

1 LOCATION

The “Valli di Argenta” site of community interest (IT4060001) is to be found in the area where the Idice and Sillaro streams flow into the Reno river, in the Italian province of Ferrara. The site includes two *Casse di espansione* (natural reservoirs): “Campotto-Bassarone” (about 560 ha) to the left bank side of the Idice stream, and “Valle Santa” (about 260 ha) to the right bank side of the same stream.

1.1 Habitats and species involved

In three natural reservoirs, both submerged and floating freshwater vegetation (*Nymphaeetum albo-lutae*, *Limnanthemetum nymphaeoidis*) and marshes vegetation (*Typhetum angustifoliae*, *Phragmitetum vulgaris*) have developed. Between the two natural reservoirs the *Bosco del Traversante* covers an area of about 150 ha (*Carici remotae-Fraxinetum oxycarpae*), a hydric forest mixed with *Ulmus minor*, *Fraxinus oxycarpa*, *Populus alba* and *Quercus robur* (code 91F0). There are important gallery formations of *Salix alba* and *Populus alba* (*Salicetum albae*) (code 92A0), along the river Reno and the reclamation canals, as well as sub-Mediterranean dry and semi-dry meadows (*Brometalia erecti*) (code 6212) along the bank escarpments. It is worth highlighting the following: the main Italian nesting colony of *Phalacrocorax carbo*, a colony of *Chlydonias hybridus*, today drastically reduced in numbers, nesting by *Botaurus stellaris* (today in small numbers) and by *Aythya niroca*, the heron population to be found in the forest, including *Ardeola ralloides*, *Nycticorax nycticorax* and *Egretta garzetta*. Other important species coming to this area include *Ixobrychus minutus*, *Ardea purpurea*, *Anas querquedula*, *Circus aeruginosus*, *Porzana parva*, *Porzana porzana*, *Locustella luscinioides*, *Acrocephalus schoenobaenus*, *Acrocephalus palustris*, and *Panurus biarmicus*.

Among insects, *Osmoderma eremita*, particularly the saproxilic kind, is present with a very small population living in a small number of trees; *Zerynthia polyxena* (lepidopter) has been found to be widespread in Valle Santa, *Lycaena dispar* (lepidopter) is a biological indicator species of wetlands quality.

As regards reptile fauna, the site sees the presence of *Triturus carnifex*, *Triturus vulgaris*, *Bufo bufo*, *Bufo viridis*, *Hyla intermedia*, *Rana dalmatina*, *Rana klepton* “*esculenta*”, *Emys orbicularis*, *Lacerta viridis*, *Podarcis muralis*, *Coluber viridiflavus*, *Natrix natrix*, and *Natrix tessellata*.

2 OBJECTIVES AND IMPLEMENTED ACTIONS

The general project objective was the restoration of environmental balances useful to the conservation, the improvement and the growth of habitats and species of community interest. The restoration of environmental balance is by definition a long-term objective, involving, as it does, complex interactions between biotic, abiotic and anthropic factors, including:

- defining criteria for the management of anthropic activities, with the aim of ensuring the hydraulic efficiency of waterways and casse d'espansione (natural reservoirs) and at the same time conserving the habitats associated to these environments;
- creating a long-term mechanism to ensure the survival of the species associated to them and the monitoring of vegetable and animal populations;
- restoring balance to environmental conditions, both in terms of water quality and presence of alloctonous vegetable and animal species.

The pursuit of the general objectives took the form of actions related to specific objectives.

2.1 **Objective 1 – Defining and applying criteria and methods for the management of anthropic activities in keeping with the naturalistic management of habitats and/or species, attainable by achieving coordination between the relevant owners and territorial bodies and the signing of specific agreement protocols**

To achieve this objective, an agreement protocol was signed between *Parco Regionale del Delta del Po*, Argenta Town Council, Rena Land Reclamation Consortium (*Consorzio della Bonifica Renana*), and the Technical Services for the river Reno basin of the Regional Government of Emilia-Romagna, for the eco-compatible management of anthropic activities (scything herbaceous areas, maintenance work in overbank areas for hydraulic purposes, water levels in the natural reservoirs and in the Bosco del Traversante, agricultural activities, etc.).

