

# FOCE DELL'ISONZO REGIONAL NATURE RESERVE

## GENERAL LOCATION

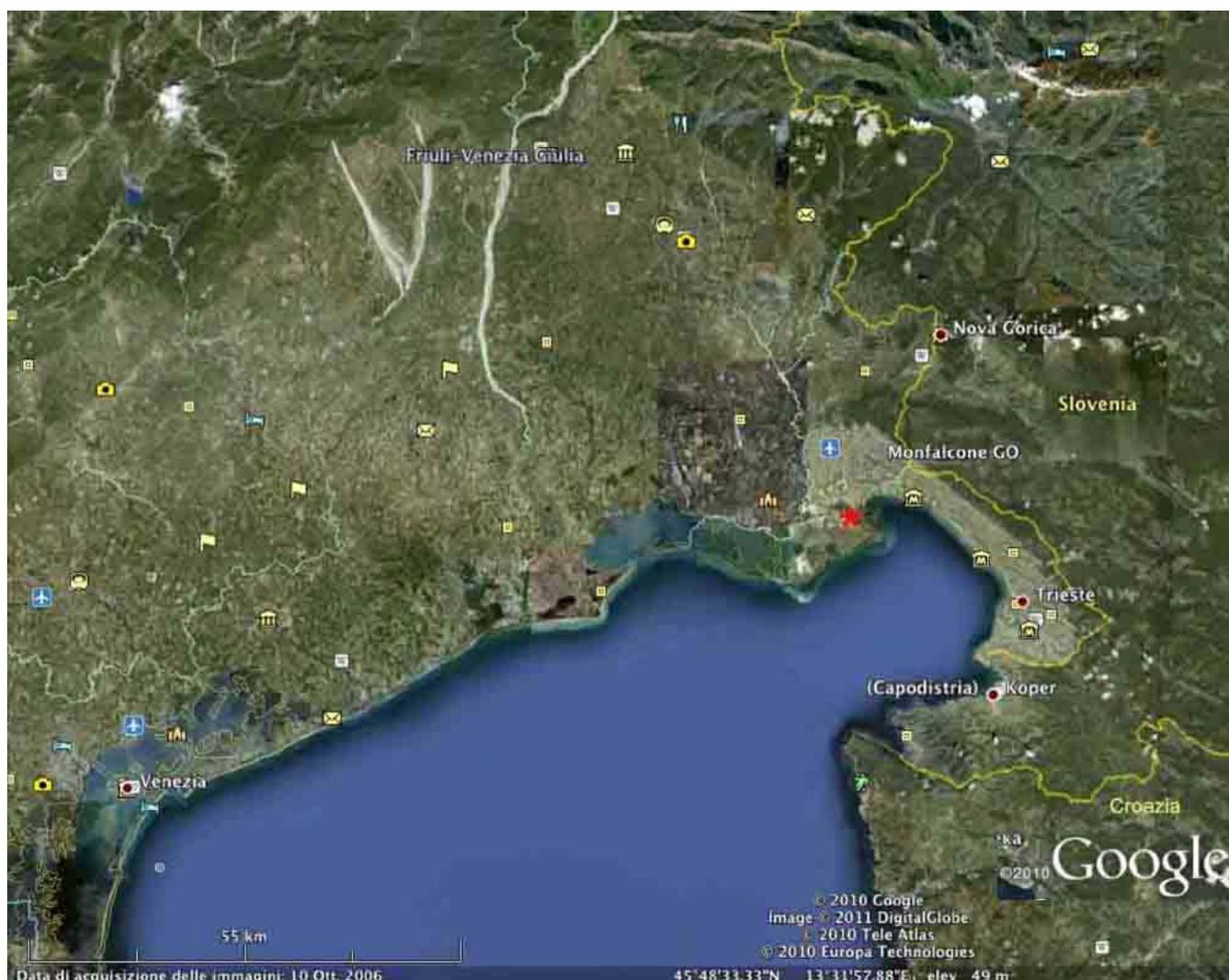
Nation: Italy // Administrative Region: Friuli Venezia Giulia // Province: Gorizia and Udine.

The wetland centre is about 6 km North as the crow flies from Monfalcone (26.000 inhabitants), 22 km East from Trieste (regional capital, 205.000 inhabitants) and about 100 km S-W from Venice (271.000 inhabitants – capital of Veneto Region).

The Nature Reserve is included within the following coordinates :

45°48'54"N-13°25'13"E 45°42'50"N-13°33'21"E 45°45'47"N-13°31'51"E 45°43'46"N-13°34'47"E

Cona Island Wetland Centre Coordinates – 45°45'22" N; 13°29'59" E



\* Wetland centre

From Google Earth 2010 (modified)

## LEGAL FRAMEWORK

Regione Autonoma Friuli Venezia Giulia – Direzione centrale risorse rurali, agroalimentari e forestali - Servizio caccia, pesca e ambienti naturali /// Consorzio dei Comuni di (Municipality consortium of: Staranzano (GO), Grado (GO), San Canzian d'Isonzo (GO), Fiumicello (UD).

