves are habitats particularly appreciated by both sedentary and migratory fauna, so as to be habitually frequented by some species protected by European and national conservation regulations. Much of the protected territory falls within the Site of Community Importance (SCI) "Torre Colimena" (site code: IT9130001).

The habitats of the Reserves suitable for Bittern are present at the "Salina dei Monaci" and the "Palude del Conte", two wetlands with a mainly coastal development that surround the town of Torre Colimena. The "Salina dei Monaci" and the "Palude del Conte" are two typical examples of wetlands behind the dunes, bordering the coastal strip towards the hinterland. The "Salina" is a natural depression, in communication with the sea through a channel carved into the rocky coast, transversely to the coast line. The soils of this area have very high concentrations of mineral salts and are characterized by the presence of numerous "halophilic" species, such as salicornia. The "Palude del Conte" was the subject of major hydraulic reclamation works after the Second World War, which consisted locally in the creation of water pipes and artificial water collection basins, in order to prevent the swamping of the area.

Figure 1: Salina dei Monaci

4 FOREWORD BIOLOGY (Botaurus stellaris)

The Bittern is a large bird belonging to the Ardeidae family (herons). The species is widely distributed globally, but in Western Europe it has a fragmented and localized distribution, with one of its most important populations located in the Po Valley. BirdLife International has indicated the conservation status of the Bittern as "vulnerable" - SPEC 3 a species whose global population is not concentrated in Europe, but which in Europe has an unfavorable conservation status.

The Bittern population is in sharp decline mainly due to its dependence on reed habitats. The overall population of the Bittern declined sharply during the twentieth century and, in the event of a failure to reverse the trend, could definitively become extinct in many European countries. The maintenance and restoration of reed habitats and associated wetlands are interventions of primary importance for the protection of this species.

Figure 2: The Bittern belongs to the Ardeidae family

4.1 Distribution and population

Bittern is a Palaearctic species: it is present and reproduces in most of Europe, northern Africa and central and eastern Asia. In northern Europe the population is largely migratory, in central and western

Europe it is partially sedentary and in southern Europe the reproduction is sporadic and the presence of the bittern is widespread in the wintering periods1. The area of the Italian population is small (5259 km², Boitani et al. 20022), the number of mature individuals is estimated at 100-140 (Brichetti & Fracasso 2003, BirdLife International 20043) and is fluctuating or stable locally; moreover, the species is present in more than 10 locations, so the conditions of applicability of criteria B and C are not achieved. However, the Italian population is small and therefore qualifies for the In Danger (EN) category according to criterion D. In Europe it does not fall into a safe state of conservation, albeit slightly increasing in several regions (BirdLife International 2004). At the moment there is no evidence that can support immigration from outside the region. The assessment therefore remains unchanged.

According to the data present in the IUCN portal, the Bittern is nesting and partially sedentary in the Po Valley, Tuscany and Umbria, irregular in other regions. The Italian population is estimated at 50-70 couples (70-100 male singers) and is considered to be fluctuating or stable locally (Brichetti & Fracasso 2003, BirdLife International 2004).

4.2 Breeding

The single verse of the bittern is called in English "boom" and constitutes an important tool for studying the bird, given the tendency of the latter to hide so well as to disappear. The Bittern emits this sound by exhaling the air, previously forfeited which, by passing through the syringe, emits the typical low frequency verse. The term "boom" indicates the single verse which, when issued in succession, becomes "booming" and represents the singing sequence with which the male reproducer attracts the female and defends the territory. Booming allows the species to communicate many kilometers away.