It is worth highlighting that the scope of the LIFE project, and in particular the participation of the 5 partners in jointly shaping the project, has been an essential tool for constructive discussion and relationship between the partners in relation to the institutional tasks of individual partners and to the objectives and management methods for the site.

A specific agreement was signed between the *Parco Regionale del Delta del Po*, Argenta Town Council, Rena Land Reclamation Consortium (*Consorzio della Bonifica Renana*), for the management of the plant nursery created within action C.4 with the aim of propagating autochtonous vegetable material. In particular, it must be pointed out that during the implementation of action C.4, the agreement signatories have developed the intention of transforming the “temporary” nursery, that is, a nursery with a life cycle corresponding to the

duration of the LIFE project, into a permanent one. This is an important and positive result in relation to the action objective and with practical results, i.e. the future production of autochthonous plant material to be used for naturalistic interventions on the site and in other plain areas with a high naturalistic value.

2.2 Objective 2 – Curbing the spreading of alloctonous vegetable species with a markedly invasive impact on autochthonous vegetation of community interest

The actions taken to achieve this objective are not directly linked to the elimination of allochthonous species; rather, they are aimed at developing curbing mechanisms or promoting the spreading of potential natural vegetation. The *Study of the forest structure (Studio dell'assetto forestale)* has yielded basic data on the forest cover of the site and on the presence and spreading of allochthonous vegetable species. Two experimental grounds have been created to test the effects of two different types of curbing actions on *Acer negundo*. Intensive improvement work on structure and flora has been carried out in the Bosco del Traversante over an area of 1,78 ha. Previously cultivated areas have been used to create 1,22 ha of forest in the plain, interspersed with 0.4 ha of wet shrubbery, including a recently-constituted wet area (0.18 ha). A nursery to propagate autochthonous plant materials has been built over an area of 0,379 ha. The nursery was used to carry out the above-described initiatives. The nursery-based propagation activities will continue, in order to provide a permanent supply of autochthonous plant material to be spread within the site.

2.3 Objective 3 – Analysing the factors inhibiting the development of forest cover in the area, with the aim of gaining insight into the cause-effect mechanisms of the latter and into the actions which need to be taken in order to control or eliminate such factors

The *Study of the forest structure (Studio dell'assetto forestale)* has produced a detailed analysis of the presence and relative weight of the inhibiting factors which have resulted in the current structure. The results of this analysis have made it possible to fully define the silviculture work and objectives and actions in the site Management Plan.

2.4 Objective 4 – Restoring ecological balance as regards water quality in the Cassa Vallesanta, which is seriously damaged by anoxia, and ensuring proper water circulation

To achieve the above objectives, the essential prerequisites were put in place. Specifically, a number of actions took place to improve water quality in the Cassa Valle Santa, whose effects necessarily imply a long-term view.

Canals were dredged for an overall length of 5,460 m, with consequences on water circulation in the basin on an area of about 150 ha; the dredged canals are the ones to be found in the area of the valley which is more directly involved in the water circulation system. Full working conditions have been restored in the Garda Alto weir, which permits water input into Cassa Valle Santa from the canal of the same name, which in turn takes water from the Emiliano Romagnolo Canal. The functionality of this weir is extremely important to allow the input of better quality water into Cassa Valle Santa.

As regards the biochemical changes in water quality, effects of dredging work can normally be seen after 1-2 years or more. A significant improvement in water quality in the Cassa Valle Santa can be obtained by increasing the input of better quality water from the Emiliano Romagnolo Canal and by reducing the input of agricultural drainage water.

2.5 Objective 5 – Curbing the spreading of *Myocastor coypus* which causes serious damage to aquatic and wetland vegetation and upsets the birds of community interest who build their nests near the water, such as *Botaurus stellaris*, *Aythya nyroca* and *Chlidonias hybridus*

Campaigns to catch *Myocastor coypus* were conducted in 2004 and 2005. Overall, 289 specimens were caught: 177 in 2004 and 112 in 2005. The catch was made in the Cassa Valle Santa, the Cassa Campotto and the Cassa Bassarone.

To achieve the present objective, it was verified that the nutria population currently living in the site is at reasonable levels, which do not represent a serious threat. The positive effects, in terms of reconstruction of habitats, vegetable and animal species, take longer in becoming apparent than curbing or elimination activities.