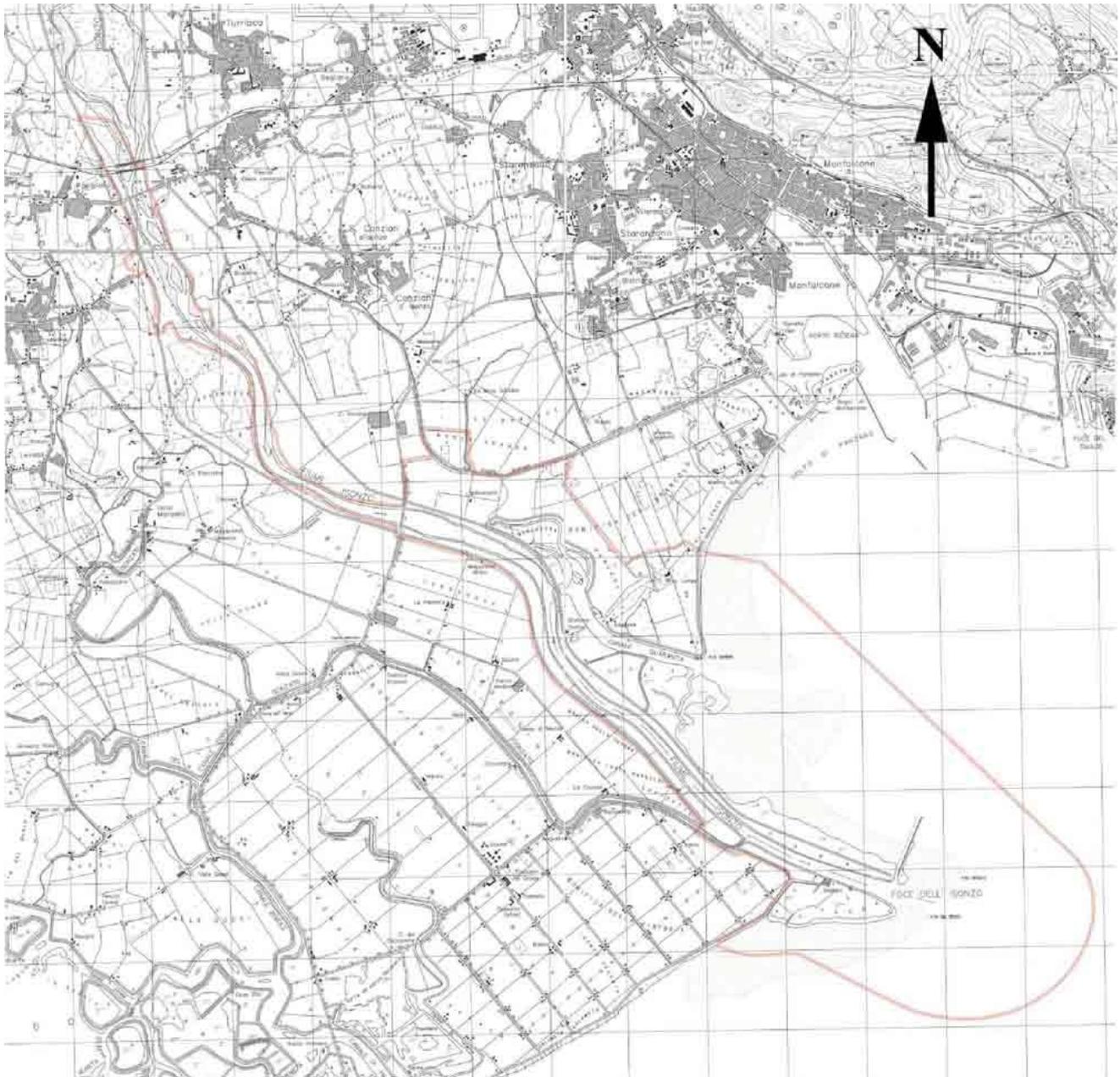
## MANAGEMENT AUTHORITY

Organo Gestore della Riserva Naturale Regionale Foce dell'Isonzo / Comune di Staranzano - piazza Dante Alighieri, 26 34079 Staranzano (GO) – Italy.

Chief executive: Fabio Perco “Stazione Biologica Isola Cona”, e-mail: fabio.perco@gmail.com

## AREA

2.340 hectares (approximately 1.200 within marine areas).



## ELEVATION

From a maximum of 9m above sea level to -3,5m isobath (under the sea surface).

## BOUNDARIES

The area lies along the last 15 km of the Isonzo River, including the mouth and a considerable portion of shallow sea. This place is located in the easternmost section of Northern Italy (Friuli Venezia Giulia Region). The area in the upper part is mostly limited to the river-bed (with emerging gravel islets) and limited floodplain portions. In the lower part it widens, covering agricultural surfaces along the river course and, more important, a vast wet area.

## GENERAL OVERVIEW OF THE SITE

The Mouth of the River Isonzo is a coastal wetland at the northernmost corner of the Adriatic sea (and of the Mediterranean sea) where the vast lagoon system of about 100.000 hectares (which includes the Po river mouth and the lagoon of Venice) meet at some point the first rocky cliffs of the Illyrian limestone area (Classic Karst). It mainly includes: shallow sea waters, mudflat tidal areas partially covered by eelgrasses carpets; salt and brackish marshes, gravel-sandy islets, reed beds, fresh water marshes; temporary wetlands, flooded meadows, small riverine and plain woods.

From 1989/1990 to 2001 a reclaimed and partially cultivated area of about 100 hectares has been restored and converted into a temporary flooded wetland, including permanent wet meadows, reedbeds, wooded areas, etc. The site regularly hosts relevant waterfowl numbers and rare animal and plant species. It also represents a very important eco-tourism, educational, research and bird-watching resort at an international level, which is regularly visited by more than 50.000 people in a year, both along terrestrial and boat routes.

#### **PHYSICAL FEATURES OF THE CATCHMENT AREA**

The Isonzo river is 129 km long and its catchment area covers a 3.400 km<sup>2</sup> surface. Before the spring-line it is mainly rain supplied and its hydrological character is "torrential", with very variable flows within a broad range of values. The upper part includes the eastern part of Julian Alps (a mainly dolomitic-limestone alpine area), and in more southern positions a Prealpine mountain area (mainly limestone and flysch) and then the Karst highlands (limestone). It has four principal direct tributaries. About 28 km from the river mouth it enters the plain (glacial-alluvial) area (Italy). This is divided by the so called "spring-line" into two sections: the high plain (with low groundwater table and prevailing gravel top soils) and the low plain (with high groundwater table, and sandy-silty-clayey top soils). Extending in less than 80 km as the crow flies from the alpine source to the Adriatic Sea, the catchment area is climatically very complex, with overlapping influences that often show themselves or prevail in relation with many factors (geomorphology, exposition, etc.). Along its mountain section (Slovenija), it has 4 hydroelectric weirs and other two for irrigation purposes in the Italian high plain (Gorizia and Sagrado), which definitely subtracts approximately 21 m<sup>3</sup>/sec freshwater to the river.

#### **PHYSICAL FEATURES OF THE SITE**

In the past millennia, just after the last glaciation and before any human intervention, the Isonzo river with its dynamic floods has naturally modelled this easternmost part of the Po plane.