During the breeding period the males show their presence through this characteristic song. According to the existing bibliography, there is clear evidence that the Bittern is a polygamous animal. The nest is made up of a platform of cane stems, positioned in the thick of the reeds. Usually four to five eggs

[1] European Union Action Plans for 8 Priority Birds Species – Bittern

[2] Boitani, L., Corsi, F., Falcucci, A., Maiorano, L., Marzetti, I., Masi, M., Montemaggiori, A., Ottaviani, D., Reggiani, G., & Rondinini, C. (2002), *Rete Ecologica Nazionale. Un approccio alla conservazione dei vertebrati italiani* Università di Roma "La Sapienza", Dipartimento di Biologia Animale e dell'Uomo; Ministero dell'Ambiente, Direzione per la Conservazione della Natura. Istituto di Ecologia Applicata, Roma

[3] Brichetti, P. and Fracasso, G. (2003), Ornitologia italiana - Gavidae-Falconidae Alberto Perdisa Editore, Bologna

are laid between the months of April and May. As far as is known, the task of incubating eggs and raising chicks is reserved exclusively for females. The Bittern pullo, in some cases, can leave the nest 12 days after hatching. The young specimens are ready to take flight between June and early August in northern Europe, May-June in the Mediterranean countries.

Figure 3: The Bittern's nest consists of a platform of reed stalks, positioned in the thick of the reeds

4.3 Feeding

The Bittern has a varied diet consisting mainly of small fish, amphibians and insects, but also of small birds and mammals. In some sites in Northern Europe, eels seem to be the main source of food for this Ardeide. From numerous researches in the field it seems that for the Bittern diet the optimal characteristics of the eels are: 3-4 years of age, weight of about 100 grams and 35 cm in length (this is the right size that allows this fish to insinuate itself in the reeds).

On the contrary, studies conducted in Italy have shown that the Bittern diet is mainly composed of very small fish (2-5 cm) such as the Gambusia holbrooki and the Alphanius fasciatus.

Figure 4: The predation of the Bittern

4.4 Characteristics of the Bittern habitat

The Bittern uses the reed beds of Phragmites australis (sometimes Thypha angustifolia) as natural nesting habitats. In literature, the minimum size of reeds fragments useful for the reproduction of the bittern is indicated in about 20 ha, although in situations inserted in a context of larger wetlands with reeds fragments not distant from each other, they can be used for nesting even smaller reeds. The maturation stage of the reeds seems to be relevant for the choice of the site: reeds of two / three years of age and flooded in a not excessive way (<30cm of water) represent the ideal nesting situation. In fact, the Bittern is highly selective in the choice of habitat, preferring reeds in the early stages of their natural succession. For this reason it is essential to implement management interventions useful to maintain the reeds in the ripening stage suitable for the permanence of the Bittern.

Figure 5: The reed bed is the nesting habitat of the Bittern

5 PROTECTION AND CONSERVATION ACTIVITIES IN THE RONR OF THE EASTERN TARANTINO COAST

Below are some projects already implemented or under construction by the RONR Management Authority of the Eastern Tarantino Coast which have a direct positive impact on the Bittern and indirect on numerous other species such as the Marsh Harrier Circus aeruginosus, Red Heron Ardea purpurea, Moretta tabaccata Aythya nyroca (Species present in Annex 1 dir. 2009/147 / CE), etc.

The first project described is called “Conservation and protection of humid environments and dunes in the P.N.R. Ugento coast and R.O.N.R. Tarantino Eastern Coast of Manduria "and provides for biodiversity conservation and conservation interventions in the R.N.O of the Eastern Tarantino Coast S.C.I. "Torre Colimena" IT913001. Among its numerous actions, the project also includes interventions for the protection of habitats of interest for the Bittern such as:

- Habitat 1150* “Coastal lagoons”;
- Habitat 1420 “Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetiea fruticosi)”;

The interventions in question aim to mitigate the disturbance operated by the numerous users of the SIC for the observation of the green birdlife present in the Salina and foresee the positioning of wooden barriers, the creation of a bird watching point and the planting, in the areas without vegetation of groups of perennial herbaceous elements with building elements of the habitat 1420 "Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetiea fruticosi)".

