
TORRE GUACETO NATURE RESERVE - ITALY

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Torre Guaceto (Fig.1) is located in the Apulia region (ITALY), on the Adriatic coast, about 15 km North of Brindisi (40.7149°N-17.7989°E).

The name of the area comes from the Arabic terms "GAW SIT" that means "freshwater site".

In 1981 the Torre Guaceto wetland was included in the List of Wetlands of International Importance (the "Ramsar List") under the Convention on Wetlands (Ramsar, Iran, 1971) and it was declared Special Protection Area by the Italian Minister of Agriculture. The Italian Minister of Environment then has instituted a Marine Reserve, extended for 2.200 ha, in 1990, and a Nature Reserve extended for 1.100 ha, in 2000. Actually the reserve is administrated by Consorzio di Gestione di Torre Guaceto.



Figure 1: Torre Guaceto Nature Reserve

The Nature Reserve is characterized by a salt marsh area which extension is about 119,41 ha. The marsh is crossed by a network of canals built in the past in an attempt to reclaim the marshy area (Fig.2), which mark off areas of varying size. In the dry season, an un-asphalted road (submerged in the autumn-winter season) divides the wetland ecosystem into two distinct compartments. The mean depth of the marshy area is about 20 centimeters in the summer season and reaches 40-45 centimeters in winter and the system is covered by dense reeds (*Phragmites australis*), which are probably the dominant biological element of the system. The mean volume of the salt marsh is approximately $3,49 \cdot 10^5 \text{ m}^3$, doubling from summer to winter. The system therefore far from the hydraulic equilibrium during the year. The

entire system, consisting of the marine area and the saltmarsh area, seems to be in an oligo-mesotrophic state.



Figure 2: View of Torre Guaceto marshy area

At present, the marshy ecosystem did not receive localized surface water inputs but only meteoric and groundwater input. Precipitation is about 630 mm per year, with strong seasonality. In fact, the region is characterized by Mediterranean-type climatic variations, with meteorologically stable summers and unstable winters.



Figure 3: Torre Guaceto has been inscribed on the List of Wetlands of International Importance

The Torre Guaceto salt marsh ecosystem is located in the Canale Reale watershed (surface: 383 Km²), even though, nowadays the Canale Reale is physically separated from the marshy ecosystem by concrete dykes and (in the final section) by a concrete river bed. Therefore, the Torre Guaceto salt marsh ecosystem is fed by the watershed

through the water-bearing stratum present under the moist area, giving considerable freshwater input from many springs. However the marsh also receive marine inputs through the groundwater. The analysis of the elements in the groundwater shows a marine infiltration, with a salinity due to Cl^- , Na^+ and K^+ . By comparing the data with 1950 data on the groundwater it seems that the marine infiltration is increasing its importance in recent years, probably due to the water management in the area. The Canale Reale stream flows into the protected marine area, to the south of Zone A (the part of the reserve enjoying maximum protection).

In the marine reserve is possible to identify an area (Fig.4), protected to the north by a promontory and to the east by two islets, consisting of a sandy, shallow bay of about 144 ha for a total volume of $5,73 \cdot 10^6 \text{ m}^3$, that receives fresh or marshy water from the Canale Reale stream and from the outflow of the brackish ecosystem and the groundwater layer. Tidal variation in the area, taken from regional sea charts, is very low.



Figure 4: View of Torre Guaceto bay

LaguNet (<http://www.dsa.unipr.it/lagunet/>) is a scientific observational network studying the fluxes of nutrients and other contaminants from lagoon catchments to the near coastal environment. The objectives of LaguNet are to support and encourage co-operation of research groups studying lagoons, wetlands and saltmarsh systems situated along the Italian coast and to evaluate the application of the LOICZ (Land Ocean Interactions in Coastal Zones, a core project of IGBP) biogeochemical flux model and typology classification to such sites.

The methodology has been applied by LOICZ to approximately 170 coastal environments worldwide; it is based on a mass balance approach and provides important information on the flux of nutrients and ecosystem functions; the approach used is applicable to a majority of coastal ecosystems with data that are normally available

from conventional monitoring campaigns. In this way it is possible to compare and to group aquatic systems having different characteristics based on properties related to biogeochemical cycles and to the ecosystem functions that result from these processes.



Figure 5: LaguNet sites around the Italian peninsular

On the basis of this experience and considering the paucity of LOICZ sites in the Mediterranean and Southern Europe it was decided to apply this methodology to a series of Italian coastal environments where sufficient data are available.

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