To Chiara, life companion and mother,
always close and enthusiastically
supportive of every initiative..

Fabio and Nicoletta Perco

The Fauna of Duino Cliffs Nature Reserve

Drawings by Elena and Fabio Perco

Municipality of/Comune di/Duino-Aurisina
Občina Devin-Nabrežina
The Nature Reserve of the Cliffs of/Riserva Naturale Falesie di/Duino
Naravni Rezervat Devinske stene

Photographs by Fabio and Nicoletta Perco
Drawings by Elena and Fabio Perco
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Above
Hummingbird Hawkmoth
- *Macroglossum stellatarum*

FRIULI VENEZIA GIULIA
Parchi e riserve naturali

Ich kreise um Gott, um den uralten Turm,
und ich kreise jahrtausendelang;
und ich weiß nocht nicht: bin ich ein Falke, ein Sturm
oder ein großer Gesang.

I circle round God, the ancient expanse -
for thousands of years, pray to tell -
and still I don't know: what shall I be thence?
A falcon? A storm? A chorale?

- Rainer Maria Rilke (1875-1926) "Das Stunden Buch"
English translation by Walter A. Aue

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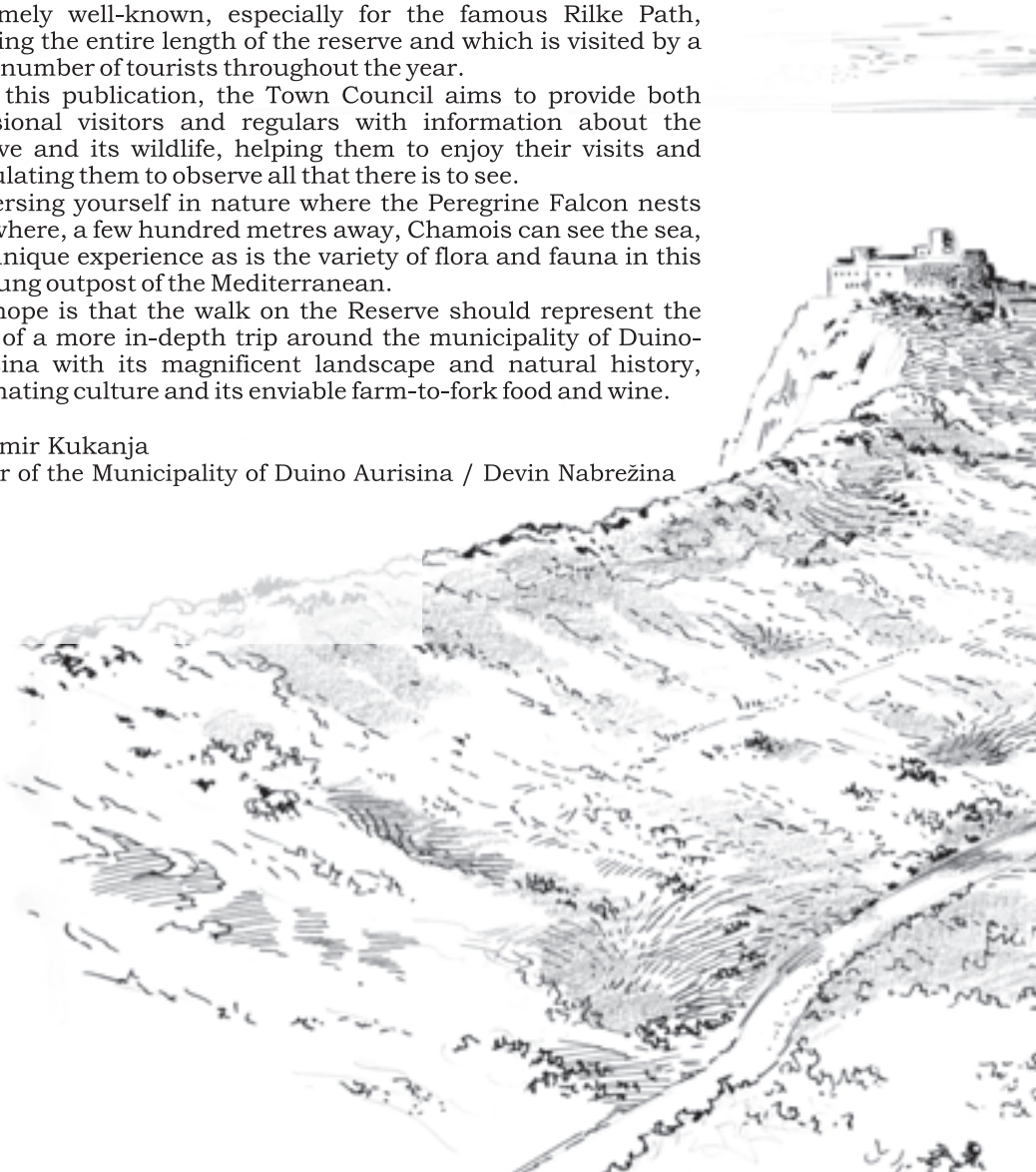
Introduction