Figure 6: Anthropogenic degradation action (Access gates to the Salina)

The second intervention is part of the ordinary maintenance activities of the consortium channels that the Arneo Reclamation Consortium realizes in concert and with the contribution of the Reserve Management Authority. Thus as shown in Figure 7 and Figure 8 maintenance activities in question have focused on the mowing vegetation reed also present along the channels to ensure a state of maturation not advanced this environment and, therefore, increase the suitability ecological and fauna of the wetlands of the Palude del Conte.

Figure 7: Reed vegetation maintenance works along the channels of the Arneo Consortium that fall within the perimeter of the Reserves

Figure 8: Reed vegetation maintenance works along the channels of the Arneo Consortium that fall within the perimeter of the Reserves

The third project, under construction, is called "PILOT INTERVENTIONS FOR THE CONSOLIDATION OF A COASTAL DUNAL SECTION IN THE LOCALITY OF TORRE COLIMENA AND FOR THE RENATURALIZATION OF THE SHORES ALONG A SECTION OF CANAL IN THE

SEA OF THE COUNTY IN THE AGRO OF MANDURIA" and is part of the project Interreg Italy-Albania-Montenegro 2014-2020, Axis 3 "3 WATCH OUT".

Among the various interventions, the project involves the renaturalization of the cemented banks of an artificial canal 3 m wide present throughout the Reserves (Figure 9).

The intervention consists in the cleaning of the banks and in the creation of a live piling bank with a simple wall and with a vertical bank (Figure 10). The piling of the bank with front vertical pole is a valid protection for the foot of the banks of shallow waterways. It is made with trunks arranged transversely and longitudinally with respect to the side that are connected by means of riveting.

To prevent the development of erosive phenomena, the interstices between the longitudinal trunks are filled with stones or cylindrical gabions up to the level of water lean. In the above interstices they are inserted on the back and tucked with earthy aggregate, bundles of tamarisks. To increase the effects from an environmental point of view, it is possible to create dens for ichthyofauna obtaining niches in the submerged part identified by means of timber walls inside the stone filling.

Figure 9

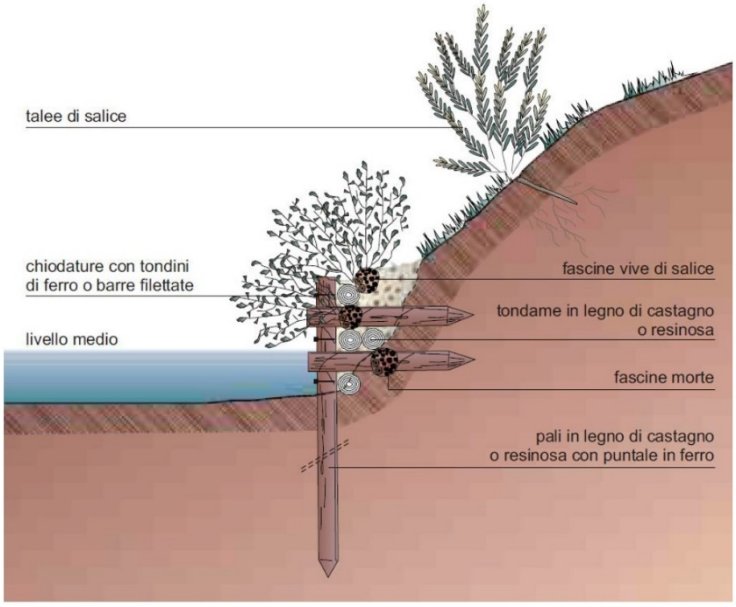

Figure 10

The renaturalization of the canal will be implemented with the planting of new reeds (Figure 11) (Phragmites communis, P. australis). The intervention will take place through the use of rods of wood species with a vegetative propagation capacity of ø min. 2 cm and are assembled (preferably on trestles); the rods must be laid in such a way as to guarantee an equally alternate arrangement of the apices and bases to form bundles. The fixing of the bundle will be done with chestnut poles placed at a distance from each other of 0.80 ÷ 1.00 m and oriented alternately upstream and downstream with respect to the bundle. The whole is covered with a layer of soil that leaves only short segments of branches protrude.

