

Sacca di Goro: preliminary analyses and proposals for the management of the lagoon included in the SAC "Sacca di Goro, Po di Goro, Valle Dindona, Foce del Po di Volano"

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Sacca di Goro is a brackish lagoon in the area of Po River Delta, it covers a surface of 2700 ha, and it has an average depth of 1,5 m. Sacca di Goro is in the central southern part of the delta, bordering with Po di Goro (NE), Scannone di Goro (S) and Bosco della Mesola (W). A sandbelt of about 8 km forms a barrier with the open sea. Freshwaters come from Po di Goro, Po di Volano and Canal Bianco; whereas the water exchange with the sea takes places only at the lagoon mouths due to the tidal currents. Salinity is highly variable throughout the year. The bottoms are muddy and sandy, the latter being concentrated around the lagoon mouths. Scanno di Goro together with Sacca di Goro and Valle di Gorino are still very wild and are among the few naturalistic 'jewels' still present in Parco del Delta del Po and in general in the Region Emilia-Romagna.

Sacca di Goro is included in the SAC and SPA "Sacca di Goro, Po di Goro, Valle Dindona, Foce del Po di Volano" (IT4060005). It is also included in Parco regionale del Delta del Po dell'Emilia-Romagna, in Stazione Volano-Mesola-Goro and in Pre-Parco or Contiguous zones, as well as in B zones of special protection. The wetland called "Valle di Gorino e territori limitrofi" and most of the river mouth of Po di Volano, included in the wetland "Valle Bertuzzi e specchi d'acqua limitrofi" have been declared wetlands of international interest according to the Ramsar convention.

Hence, Sacca di Goro has a very high naturalistic value, and it is also important from the socio-economic point of view due to seashell farming. For this reason, the Regional Park Delta del Po Emilia-Romagna has assessed the efficacy of administrative and management tools for the safeguard of such a rich and complex environment, also taking into account the possibility to develop a Management Plan specifically dedicated to such a site.

To achieve such a task, a preliminary detailed study was carried out to better understand the characteristics and problems of the area. The study has taken into account human activities and habitats and species of community interest present in the area. A number of preliminary management measures have been suggested, in order to achieve a higher compatibility of the activities carried out in the area, integrating them with the needs of habitat and species conservation.

Human activities

About one third of the Sacca is given in concession to fishermen for shellfish collection (Tapes philippinarum and Tapes decussatus). The collection is done using "rasca manuale" or "idrorasca" tools that insist on lagoon bottoms. More than 1000 people are employed, the activity has flourished in recent years due to the high pro-

ductivities. In Sacca area traditional fishing is carried out, especially using fixed nets called "cogolli" or "trama-gli".

Waterbird hunting is carried out throughout the lagoon, except in the zone B of the Park and the Reserve. An increasing touristic development is also taking place, especially related to boat excursions and to people sun-bathing along the littoral belt.

Faunistic richness

Amphibians are not well represented in brackish areas. In the surrounding wood areas there is *Pelobates fuscus insubricus* which is a priority species. In Sacca di Goro the most common species is *Bufo viridis* and in some areas *Hyla intermedia* is present. Both species can tolerate slightly salty waters. Among reptiles, the presence of *Emys orbicularis* and *Caretta caretta* is of interest. Both amphibians and reptiles are negatively affected by the alteration of reproductive habitats (water variations, increase of salinity) and in case of *Caretta caretta* by maritime traffic, net fishing and tourism. The mammals of community interest are only a few, in particular *Hystrix cristata* and some bat species. On the contrary, the fish community is very rich in species of interest. In SAC "Sacca di Goro, Po di Goro, Valle Dindona, Foce del Po di Volano" there are 11 species of interest. Among these, *Acipenser sturio* and *Acipenser naccarii*, priority species and the latter endemic of Adriatic sea, forage in the area. An important presence is also *Petromyzon marinus*, *Alosa fallax*, *Knipowitschia panizzae*, *Pomatoschistus canestrinii* and *Aphanius fasciatus*. Freshwater fish populations are threatened by competition with not native species (e.g. *Silurus glanis* and *Gambusia hoolbroki*). Furthermore, fish populations are threatened by environmental alterations (pollution, barriers in the rivers, cutting of waterplants) and by fishing.

The site is also a IBA "Important Bird Area", called "Valle Bertuzzi e Sacca di Goro". The bird populations are therefore of international relevance during migrations, in winter and during the breeding season. A high number of waterfowl and waders rest and winter in the area (especially *Calidris alpina*, *Numenius arquata*, *Calidris canutus*, *Pluvialis squatarola*, *Calidris alba*, *Haemantopus ostralegus longipes*, *Charadrius alexandrinus*, *Ardearia interpres*, *Limosa lapponica*). During the breeding period there are important colonies of *Ardea purpurea* and of *Sterna albifrons*. Birds are mainly threatened by environmental alterations (pollution, loss of reedbed, saltmarshes, dunes), disturbance by hunters and fishermen, presence of tourists on the beaches.

Floristic and vegetational richness

In the site there are 13 Habitats of community interest (dir 92/43/EC "Habitat") and important floristic species, rare or threatened, such as: *Salicornia veneta*, *Bassia hirsuta*, *Triglochin maritimum*, *Spartina maritima*, *Limonium serotinum*, *Puccinellia palustris* and *Ruppia cirrhosa*. An investigation has been carried out to determine the distribution of *Ruppia cirrhosa* in the area. By analysing satellite images, the distribution of reedbeds of *Phragmites australis* has also been determined. The results are not promising. Seagrass bed residuals are found only in small portions of Valle Gorino and of Scanno di Goro e Volano. The reedbed in Valle di Gorino has been reduced of about 82% in 10 years. The environmental alterations, often induced by man, such as increase in salinity, turbidity, erosion and diffusion of allochthonous species are among the main causes of reduction and fragmentation of important vegetation formations, reedbeds and seagrass beds in primis.

Management priority objectives (according to Natura 2000 directives)

- Conservation and possibly increase of *Phragmites australis* facies and of seagrasses.
- Maintenance and possibly increase of breeding birds, and conservation of the ecological role of the site for refuge, rest and wintering of migratory birds.

- *Conservation and increase of fish populations of conservation interest.*
- *Conservation of riveline areas characterised by high naturality. Restoration and promotion of naturalistic management techniques of such areas.*
- *Sustainment of the local economy through the promotion of sustainable activities at low environmental impact, with particular attention to traditional fishing and naturalistic tourism.*

Possible actions

- *Monitoring in order increase the naturalistic understanding of the area, to plan the interventions properly, and to assess the trend to lagoonal environmental status.*
- *Guidelines for the management of reedbeds and seagrass beds in Valle Gorino.*
- *Maintainance of a sufficient water circulation.*
- *Guidelines for internal navigation in order to reduce erosion and disturbance.*
- *Guidelines for fishing activities and “capulerio” waste (residuals of bivalves derived from shellfish collection) in order to reduce the impacts on the bottom, to optimize the use of fish farm areas and to avoid the progressive decrease of channel sections.*
- *Guidelines for tourism to promote sustainable activities, in particular regulating the presence in critical periods for the fauna, and diversify the economic development.*
- *Divulagation and sensibilization actions in order to make the population conscious of the ecological importance of the area, and to explain the proper territorial management, use and fruition modalities.*



Salicornia veneta (Salicornia veneta) (foto: Archivio Parco Delta Po)