2.6 Objective 6 – Reducing the populations of allochthonous invertebrate and fish species, which are strongly invasive on the fish species of community interest

Curbing activities were focused on the *Silurus glanis* species, because of its characteristic high and prolonged reproductiveness, the absence of predators and the typical voracity of this species.

4 curbing campaigns were carried out between 2004 and 2005, by means of a direct current stunner. The technical features of the tool and the choice of the most suitable periods have made it possible to take selective action exclusively on the desired fish species.

The following quantities of fish were caught:

Year	Total catch (kg)
2004	2061
2005	7297
Total	9358

2.7 Objective 7 – Increasing the structural heterogeneity of helophytic vegetation, so as to create a suitable environment for the feeding of species such as *Botaurus stellaris*, *Aythya nyroca*, *Ixobrychus minutus*, *Ardea purpurea*, *Porzana sp. pl.*

The Cassa Valle Santa is an area of thick and mature cane thicket, where scything was carried out in irregularly distributed areas, for an overall estimated surface of 6,5 ha. The work has made it possible to significantly affect the layout of the cane thicket which has been thinned.

As regards the objective, an extract from the Italian Wildlife Institute (Istituto Nazionale per la Fauna Selvatica, INFS) final Report is worth highlighting here: *“.....Over the last few months, a specimen was seen on 14 October, 2 specimens on 4 November and a specimen on 13 January 2006 during the international censuses of wintering waterfowl (International Waterfowl Census). On 4 November a specimen was seen alighting on one of the scythed patches on the edge of the cane thicket (action envisaged in the Life Project to promote cane thicket diversification with the aim of maintaining some of the prerequisites of *Botaurus stellaris* e di *Aythya nyroca* habitats), as was the case on 13 January...”*

Morphologic and structural diversification is pursuable and maintainable through periodical renewal of cane thicket vegetation, by means of scything work repeated at different times of the year over alternating areas. The presence of *Botaurus stellaris* observed in the recently-scythed areas, cannot be attributed to chance, and can therefore be seen as a positive result, particularly if the site potential is taken into account.

2.8 Objective 8 – Reducing the impact of anthropic access to damp meadows on the bird species coming to damp meadows

Two tree hedges have been created to link the footpaths used for teaching activities and the damp meadows. The overall length of the hedges is 1,500 m. The shielding and protective effects will reach the desired level in a few years' time, when the newly-planted vegetation has reached a degree of maturity and development. A watching turret has been built between the Traversante Alto and Traversante Basso damp meadows, near the perimeter bank of the Cassa Campotto, so as to allow respectful watching of the bird fauna coming to the damp meadows.

2.9 Objective 9 – Creating appropriate habitats for the presence and reproduction of *Osmoderma eremita*

A very specific and peculiar objective is the building of suitable habitats for the presence and reproduction of *Osmoderma eremita*. In order to create ideal habitats for the growth of the small local population *Osmoderma eremita*, pollarding cuts were carried out on 100 specimen of white willow (*Salix alba*).

3 SHORT PROJECT ASSESSMENT

The following is a short summary of the positive results achieved in the project:

- 1) The signing of a agreement protocol between the Parco Regionale del Delta del Po, Argenta Town Council, Reno Land Reclamation Consortium (Consorzio della Bonifica Renana), and the Technical Services for the river Reno basin of the Regional Government of Emilia-Romagna, for eco-compatible management of anthropic activities, in keeping with the indications contained in the Management Plan.
According to the "*Habitat*" directive, for each SIC must be adopted, within six years from the instituton, the necessary conservation measures in order to his designation as Special Zone of Conservation.
- 2) Drawing up of the Management Plan for the site of community interest, that considers the requirements of habitats and species present in the site, with reference to existent relations at territorial level too.

The conservation policies of the Nature 2000 Net propose to integrate the total conservation measures with the planning at different government levels (international, national, local), according to what foresees the directive "*Habitat*".

At this purpose it is opportune to remember that the Territorial Plan of the Station “Campotto”, which is in phase of re-adoption, acknowledges and includes principles, rules and directions of the Management Plan elaborated within the LIFE project.