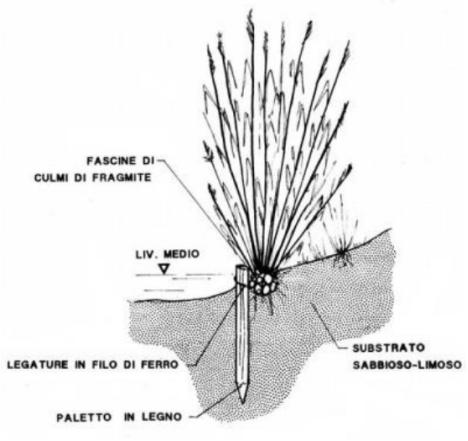

Figure 11: Renaturalization intervention

Finally, the top portion of the bank and the portion overlooking the wetland will be affected, after reducing the reed present, by the construction of functional wooden structures designed to act as perches and nesting supports for birdlife. In fact, the difficulty of some ornithic species in being able to settle in the wetland seems evident because of the strong competition for the few points of support and nesting.

In particular, the wooden structures will be built using chestnut stakes and wood material found on site. The chestnut poles will be fixed in the bank according to shapes and combinations which are functional supports for the construction of the nests by the birds. These structures located at the interface between the bank on the ground and the flooded areas of the wetland, will emerge among the reeds and offer the possibility of settlement and nesting to the ornithic fauna.

6 ANALYSIS OF THREATS AND LIMITING FACTORS

According to the European Union Action Plans for 8 Priority Birds Species - Bittern, the threat factors are the following:

1. **Habitat degradation**

The main threat to reed populations and natural wetlands is represented by the progressive aging of reeds, which leads the vegetation to an excessively mature stage. In fact, the progressive burial also favored by the colonization of the reeds by arboreal or arborescent essences (e.g. Salix sp. And various exotic ones such as Amorpha fruticosa), makes the reeds dry and therefore no longer usable as a nesting site. In the Reserves of the Tarantino Coast, the humid habitats that were once present have been reclaimed and replaced with canal systems and artificial basins. These hydraulic engineering works built in the last century are characterized by too high depths, not suited to those favored by the Bittern and by steep slopes which do not favor nesting of the target species.

Level of importance for the EU: high

2. **Pollution of the aquatic body**

The quality of the aquatic body is important for the maintenance of the bittern reproduction habitat. Eutrophication of water resources can adversely affect the ecological quality of reeds. The algal

blooms deriving from eutrophication, for example, increase the turbidity of the water bodies and can reduce the feeding efficiency of the bittern negatively affecting the efficiency of predation on small fish.

Level of importance for the EU: locally high

3. **Availability of food**

The availability of food is obviously fundamental for the presence of the Bittern. It is important to emphasize, indeed, that it is not only important that the food resource is present, but that it is available for the needs of the Bittern itself. Deep waters can host large fish populations but which are inaccessible to our target species. In Italy, for example, as many as 19 wintering Tarabuso specimens have been observed in a reed area of only 15 hectares characterized by a water depth of 10-20 cm which provided the ideal conditions for catching small fish such as Gambusia and Aphanius.

Level of importance for the EU: high

4. **Lack of large reed bed habitats**

The populations of Bittern have greatly decreased in the territories where numerous wetlands have been lost and where the availability of large "wet" reeds with adequate feeding conditions has been lacking. The numerous studies carried out, in fact, have demonstrated unequivocally that the local populations of Bittern can easily become extinct when these conditions occur in small sites.

