**Gimme shelter: endangered waterbirds in the coastal area between Timavo and Tagliamento river mouths**

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**Introduction**

«The loss of bird diversity is likely to be the “tip of the iceberg” in terms of overall biodiversity loss in Europe’s habitats» (Tucker & Evans, 1997). Breeding birds can indeed highlight a critical state of the environment. Breeding birds are strongly associated to specific habitats during their breeding period, and they are more vulnerable to local factors. Also, breeding populations are affected by their conditions at the wintering grounds. The outcomes of the breeding phase can either give a big input to the populations, or let them drastically decrease. For instance the Little Terns breeding on muddy areas have a very low breeding success, whereas on sand islets they can reach a very good breeding success. In protected areas, the optimal conditions should then be created, in order to compensate difficult situations.

Wetlands are continuously evolving, towards terrestrial conditions if sedimentation is strong, towards marine conditions if the erosion is significant. At present the second situation is usually happening, also due to human interventions (Davidson et al., 1991).

**The context**

In table 3 the breeding species of 4 Northern Adriatic areas are shown. Grado and Marano lagoon is characterised by the lowest numbers (33 verified, 9 probable or irregular). In Venice province there are 41 verified, 7 probable or irregular, in Po Delta-Veneto 36 verified and 4 probable or irregular, in Po Delta-Emilia Romagna 54 verified and 10 probable or irregular. Conversely, all 4 areas have the same numbers of wintering species.

**Population trends for waterbird species breeding in Friuli Venezia Giulia**

The following table shows the trends for some breeding waterbird populations in FVG and the percentage of population included in natural reserves. The species of community interest according to annex I of dir 79/409EC are in bold, the species with negative trends in red.

Some species, such as the Purple Heron, breed mainly inside protected areas, other species, such as the Little Tern, Night Heron and Little Egret breed mainly out of them.

This can cause highly vulnerable situations, risking the extinction at the local level (mod. Guzzon & Utmar, 2004). Analysing the breeding areas according to the preferred habitats (Table 3), subdivided into wetlands, reedbeds, fens, halophyous areas and saltmarshes, it is apparent that the favourable areas are of limited extension.
Breeding species of conservation interest
The following table shows level of protection, numbers, threats and conservation measures of species of conservation importance, that should be properly monitored, and in some cases added to a regional red list.

Some case studies
Some examples of critical species in FVG region are given. The Little Egret is a common species, but the trend is decreasing although breeding sites are increasing. Even more evident is the decrease for Little Stern and Snowy Plover, two species that used to be common. Some passerines of conservation interest are found in habitats at risk, such as the association Bolboschoenus maritimus of Marano lagoon (Guzzon & Panzarin, 2005). Reedbed passerines would very much suffer from the disappearance of such a habitat, as they use it both for breeding and foraging, and are therefore the most sensitive species to alterations of river mouth environments.

Main impacts on breeding birds
The Marano lagoon is at risk, as many saltmarshes are disappearing, the bottoms are damaged by clam fishing, areas at Potamogeton sp. are disappearing, there is a reduction in areas at Cladium mariscus and Salix cinerea and alba at the Stella river mouth, and there is a generalized marine ingression with disappearance of typical wetland habitats.

Table 5 shows the extension, level of safeguard and impacts on important breeding areas. Most breeding species are concentrated in a few hundreds of meters. In many lagoonal areas, especially westward, saltmarshes are rapidly decreasing. As a consequence, areas that used to be isolated are now progressively moving towards an open lagoon situation. At the Stella river mouth the formations at Bolboschoenus maritimus are disappearing. This is probably due to the past drier regime of the river (1993-2003) that has caused an ingression of salty water. The same phenomenon has been observed close to the Isonzo river mouth (Caneo), where the formations at Bolboschoenus maritimus are now substituted by halophytic species (Spartina and Puccinella). Phragmites australis is decreasing everywhere. The reduction is caused both by a decrease in freshwater inputs, by management interventions such as cutting and grazing, and by the reclamation of a portion of Isonzo river in the Eighties. The coastal woods are at risk due to human interventions (esp. touristic structures). The lagoonal woods are also managed in a way that is not favourable to breeding birds (Ardeidae). Some reedbeds (Phragmites australis) are present along the coast in the proximity of wetlands. Such sites are very important for breeding birds but are not safeguarded. The sandy shores between Grado and Lignano are a good example of low coasts not modified directly by human intervention. The eastern part is interested by strong erosion, whereas the western part is in sedimentation.

Human activities that are not favourable
In fish farms the water level is kept high in summer, and this is not favourable for breeding birds. Management activities such as channel excavation and vegetation cutting are carried out during the breeding period, and this causes disturbance to many breeding birds. Boats and tourists on sand banks can induce nest abandon. Disturbance can also cause higher predation on chicks. Clam collection and fishing should also be limited during the breeding period.

What to do?
Wetland values can be increased through environmental restoration and effective management policies. Considering the first option, several cases have been developed in Italy. In Emilia-Romagna, for instance, the follo-
wing interventions have been carried out in Po River Delta (Costa, 2004) with an immediate improvement of population trends of birds of interest (Table 6). Another example is saltmarsh rebuilding in Venice lagoon, that has lead to nesting of many important waterbirds, several of them of community interest (Scarton & Valle, 1999). With regard to the second strategy, restoration, a good example is given by Tinarelli in Emilia-Romagna. In table 7 the main results are shown (Tinarelli, 2004).

Breeding waterbirds in FVG: acquired, reintroduced and disappeared species over the last 20 years
Colonization or recolonization of Friuli Venezia Giulia coastal area has also occurred, as shown in table 8. A lot of changes have been caused by the passive safeguard of coastal areas, such as decrease of disturbance, or by a natural increase of the breeding area. Conversely, the success of focused interventions seems to be low.

Conclusions and guidelines
1 – A standardized monitoring of breeding sites should be carried out, in order to gather data on breeding species and relative threats. A regional Red List should be prepared, and local action plans drawn in order to safeguard rare or endangered species.
2 – Improvement or restoration of breeding sites should be carried out.
3 – The disappeared saltmarshes in Marano lagoon should be recreated, and water removal reduced to ensure a proper outflow of freshwater in lagoon.
4 – Reedbeds not subject to tides should be conserved (valle Grotari, Valletta and Lisert) as they are very important for heron breeding, and woodlands surrounded by wetlands should also be safeguarded.
5 – The importance of grazed wetlands for breeding birds is controversial, whereas the importance is clear as foraging sites; the best option may be to alternate grazed and not grazed areas.
6 – Water levels should be controlled in not tidal areas, with very limited variations during the breeding season (April-July).
7 – The limitation of human disturbance and the control of terrestrial predators is also very important during breeding.
8 – Rule of the 15 days: if during the breeding period species of community interest appear in a protected area, all potential impactant activities are suspended.
9 – In fish farms managed also as hunting estates the maintenance activities should be performed after 15 July.
10 – The fundings for environmental conservations should not be concentrated in esigus and strongly infra-structured areas, but should be distributed on wider areas in order to conserve the biodiversity more effectively.
11 – It is urgent to adopt measures to avoid local extinction of Little Tern and Snowy Plover.
12 – It is urgent to increase the safeguard of heron colonies, adopting a proper management of the sites.