In fact, in the Nature Reserve and in the nearby areas, we can recognize many canals as ancient paleo-riverbeds. In the upper part of the Nature Reserve, the river-bed is still distinguished by slight meandering, wide sandy-gravel deposits and shallow water levels. In the middle-final part the river-bed straightens, sandy-gravels deposits disappear and water depth reaches 12m. The final part of the river was once a little delta with two branches separated by the *Cona Isle: Sdobba* to the west and *Quarantia* on the east. Then, in the last century the river, with a dam and embankments, was forced on the *Sdobba* branch. At the river mouth there are two large growing silty-sandy sandbanks (with some emerging islets) recalling a typical 'counterslope' morphology found at the lagoon's mouth.

In the last decades many artificial big boulder protections were built along the banks to protect them from erosion. Natural erosion is currently active also along the salt-marshes and coastal section of the Nature Reserve.

In the Nature Reserve the principal soil types are: recent alluvial gravel soils closer to river-bed areas, particularly in the northern high plain section; recent alluvial limestone-dolomitic sandy or sandy-silty soils of the river banks and floodplains; silty-clayey soils with good amount of organic matter in the reclaimed freshwater wetlands areas; natural layered salty-silty soils with organic matter of salt-marshes areas; sandy coastal deposits.

Freshwater quality (according to IBE method) is classified as "slightly polluted" or "eutrophic" and it is appropriate for cyprinids and salmonid life.

The Isonzo delta area (with the adjacent coastal area of Monfalcone) is the final part of the low and still partly marshy coastal section of the Adriatic Sea (from the Po delta through Venice and Grado-Marano lagoons) before the Illyrian-Karst high rocky coasts.

The Gulf of Trieste tides are the largest in the Mediterranean sea, with two high and two low tides every 24 hours and 52 minutes. The average maximum spring tide is 86 cm, whilst the average maximum neap tides is 22 cm. The combination of irregular factors (drought, winds, air pressure and oscillations in the average level of the Adriatic Sea) may produce extreme tide phenomena that can range from 150 cm above to 150 below mean sea level.

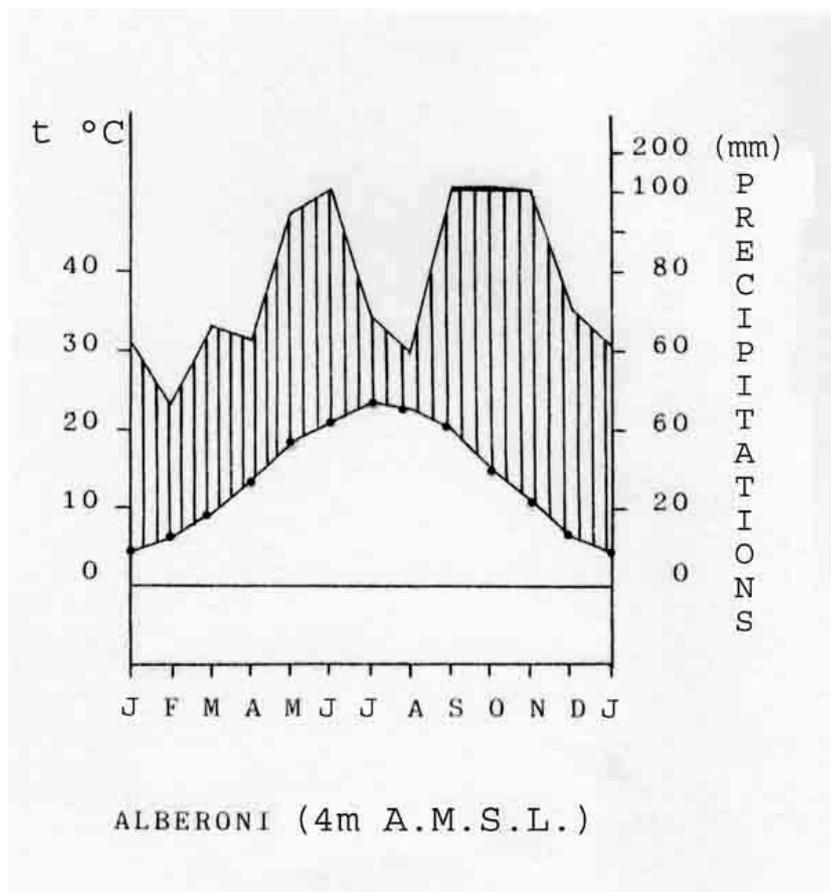
The salinity of the Adriatic Sea is equal to 37,5‰, while in waters around Cona Isle the values decrease to below 35 ‰ for fresh waters coming from the rivers Isonzo and Timavo (underground Karstic river). The salt water front moves (beneath freshwater) upstream depending on the phase of the tide, almost as far as the first bridge along the provincial road s.p.19. During floods, freshwater full fills all the river-bed.

The sea temperature usually varies with air temperature with a time-lag of nearly a month.

At its arrival in the high plain, the river appears to lose most of its flow. It partly recovers along the spring-line, at the juncture between the high and low plain, more or less near the bridge of Pieris along the national road s.s.14. (at the northern limit of the Nature Reserve), where the ground water level table (which is also supplied by underground flow from the Karst highlands) almost reaches the surface. Here the normal regime of the river flow increases drastically, reaching 50 m<sup>3</sup>/sec'.

The climate, temperate-humid, has intermediate characteristics between continental and mediterranean conditions, with not very wide thermal excursions.

The annual average temperature is 13.2°C. The air temperature (very variable) is highest in July (rarely in August), while the coldest month of the year is January. Temperatures reaching 37°C are often recorded during the summer. The rainfall is estimated at approximately 1095 mm/year, with the highest peak in autumn (from September to November) and a secondary peak in May and June. As precipitation exceeds 50 mm in the driest month, the area falls within the Central Europe - northern Adriatic-type climate. It is worth highlighting the strong influence of NE wind (Bora), hardly blowing overall in winter from the Russian-Siberian anticyclone, and the Sirocco that can also blow hard and be the cause of particularly high tide phenomena.