Level of importance for the EU: medium / high

5. **Climate change**

Climate change is causing negative impacts on the reproduction of Bittern. The loss of the rooms suitable for hosting them, due to seasonal weather variations, is one of the causes that most favors the decline of this species.

Level of importance for the EU: potentially high if in synergy with other factors

6. **Saline intrusion**

The wetlands frequented by the Bittern are strongly at risk, also, due to the rise in sea level and, therefore, the consequent increase in salinity of the aquatic body. This variation in salinity adversely affects vegetation and food availability.

Level of importance for the EU: potentially high for some sites

7. Uncontrolled tourist use

Wetlands are subject to pressure and impacts from numerous forms of entertainment. The negative effects deriving from the trampling of the young reeds, for example, contribute significantly to determine unfavorable conditions for the Bittern. To the negative effects listed above, there is the disturbance deriving from the noise caused by users of wetlands and recreational activities carried out within the aquatic body (fishing, navigation, etc.)

Level of importance for the EU: high in specific sites

8. Excessive withdrawal of water

Excessive withdrawal of water in certain wet areas can lead to the drying of the reeds and therefore to the loss of the Bittern habitat. This problem also occurs in newly created sites which may not be able to guarantee an adequate water supply throughout the year.

Level of importance for the EU: high in some areas

9. Intoxication

Bittern, like all species that eat fish, are potentially at risk of pollution from heavy metals and pesticides, being at the top of the food chain.

Level of importance for the EU: low in terms of population, potentially high for particular sites

10. Poaching

Although Bittern is a protected species across Europe, illegal poaching activities contribute to making the population of this ardehyde more endangered.

Level of importance for the EU: low

Below (Figure 12) the matrix of the importance of threats and limiting factors for the survival of the Bittern populations divided by each EU country as reported in the European Union Action Plans for 8 Priority Birds Species - Bittern is reported. The table data show that in Italy the most important threat factors are

- The degradation of habitats (with very high critical values);
- Uncontrolled tourist use (with high critical values)
- Poaching (with high criticality values)

TABLE 2 :

IMPORTANCE OF TRHEATS AND LIMITING FACTORS IN EACH EU COUNTRY

	1	2	3	4	5	6	7	8	9	10	Bittern population
Austria	-	0	0	0	-	0	0	0	-	0	100-150
Belgium	-	-	-	-	-	-	-	-	-	-	60-65
Denmark	++	+	0	+	+	+	0	0	-	0	80+
Finland	0	0	0	0	0	+	0	0	0	0	250-300
France	++	++	0	+	0	0	+	+	0	+	300-350 ?
Germany	++	+	0	++	+	0	+	+	0	0	900-1000
Greece	-	-	0	0	-	0	-	-	-	-	0 ?
Ireland	no Bittern population										0
Italy	++	-	0	0	0	0	+	-	-	+	35-65 ?
Luxembourg	no Bittern population										0
Netherlands	++	+	-	+	+	0	+	++	0	0	150-275
Portugal	+	0	0	+	0	0	0	0	0	+	0 ?
Spain	++	+	0	++	0	0	0	++	0	0	30+
Sweden	-	0	0	+	+	++	0	-	0	-	400
UK	++	+	++	++	0	0	++	+	0	+	20

\- = no information
0 = not important
\+ = of some importance
++ = very important