- 3) Building a nursery to propagate autochthonous plant materials, by producing materials used in the actions included in the LIFE project, and starting the propagation activities which partners intend to pursue on a permanent basis, so as to have materials for naturalistic interventions in the site and in other plain areas with a high naturalistic interest.
- 4) Carrying out a detailed study of forest vegetation in the site of community interest, and producing a detailed map of structural types which is a basic exploration tool to monitor current changes and future developments.
- 5) Carrying out intensive improvement work on the structure and flora of the Bosco del Traversante, covering an area of 1.78 ha.
- 6) Creating 1.22 ha of forest in the plain and 0.4 ha of wet shrubbery on previously arable land.
- 7) Dredging of 5.46 km of sub-lagoon canals in the Cassa Valle Santa to the advantage of a basin area covering about 150 ha.
- 8) Full restoration of working conditions to the hydraulic parts of the Garda Alto weir, connecting the Garda Alto drainage canal and the Cassa Valle Santa, both of vital importance in ensuring input of better quality water (from the Emiliano Romagnolo Canal) into the Cassa Valle Santa.
- 9) Curbing the population of *Myocastor coypus*, by capturing 289 specimens in the site of community interest over the period 2004-2005.
- 10) Curbing the *Silurus glanis* species, by catching 9358 kg of fish over the 2004-2005 period.
- 11) Scything over a 6,5 ha area to ensure morphologic, chronological and structural diversification of the cane thicket in the Cassa Valle Santa. All the actions mentioned at the points from 5 to 11 are situated within a picture of safeguard measures, directed to reduce, contain and/or avoid deterioration phenomena of the habitat and species for which the site has been instituted.
- 12) Carrying out surveys on the fauna (insect fauna, reptile fauna, bird fauna, and chiropter fauna) and flora (forest and damp meadows vegetation), to serve as basic reference to monitor evolutions and changes in habitats and species. Specific studies have been carried out on the eating habits of ardeids and on ornithic fauna associated to the forest environment of the Bosco del Traversante.
- 13) Producing an information leaflet and teaching package (5000 copies).
- 14) Organising public events and technical meetings about the site and the actions taken there.

By contrast, the negative aspects of the project are briefly illustrated below.

- 1) The delays accumulated over the entire project made it impossible to carry out the occasional management actions (category C) by the deadlines indicated in the timescale of the initial project proposal. This did not hamper the actual realisation of such actions, but it did hamper or decreased the significance of the monitoring activities subsequent to the interventions.
- 2) Failure to restore the *Brometalia erecti* habitat, with cancellation of this initiative, originally envisaged in the initial project proposal, in the changed version of action C5.

4 PROSECUTION OF THE PROJECT

As far as the prosecution of the project is concerned, it will be necessary in the future to carry out the monitoring of the contents of the agreement protocol among Po Delta Regional Park, Municipality of Argenta, Reno Land Reclamation Consortium, Technical Service of Basin River Reno.

As far the invasion of allochthonous species is concerned, it will be necessary in the future proceeding to interventions of direct control on the diffusion of *Acer negundo*; carrying on with the periodical cutting up of the shrub grove of *Amorpha fruticosa*; carrying out the treatments necessary for the cultivation of the arboreous and shrubby species implantation and realising new implantations; carrying on with the breeding activities for the production of vegetal material of autochthonous species; monitoring in the time the situation of presence and diffusion of the allochthonous vegetal species in the whole site.

It is besides necessary to proceed with the monitoring of the evolutions of the different structural types described and localised with the study of the forestal structure (action A.9) (specifically the species *Ulmus minor*); to increase the quality of the water in Cassa Valle Santa, introducing water from the Emiliano Romagnolo Canal; to monitor periodically the main biochemical water parameters within Cassa Valle Santa.

It is useful to carry on the periodical activities of monitoring and containing, leading little capture annual campaigns of the allochthonous fishes, of different species of *Silurus glanis*, as well of the population of *Procambarus clarkii*.

Repeated mowings in different times on alternated surfaces allow the periodical renewal and the morphological and structural differentiation of the reed thickets in Valle Santa.

It is at last essential to execute the necessary agricultural treatments (reparations, weedings, mowings, rescue irrigations, etc.) to allow the full achievement of the hedges of trees, created to reduce the disturbance of the didactical and recreational fruition of the site, and for the birdlife which frequents the humid meadows.