*Isola della Cona* Climatic Diagram

### BIOGEOGRAPHY

The area is included in the Temperate Bioclimatic Region, Alpine Geographic Section and develops from supra-temperate to meso-temperate level (Rivas-Martinez Bioclimatic classification, currently used by botanists).

As we are in the northernmost wetland of the Mediterranean Sea, in junction with continental areas, biogeographic domains overlap. This area represents a part of the junction between the Italian Peninsula low coasts and the limestone cliffs of the Balkans.

### FLORA

The local flora (about 640 species) includes approximately 50% "continental" and 27% "mediterranean" (mainly euri-mediterranean) species. For this reason the area is very peculiar, even if relatively small.

The area supports the following principal vulnerable and endangered species (for complete lists see also Section Habitat, Flora e Vegetazione):

Red Lists of Italy Plants <sup>(1)</sup> species	
Species	IUCN categories
<i>Nymphoides peltata</i> (Gmelin.) Kuntze, <i>Plantago cornuti</i> Gouan, <i>Senecio paludosus</i> L.	Endangered
<i>Allium angulosum</i> L., <i>Allium suaveolens</i> Jacq., <i>Cirsium canum</i> (L.) All., <i>Hottonia palustris</i> L., <i>Orchis palustris</i> Jacq., <i>Plantago altissima</i> L.	Vulnerable
Council Directive 92/43/CEE (Habitats Directive - Nature 2000) - Annex II <sup>(3)</sup> Species	
Species	Notes
<i>Salicornia veneta</i> Pignatti & Lausi	Priority species. Biogeographically important as endemic of the northern shallow coastal section of the Adriatic Sea, from Venice Lagoon to Capodistria (Koper - Slovenija). The area is relevant as a connection between the western and Eastern boundaries of the species area.
<i>Gladiolus palustris</i> Gaudin	

Besides the species already cited above, the area hosts other noteworthy plant species:

Regional Red Lists of Italy Plants Species with IUCN categories: 1 Extinct in nature species (*Sium latifolium* L.), 11 Vulnerable species, 2 Low risk species. Council Directive 92/43/CEE - Annex V Plant Species: 2 species: *Galanthus nivalis* L. subsp. *nivalis*, *Ruscus aculeatus* L. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix II plants: 11 species, 10 of which are orchids.

Plant species locally protected by regional (Friuli Venezia Giulia) act: L.R. 9/2007, art. 96<sup>(6)</sup> DPR 20 marzo 2009, n. 074/Pres.: besides species included in the above lists, in this category fall other 6 species present in the Nature Reserve.

## FAUNA

The site is the first (or the last) wetland of this northern side of the Mediterranean Sea, and it is relevant as a wintering or stopover refuge (rich in food resources) for a high number of specimens belonging to many bird species during autumn/spring migrations. The restored areas are protected resting areas for birds during bad weather events (strong Bora wind etc.).

Mainly after habitat restoration, hunting bans and visitors' disturbance mitigations, many species of European importance (150, according to directives in force) that were endangered or locally decreasing, have remarkably increased. Many species, included in Annex I of Council Directive 79/409/EEC (Birds Directive, now replaced by C. D. 2009/147/EC), have been observed or are regularly present, i.e., e.g.: *Ixobrychus minutus*, *Circus aeruginosus*, *Pernis apivorus*, *Himantopus himantopus*, *Burhinus oedicnemus*, *Charadrius alexandrinus*, *Sterna albifrons*, *Alcedo atthis*, *Caprimulgus europaeus*, *Dryocopus martius*, *Lanius collurio*. So it is for the C. D. 92/43/EEC (Habitats Directive) annex II or IV species. It is worth naming at least the following ones: Mammals: *Pipistrellus kuhlii*, *P. nathusii*, *Nyctalus noctula*, *Eptesicus serotinus*, *Felis sylvestris*, *Tursiops truncatus*, *Stenella coeruleoalba*, *Delphinus delphis*. Reptiles: *Emys orbicularis*, *Caretta caretta*, *Lacerta viridis*, *L. muralis*, *L. sicula*, *Coluber viridiflavus*, *Elaphe longissima*, *Natrix tessellata*. Amphibians: *Triturus carnifex*, *Bufo viridis*, *Rana lessonae*, *R. latastei*, *R. dalmatina*. Fresh water Fishes: *Petromyzon marinus*, *Acipenser naccarii*, *Alosa fallax*, *Aphanius fasciatus*, *Salmo trutta marmoratus*, *Leuciscus souffia*, *Chondrostoma genei*, *Alburnus alburnella*, *Cobitis taenia*, *Cottus gobio*, *Knipowitschia panizzae*, *Pomatoschistus canestrini*. Invertebrates: *Pinna nobilis* (Mollusca), *Zerynthia polyxena*, *Coenonympha oedippus*, *Lycaena dispar* (Lepidoptera).

As for some plant species, there is a contemporary presence of species characteristic of northern continental areas, and southern mediterranean ones (e.g. birds as: black woodpecker and sardinian warbler; common eider and little bittern; crested tit and cetti's warbler). In the same way, species with western or eastern distribution have their borders in this particular geographic area [e.g.: *Rana latastei* and *Rana dalmatina*; *Rana esculenta synklepton lessonae* and *Rana ridibunda*; *Hyla intermedia* (syn. *Italica*) and *Hyla arborea*], which is present in the nearby Trieste province.

The site is also a unique example within the Northern Adriatic area of wetlands whose ecological function is fundamental both for waterbirds and bird species living and/or breeding in rocky, quite dry, areas (e.g. peregrine falcons breeding in the nearby cliffs of the Karst, relying on abundant quarries within the Isonzo river-mouth).

### SOME NUMBERS

Fresh water Fishes: 38 species; salt/brackish water Fishes: more than 90 species; Amphibians: 11 species; Reptiles: 13 species; Mammals: 35 species; Birds: 322 species (106 of them breeding within the Nature Reserve area); Invertebrates: Lepidoptera: approximately almost 300 species, Odonata: 35 species (recorded in 2008-2010). Among these, particularly important are *Selysiothemis nigra*, which represent the northernmost record in West Europe and *Anax ephippiger*, a migratory species coming from arid zones of Africa, Middle East and SE Asia (Pers. Comm. - by J.-J. Mekkes and C. Uboni).