Figure 12: Estimate of the importance of threats and limiting factors in Europe

7 IDENTIFICATION OF DECISION MAKERS AND STAKEHOLDERS

Decision Makers

Type	Interaction with habitat and species
European Community	The European Community through its strategies, its rules and its financial instruments, directly influences the planning, management and design of protection interventions on the territory
Apulia Region	The Apulia Region through its strategies, its rules and its financial instruments, directly influences the planning, management and design of protection interventions on the territory
Municipality of Manduria	The municipality of Manduria, as the Management Authority of the Reserves, has among its purposes dictated by art 2 of the Regional Law n. 24 of 23 December 2002 "[...] *to conserve and recover biocoenoses, with particular reference to the habitats and animal and plant species contained in Council Directive 79/409 / EEC of the Council of 2 April 1979, relating to the conservation of wild birds and 92/43 / EEC of the Council of 21 May 1992 on the conservation of natural and semi-natural habitats and of flora and fauna, as well as ecological balances, hydraulic and hydrogeological balances* "
Land Reclamation Consortium "Terre d'Arneo"	The Land Reclamation Consortium "Terre d'Arneo" is the body governed by public law, subject to control by the Puglia Region, which has the task of managing the system of canals and basins present in the Reserves of the Eastern Tarantino Coast.

STAKEHOLDERS

Stakeholders typology	Interaction with habitat and species
Farmers	There are numerous agricultural actions surrounding the wetlands of the Reserves and which have direct and indirect effects on the chemical-physical state of the aquatic body.
Homeowners in neighboring areas	The owners of the houses that border the reserve wetlands system or that are adjacent to them, have changed the state of the places by eliminating portions of the natural landscape.
Sports fishermen	Sport fishermen who frequent the Palude del Conte Basin, rich in euryhaline fish, have a significant impact on birdlife through the destruction of reed portions (to ensure a fishing spot along the banks) and visual disturbance
Users / tourists	Tourists / users of the wetlands of the Reserves can produce disturbing actions on bird species through the production of noise sources
Accommodation facilities	The receptive and recreational structures that are close to the wetlands of the reserve can have a significant impact on birdlife due to the production of noises during the day, through the drainage of large quantities of water through the wells present in the structures, etc. .

8

9 DEFINITION OF THE OBJECTIVES AND ACTIONS OF THE PLAN

The general objective of this plan is to implement strategies and protection actions aimed at the conservation of the Tarabuso specimens present in the Reserves of the Eastern Tarantino Coast

and to improve the ecological conditions useful for determining an increase in consistency and distribution of the species of interest.

Specific Objectives		Actions	
Os1	*Improve and restore the reed habitats of the Eastern Tarantino Coast Reserves to implement the Bittern conservation strategies*	A1	Increase surveillance and monitoring in key areas
		A2	Acquisition of interested areas to the Authority's assets: 1. from the presence of habitats 1410: Mediterranean salt meadows (Juncetalia maritimi) and 1420: Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetiea fruticosi) 2. the presence of reeds (Phragmithes australis) in all areas adjacent to the canal and basin system of the "Terre d'Arneo" reclamation consortium
		A3	In situ conservation interventions: experimental ecological restoration actions with the creation of areas suitable for nesting also through the maintenance of the functionality of the reed bed environment, maintaining a state of non-advanced maturation and continuous flooding. The ideal water level in the nest localization sites should never be less than 5-10 cm and not exceed 30-40 cm. The plots surrounding the location of the nest should maintain, at least in rotation, a minimum level of flooding
		A4	Interventions to eliminate the cemented banks and reconstitute them with natural materials and suitable slopes. The presence of vegetated banks that degrade towards the basins of the wetlands, as well as clear and low water canals within the reed bed fields are essential elements to allow foraging the Bittern, which needs shielding conditions even in the supply
		A5	The expansion of the reed bed sectors with dimensions greater than 10/15 has continuous and in the most possible rounded shape (reed borders of even considerable length are not useful for nesting),

			in order to favor nesting of Bittern and other species of ardeidae.
Os2	*To deepen knowledge on migration strategies and the ecology of Bittern in Reserves*	A5	Initiate annual monitoring of key areas
		A6	Intensify catch and ring programs
		A7	Radio-mark specimens during the reproductive period
Os3	*Assess the impact of water and sediment pollution*	A8	Investigate the presence of pollutants in wet areas and on tissue samples
		A9	Monitor the status of the habitat on key sites
Os4	*Raise public awareness and decision makers*	A10	Propose seminars to decision makers
		A11	Produce audiovisual information material
		A12	Organize information campaigns at schools, accommodation facilities, etc.
		A13	Realize information panels near the Bittern habitats

