

Challenging nature conservation in a peri-urban area

Constructed wetlands are treatment systems that use natural processes involving wetland vegetation, soils, and their associated microbial assemblages to improve water quality. The Parco Naturale Regionale Molentargius-Saline, located in southern Sardinia between the two cities of Quartu Sant'Elena and Cagliari (Italy), is a wetland of great international value. The way to the Natural Reserve institution has been long; several years of works were necessary to achieve the protection and survival of the ecosystem. An essential requirement for the success of this process was the realization of the Molentargius Protection Plan, financed by the Environmental Ministry, which planned to realize the constructed wetland called EcoSistema Filtro (ESF).



The changing of the ESF from its construction to 2009.

The ESF is a Free Water Surface System (FWS) covering about 37 ha. The ESF treats the wastewater coming from the Is Arenas depuration plant and it provides the appropriate quality and quantity water for the feeding of the freshwater ponds. During the years the ESF has become a suitable habitat for several protected species of plants and animals ("Habitat 1150" - Directive 92/43/CEE). The ESF performs a twofold action: it provides secondary treatment of the water coming from the Cagliari treatment plant, and it supplies and controls the water and biochemical balance of Bellarosa Minore and Perdalonga. The context within which the artificial ecosystem of ESF is located, its significant size, and the role it plays within the natural Park, made it a unique constructed wetland of its kind in southern Europe. In fact, the ESF offers an ideal habitat for the stopover, wintering, and nesting of bird species of considerable importance.

Floristic surveys conducted in the ESF from 2005 to 2013 have documented changes in the composition of vascular flora over time and describe the ecological differentiation and evolution of the plant communities. The flora of ESF comprised 275 taxonomic units, including 201 specific entities, 72 subspecific taxa, and 2 varieties, distributed in 25 orders, 51 families, and 161 genera. The rich floristic composition of this peculiar environment can be attributed to its location between a freshwater basin, Bellarosa Minore, and a saline one, Bellarosa Maggiore. The value of the flora is represented by the presence of endemic species that took advantage of the new saline and nitrogen-rich habitats developed after the construction of ESF.

The significance of the wetland for biodiversity conservation highlights the importance of identifying the correct balance between the need to protect and conserve wildlife and the operation and maintenance of a water treatment system located within a protected area. Included in a natural park, but trapped in a sprawling and rapidly growing urban context, the EcoSistema Filtro provides multiple uses and preserve local biodiversity. The ESF is thus an example of a constructed habitat in an urban setting that has become a key reservoir of local and regional biological diversity. Sites such as the ESF are thus important because they can act as drivers of sustainable development in areas in which most of the world's population now lives and comes into direct contact with nature.

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Publication

[Can Artificial Ecosystems Enhance Local Biodiversity? The Case of a Constructed Wetland in a Mediterranean Urban Context.](#)

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