For such a “small” site, the total number of bird species until now recorded here is exceptionally high at a European level. The Isonzo river-mouth, in fact, regularly supports more than 20.000 waterbirds in winter (up to 47.000 in November 2003; normally beyond 50.000 non Passeriformes). The majority of them are wildfowl (swans – up to 700, geese – up to 3.500, ducks – up to 40.000) but a relevant percentage is represented by cormorants, shags, divers, grebes, herons, rails (particularly the coot: up to 17.000), gulls, waders etc.

As the marine part of the Nature Reserve covers about 1.200 ha of shallow waters (with relevant extensions of eel grass prairies), it regularly supports significant populations of characteristic fish species of coastal areas along the northern Mediterranean sea (e.g. *Liza sp. pl.*, *Dicentrarchus labrax*, *Solea vulgaris*, *Sygnathus acus*, *Aphanius fasciatus*, etc. *Alosa fallax* is an anadromous species which has been previously mentioned for this area.

It represents also an important piece of the ecological corridor between the Adriatic Sea and the sub-alpine area (Julian alps). It hosts many other fish species and sub-species of high naturalistic value. In particular, it is very important in the conservation of the cobice sturgeon (*Accipenser naccari*), endemic species in extinction risk, which reproduces in the inner running freshwaters and develops in the sea or in the river mouth. The most recent sightings of this species in the FVG region are located in the low Isonzo basin, and the Nature Reserve area is the only one that connects the Triest Gulf with the southern sites where this sturgeon species has been observed in the last decade. On the other hand, Nature Reserve brackish and freshwater ponds and swamps are important habitats for the conservation and the growth of the European eel (*Anguilla anguilla*), which is in a general strong decline and threaten. Freshwater running waters host *Salmo marmoratus*, one more important endemic species of the Padano -Veneto plains (ancient left bank affluent of the Po River).

### **MAIN HABITATS**

The area is an important bio-genetic reserve within a biogeographic (Mediterranean-Balkan/Illyrian-Continental) bordering man-altered territories. Main habitats are below mentioned and briefly described and, if they are also Nature 2000 habitat, appointed using the *Council Directive 92/43/CEE Annex I* definitions (bond font).

#### OPEN SEA AND TIDAL AREAS

**Sandbanks which are slightly covered by sea water all the time** Corine91<sup>9</sup> code: 11.125, 11.22, 11.31 / Nature 2000 code: 1110

Sub-littoral sandbanks permanently covered by sea water, with or without *Zostera marina* prairies (in brackish-salt waters), *Cymodocea nodosa* prairies (in salt waters) and *Zostera noltii* prairies in shallower salt waters.

**Estuary** Corine 91 code: 13.2, 11.2 / Nature 2000 code: 1130

The downstream part of the Isonzo river is subject to the tide and extends itself from the limit of brackish waters (more or less corresponding to the bridge on the provincial road s.p.19) to the sea. The mixing of fresh with salt waters and the reduced current flowing in the shelter of the estuary, lead to the deposition of fine sediments, forming extensive intertidal sand and mud deposits (incipient formation of a delta at the mouth of the estuary).

Main habitats: benthic algal communities, *Zostera* beds, *Spartina maritima* swards, etc.

Inside the river embankments, in the un-reclaimed surfaces, is evident the predominance of brackish waters. The habitat is flooded by fresh waters and the soils are more or less permanently wet. There are various interesting habitats as rushes prairies (*Juncus gerardi*, *J. maritimus* and *J. acutus*), populated by Red Lists species. There are also *Phragmites australis* and *Scirpus maritimus* reed-belts. Where fresh waters prevail, there are other types of reed thickets (*Typha* species thickets, etc.).

**Mudflats and sandflats not covered by sea water at low tide** Corine91 code: 14 / Nature 2000 code: 1140

Sands and muds which emerge during low tides, partially covered by *Zostera noltii* beds and partly devoid by vascular plants and coated by green, blue, brown algae and diatoms.

#### NATURAL BEACHES

**Annual vegetation of drift lines** Corine91 code: 17.2 / Nature 2000 code: 1210

Formations of annual plants (*Cakiletea*) occupying accumulations of sand with drift material rich in nitrogenous organic matter. Main species are: *Cakile maritima*, *Salsola kali*, *Altriplex latifolia*, *A. tatarica*.

#### SALT MARSHES AND SALT MEADOWS

**Salicornia and other annuals colonizing mud and sand** Corine91 code: 15.1 / Nature 2000 code: 1310

Salt pioneer formations (*Thero-Salicornietea*) with annual glasswort swards (*Salicornia patula*, *S. veneta*) and herbaceous seepweed (*Suaeda maritima*) on muds or organic deposits periodically inundated by sea water.

**Flat leave cordgrass swards** (*Spartinion*) Corine91 code: 15.21 / Nature 2000 code: 1320

Perennial pioneer grassland of coastal salt muds, constantly wet and regularly inundated by high tide, and dominated by flat leaved *Spartina maritima*.

**Saltmarsh couch beds** (*Agropyron pungentis*) Corine91 code: 1330

Nitrophilous tall grass communities with *Elymus pycnanthus* (*Agropyron pungens*)

**Mediterranean salt meadows** (*Juncetalia maritimi*) Corine91 code: 15.5 / Nature 2000 code: 1410

Various communities of *Juncetalia maritimi* wet by means of brackish to salt water.

- Tall rush salt marshes dominated by *Juncus maritimus*, with *Juncus acutus*, *Carex extensa*, *Aster tripolium*, *Plantago cornuti*, *Limonium vulgare*, ecc. Corine91 code: 15.51
- Halophilic marshes with *Puccinellia festucaeformis* Corine 91 code: 15.55

*Juncetalia maritimi* habitats are the most extended in the salt marshes of the area.

**Mediterranean and thermo-Atlantic halophilous scrubs** (*Arthrocnemetea fruticosae*)

Corine91 code: 15.6 / Nature 2000 code: 1420

Perennial vegetation of marine salt muds mainly composed by dwarf shrubs, essentially with mediterranean-atlantic distribution (*Salicornia*, *Suaeda* and *Limonium vulgare*, *Atriplex* communities.