10 COSTO DEL PIANO DELLE AZIONI DI TUTELA

Specific Objective	Action	Cost	Duration	Funding source
Os1	A1	€ 5,000,00 (Agreement with local associations)	Every year	Protected area management funds
	A2	€ 1.500 per Ha approx	/	Protected area management funds, municipal funds, regional and community funds (OP ERDF, LIFE, etc.)
	A3	€ 5.000,00	Every year	Protected area management funds, municipal funds, regional and community funds (OP ERDF, LIFE, etc.)
	A4	€ 400.00 per linear meter (the cost includes the costs of demolition, transport and disposal of rubble and reconstitution of the embankment with planting)	/	Regional and community funds (OP ERDF, LIFE, etc.)
Os2	A5	€ 2.500,00	Every year	Protected area management funds, municipal funds, regional and community funds (OP ERDF, LIFE, etc.)
	A6	€ 2.500,00	Every year	Protected area management funds, municipal

				funds, regional and community funds (OP ERDF, LIFE, etc.)
	A7	€ 2.500,00	Every year	Protected area management funds, municipal funds, regional and community funds (OP ERDF, LIFE, etc.)
Os3	A8	1,500,00	Every two years	Protected area management funds, municipal funds
	A9	1,500,00	Every year	Protected area management funds, municipal funds
Os4	A10	€ 1.000,00	Every year	Protected area management funds, municipal funds
	A11	€ 5.000,00	Every two years	Protected area management funds, municipal funds, regional and community funds (OP ERDF, LIFE, etc.)
	A12	€ 2.500,00	Every year	Protected area management funds, municipal funds, regional and community funds (OP ERDF, LIFE, etc.)
	A13	€ 1.500,00	Every year	Protected area management funds, municipal funds, regional

				and community funds (OP ERDF, LIFE, etc.)

11 PLAN MONITORING INDICATORS

Specific Objective	Context indicators	Performance indicators	Result indicators
Os1	No. of protection interventions present	No. of protection interventions carried out	Increase in the surface of the redeveloped habitats
	Control activities carried out on the territory	No. of reintroductions carried out	
	Surface areas covered by fire	No. of prevention interventions carried out	Surface of renaturalized areas
			Potential habitat surface increase
			Ecological corridors surface increase
Os2	No. of individuals observed	No. of animal species registered / species existing previously (faunal census)	Increase / maintenance of species richness

	Qualitative diversity index[4]	No. of registered plant species / previously existing species (floristic-vegetational census)	
	No. of existing monitoring stations	No. of annual environmental surveys carried out	
Os3	Indicative Level Macrodescriptors LIM2[5]	No. of detractors eliminated	Extension of renaturalized areas
	Surface of the areas to be reclaimed / total surface	Surface affected by landscape and environmental recovery	
	No. risky activities in the territory / total activity		
Os4	Awareness activities already carried out	No. of information meetings organized	Increase in the number of people who participated in awareness-raising events compared to the total resident population
	No. of information campaigns carried out in the park area	No. of seminars organized	Increase in the guided visits of the school population

[4]Qualitative diversity = S + / S-. S + = characteristic species; S- = adventitious species.

[5]Ammonia nitrogen, Nitric nitrogen, Dissolved oxygen, BOD, COD, Total phosphorus, Escherichia Coli UFC / 100

	No. of seminars on the park organized by the Park Authority, by environmental associations, universities, research centers	No. of projects aimed at environmental awareness	Increase in the number of interviews / television, radio and / or journalistic reports on the Park
		No. of people who participated in environmental education activities	
		No. of local schools that participated in educational activities	
		No. of schools outside the park area who participated in educational activities	
		No. of didactic projects realized	
		No. of multimedia products and studies carried out	

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