Main species: *Arthrocnemum fruticosum*, *Halimione portulacoides*, *Inula crithmoides*, *Artemisia coerulescens*.

#### FRESHWATER HABITATS

**(Salix elaeagnos) gravel bank thickets** Corine91 code: 24.224 / Nature 2000 code: 3240

Willow thickets (*Salix elaeagnos*, *S. purpurea*) on gravels of exposed river-bed, in the upper part of the area. They occupy the positions regularly submitted to flood violence.

**Floating and submerged vegetation with Ranunculus trychophyllus** Corine91 code: 24.4 / Nature 2000 code: 3260

*Ranunculon fluitantis* and *Callitriche-Batrachion* submerged or floating vegetation in channels and main ditches.

Main species: *Potamogeton* spp., *Ranunculus trychophyllus*, *Callitriche* sp.pl., *Sium erectum*, ecc.

**Reed bed thickets (Phragmition)** Corine91 code: 53.1

Species-poor reed bed formations of tall helophytes. Usually dominated by one species (*Phragmites australis*, *Typha angustifolia*, *T. latifolia*, *Cladium mariscus*, *Schoenoplectus tabernaemontani*, ecc.), growing in stagnant or slowly flowing freshwater of fluctuating depths and sometimes on only waterlogged ground.

**Tufted sedge tussocks (Caricetum elatae)** Corine91 code: 53.2151

Waterlogged river banks prairies, dominated by *Carex elata*.

#### NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS

**Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae)** Corine91 code: 34.75 / Nature 2000 code: 62A0

Semi natural dry grassland with or without shrubs on alluvial and mainly calcareous soil, with a rich variety of orchid species (*Ophrys holosericea*, *Orchis coriophora*, *O. militaris*). This habitat is found in the northern part of the area and is generally considered endangered because of a strong alien shrub species proliferation and exploitation for arable land.

Main species: *Chrysopogon gryllus*, *Bromus erectus*, *Botriochloa ischaemon*, etc.

**Mediterranean tall herb and rush meadows (Molinio-Holoschoenion)** Corine91 code: 37.31 / Nature 2000 code: 6420

Wet and pastured meadows along the river, inside restored areas, etc. Main species: *Holoschoenus australis*, *Schoenus nigricans*, *Oenanthe lachenalii*, *Alibaea officinalis*, *Sonchus maritimus*, etc. and many precious ones as *Allium angulosum*, *A. suaveolens*, *Cirsium canum*, *Gladiolus palustris*, *Orchis laxiflora*, *Plantago altissima*. Thickets of the exotic shrub *Amorpha fruticosa* grow in abandoned sites.

**Lowland hay meadows** Corine91 code: 38.2 / Nature 2000 code: 6510

Species rich hay meadows of the plain to sub-montane levels (*Arrhenatherion*) present in some fields of the area and on embankments sections. Main species: *Arrhenatherum elatius*, *Centaurea jacea*, *Crepis biennis*, *Daucus carota*, *Leucanthemum vulgare*, *Leontodon hispidus*, ecc.

## FORESTS

### **Illyrian oak–hornbeam forests (*Erythronio-Carpinion*)** Corine91 code: 41.2A / Nature 2000 code: 91L0

Little coppiced woods on tendentially wet alluvial soil, with clay and silt, residual of ancient plain wet forests, with some floristic glacial relicts.

Main species: *Fraxinus angustifolia*, *Ulmus minor*, *Quercus robur*, *Viburnum opulus*, *Staphylea pinnata*, *Ruscus aculeatus*, *Allium ursinum*, *Polygonatum multiflorum*, *Galanthus nivalis*, *Ornithogalum pyrenaicum*, *Leucojum aestivum*, and some micro-thermic species, local relicts of the last Glacial Period (*Mercurialis perennis*, *Veratrum album*, *Lilium martagon*).

### **Salix alba and Populus alba galleries** Corine91 code: 41.141 and 44.6 / Nature 2000 code: 92A0

Residuals of riparian woods along the Isonzo river banks, on young, sandy-silty soils, with more or less slow drainage, submitted to floods and coppiced. *Salix alba* thickets occupy the positions of banks most exposed to flood violence. Main species: *Populus nigra*, *P. alba*, *Salix alba*, *Sambucus nigra*, *Rubus caesius*, *Carex pendula*, ecc.

As a result of the awful management of the past, these woods are often degraded by strong presence of brambles and exotic pests as: *Acer negundo*, *Populus x canadensis*, *Robinia pseudacacia*, *Amorpha fruticosa*, *Lonicera japonica*.

## ARABLE LAND

Inside dams (right bank) there are still some cultivated surfaces.

The dry-land outside the Nature Reserve (entirely private land) is intensively cultivated (maize, soy-bean, sugar beet, hybrid poplar for cellulose) however, some little wet areas, small coppiced woodland patches, freshwater canals and ditches with pond-weeds and other aquatic species populations, still remain.

In the last few years, interventions such as reforestation, hedge plantation and hay meadow creation increased on arable land - interventions due to EU (European Union) financial contributions and carried out by using (prevalently) autochthonous species (woods and hedges).

### Ecosystem services of the site and derived benefits

In addition to the role of biogenetic reserve (for local habitats, species and landscape features), particular ecosystem services are those related to fish stocks population dynamics and the function of buffer zone related to the river waters and hydrogeological protection of inland areas.

The consistent restoring works, carried out since early 90s of the last century, have transformed about 100 ha of arable land into temporary freshwater marshes (a habitat which was no more present in the area). This action has increased biodiversity in terms of new wet habitats and species richness, providing also the opportunity to locally extinct species to come back.

The “Cona Island Wetland Centre” area is an example of an environmental sustainable/friendly structure. Since the year 2006, it became energetically self sufficient, by a photovoltaic, a thermo-solar power plant and by a short supply chain biomass plant used for heating.

## **OTHER CULTURAL VALUES**

Despite the nature conservation values of the site, this location it is believed to be occurring in a mythic area, sited near and around the springs (and mouths) of Timavo river. Here in ancient times the legend reports the presence of *Diomaedes* and his people, coming from Troy destroyed. *Strabo*, greek author living during *Augustus* time, describes the area in his “*Geographia*”. He describes an ancient sanctuary dedicated to the Goddess *Diana – Artemis* and the “famous” horses of the Veneti. The Isonzo River, according with some modern historians, is also a possible site for the mythic *Eridanus flumen* and the *Electridae insulae*, a strategic port where precious amber arrived from the Baltic area, after crossing the continent, brought by commercial caravans. Here it was loaded on the boats (along with other materials) to be brought to Rome and other Mediterranean locations. Such intense activity found its main location in the near town of *Aquileia*, founded by the Romans later on (181 BC).

## **LAND OWNERSHIP AND USE**

Within the Nature Reserve:

- Private lands are about the 20% of the total areas (mainly inland cultivated areas outside the river dams, but cover also some river banks areas – cultivated, wooded and afforested - and some natural areas such as part of the saltmarshes and wet meadows)
- Regional and local municipalities public properties cover about the 30% of the total areas [Regional properties extend over river bed and river banks surfaces, especially in the lowest brackish section of the river, they also cover some coastal areas and the Quarantia channel, an old, closed branch of the Isonzo delta. Local municipalities properties cover wet areas, mainly restored (Staranzano Municipality)].
- State owned areas cover almost the 50% of the total. They cover some northern river-bed and river banks areas, parts of saltmarshes and brackish reed-beds areas, marine areas.

The dry land outside the Nature Reserve (almost entirely private) is intensively cultivated with agro-industrial systems (anyway favourable feeding areas for wintering geese). As we are in a reclaimed area with surface water

ground table, fresh water must be pumped out to keep the cultivated surfaces dry enough. The water pumped out is sent to the sea by means of canals.

## **FACTORS ADVERSELY AFFECTING THE SITE'S ECOLOGICAL CHARACTER**

### **A) WITHIN THE NATURE RESERVE**

In the first decades of the last century almost the entire territory (which was completely natural) along the coast (reed-beds and salt-marshes) and along the river (reed-beds, woods, pastures) was reclaimed, drained and converted from wetland to arable land. Almost all the original streams in the surroundings were canalized and the river itself was dammed. Reclaiming works and wood exploitation continued through the seventies till the early eighties. Arable land increased also along the right river-bank in the last decades. On the other hand, in the last years some forestation in flood-plain areas have been made.

Disturbance by professional fishing in the mudflat area along with the accidental catch of birds in the nets is still a relevant problem, in the same way it is a problem the salt-marshes erosion both for natural and artificial trampling in (nets deposit areas).

Other disturbances are: holidaymaker boating activities along the marine borders during summer, mussel unprofessional collection regularly performed along the tidal areas, angling along the banks in the upper part of the river.

There is also a new project of nautical marina inside the Nature Reserve.

Natural adversities are: increasing sea levels, erosion along the river and on salt-marshes, the evident increasing presence of animal alien species (as *Procambarus clarkii*, *Myocastor coypus*, *Harmonia axyridis*) and plant alien species (*Acer negundo*, *Robinia pseudacacia*, *Amorpha fruticosa*, *Lonicera japonica*, *Aster squamatus*, *Fallopia japonica*, etc.).

### **B) IN THE SURROUNDING AREA**

Main problems are also intensive agriculture and industrial areas expansion (in farther locations close to Monfalcone), with obvious consequences on habitat fragmentation. As major long term problems: the slow increase of sea levels and the increasing presence of the same animal and plant alien species mentioned above.

## **CONSERVATION MEASURES TAKEN**

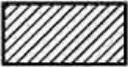
The area is a Regional Nature Reserve (Riserva Naturale Regionale *Foce dell'Isonzo*) instituted in 1996 by Regional Act n. 42/96, according to the rules of national law on protected areas n. 394/92.

It moreover falls in two declared Natura 2000 areas: a Special Protection Area for birds (SPA) [Last Legal Act: D.M 19 giugno 2009 *Elenco delle Zone di Protezione speciale (ZPS) classificate ai sensi della Direttiva 79/409/CEE*] and a Site of Community Importance (SCI) for other important species and habitats [Last legal act: D.M. 30 marzo 2009 *Secondo elenco aggiornato dei siti di importanza comunitaria (SIC) per la regione biogeografica continentale in Italia ai sensi della Direttiva 92/43/CEE*]. SPA and SCI areas, which cover the same surfaces, are named Foce dell'Isonzo - Isola della Cona, with code IT3330005. The SPA/SCI area is wider and does not coincide totally with the Regional Nature Reserve (even if most part of this one lays within the boundary of SPA/SCI surface itself), and includes a smaller marine area and about 100 hectares of cultivated land (See map below). It is worthwhile remember here that, according to the same Directive 92/43/CEE: “A Site of Community Importance means a site which, in the biogeographical region or regions to which it belongs, contributes significantly to the maintenance or restoration at a favourable conservation status of a natural habitat type in Annex I or of a species in Annex II and may also contribute significantly to the coherence of Natura 2000 referred to in Article 3, and/or contributes significantly to the maintenance of biological diversity within the biogeographic region or regions concerned”.

The Regional Nature Reserve is also close (about 4 km straight line distance) to the already declared Ramsar Site of Valle Cavanata which is located in a more southern position.

The whole proposed site (Nature Reserve) is included into an “Important Bird Area”.

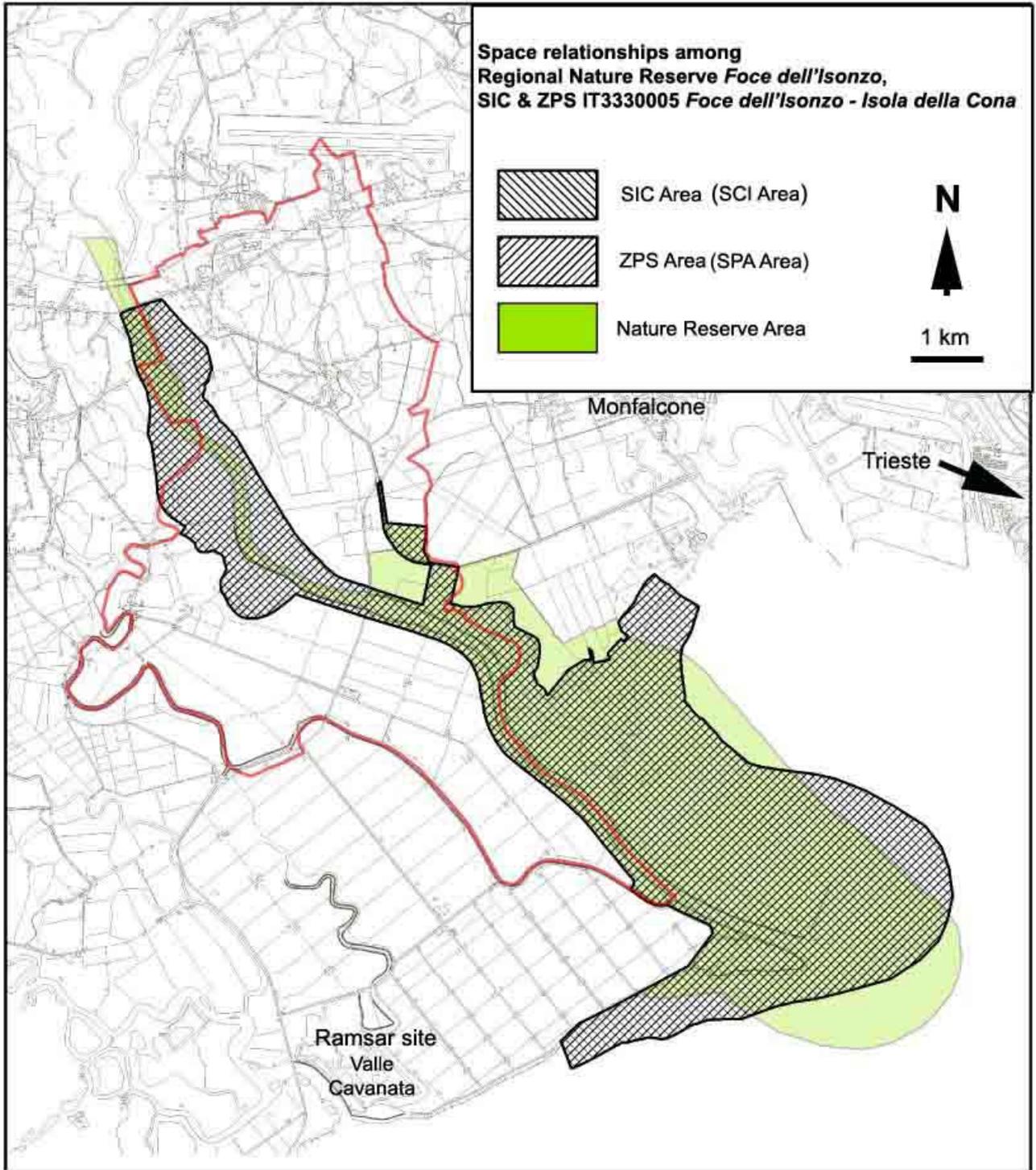
**Space relationships among  
Regional Nature Reserve *Foce dell'Isonzo*,  
SIC & ZPS IT3330005 *Foce dell'Isonzo - Isola della Cona***

-  SIC Area (SCI Area)
-  ZPS Area (SPA Area)
-  Nature Reserve Area

N



1 km



### **OTHER CURRENT MANAGEMENT PRACTICES**

Salt meadows and restored swamps controlled by grazing with horses and cattle; trimming and/or mowing wet meadows and pastures; surface water level control in restored areas to favour waterfowl; control actions on alien species (*Amorpha fruticosa*, *Myocastor coypus*, etc.); collaborations with some private land-owners.

Controlled grazing and trimming/mowing favour various open habitats and important and related target plant species as: *Allium angulosum*, *A. suaveolens*, *Cirsium canum*, *Orchis laxiflora*, *O. palustris*, *Plantago cornuti*, *P. altissima*, *Carex divisa*, *Dactylorhiza incarnata*, etc. Water level control favours others (*Ranunculus circinatus*, *Rumex palustris*, etc.).

### **CURRENT SCIENTIFIC RESEARCH AND FACILITIES**

In the reserve and surrounding areas is active the “Stazione Biologica Isola della Cona”, which began its activity in the year 1996. Regular fauna (mostly birds but also other zoological groups) monitoring has been performed since 1989.

Main researches are: monitoring flora and fauna, monitoring invertebrates, support to researchers, cooperation with other international research institutes etc.

### **PUBLIC FACILITIES AND COMMUNICATION ACTIVITIES**

There is a Visitor Centre area at Isola della Cona which includes three buildings. Two of them are adapted as bird and landscape watching facilities. The largest building has a museum (with dioramas, aquariums, underwater views etc.), shop, laboratories and offices for the staff and the Research Station “Isola della Cona” (SBIC), bar etc. The surrounding area is provided with screened footpaths and hides and horse riding structures. As the site is one of the most important birdwatching sites in Central Europe e Northern Mediterranean region, there are a lot of facilities for it. Environment education and guidance activities are regularly lead by specialized staff, especially (but not only) dedicated to schools. There is also a second, private Visitor Centre sited near the river mouth on the other side river (Caneo area). At the moment this building is shutdown. It is equipped with rooms, a restaurant, watching towers, a visitor room, a footpath on boardwalk in the nearby reed-bed and boating opportunities.

There are 3 web sites directly related to the Nature Reserve:

<http://www.sbic.it>

<http://www.isoladellacona.it>

<http://www.facebook.com/pages/Isola-della-Cona/320887728388>.

There is also a guide-book titled “La Foce dell’ Isonzo e l’ Isola della Cona” (2006), available also in English (2008).

### **CURRENT RECREATION AND TOURISM**

Up to 36.000 visitors per annum in 1998 – 99 in the main Wetland Centre (Isola della Cona). Biking, trekking and horse riding are common along upper river embankments. Isola della Cona, the core area from a wildlife conservation point of view, is at the present moment accessible through the purchase of a ticket (up to 5 € per person).