The municipality of Duino is host to a large number of natural sites that greatly contribute to the area's hospitality and tourism and represent an important opportunity for all nature lovers to enjoy beautiful areas and to discover more about the fauna and flora of this corner of the Karst.
The Nature Reserve of the Cliffs of Duino, which we hope will continue to be accessible through the efforts and contribution of the Autonomous Region of Friuli Venezia Giulia, represents the most beautiful of gateways to the province of Trieste and its famous capital.
Located between the Castle of Duino and the Bay of Sistiana and between the soon-to-be-created Reserve of the Costa dei Barbari and the mouths of the River Timavo, the Cliffs of Duino are extremely well-known, especially for the famous Rilke Path, running the entire length of the reserve and which is visited by a large number of tourists throughout the year.
With this publication, the Town Council aims to provide both occasional visitors and regulars with information about the reserve and its wildlife, helping them to enjoy their visits and stimulating them to observe all that there is to see.
Immersing yourself in nature where the Peregrine Falcon nests and where, a few hundred metres away, Chamois can see the sea, is a unique experience as is the variety of flora and fauna in this far-flung outpost of the Mediterranean.
The hope is that the walk on the Reserve should represent the start of a more in-depth trip around the municipality of Duino-Aurisina with its magnificent landscape and natural history, fascinating culture and its enviable farm-to-fork food and wine.

Vladimir Kukanja
Mayor of the Municipality of Duino Aurisina / Devin Nabrežina

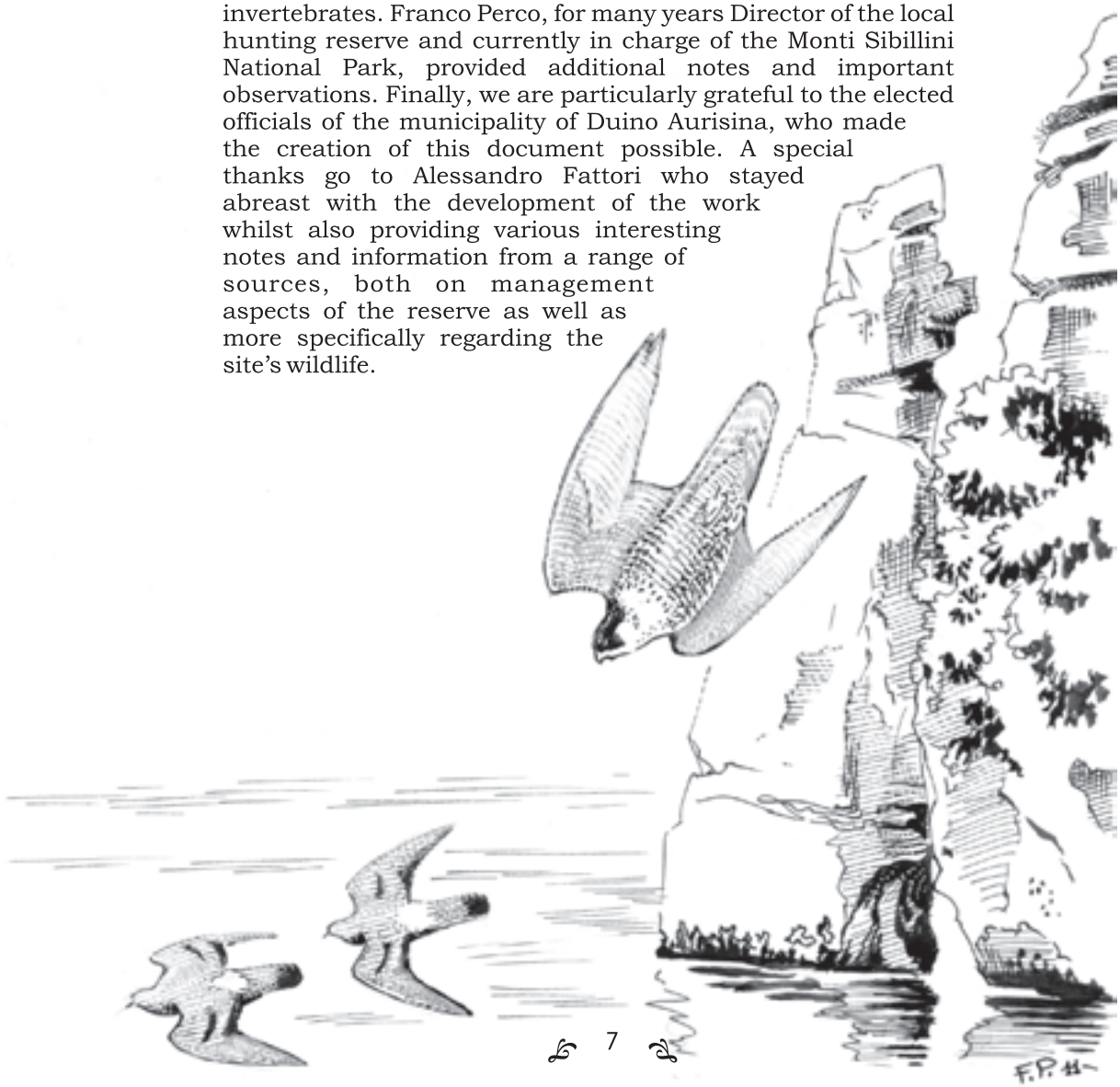


At the end of the 19th century the area was almost completely bare and devoid of trees and bushes.
The dominant bird species on the Karst at the time, such as the Rock Partridge, and, amongst the birds of prey, the Short-toed Eagle, preying on snakes, are now locally extinct or much rarer.

Preface and acknowledgements

This study represents a summary of the results of a series of surveys carried out on the wildlife and environment along the Duino coastline from the Castle of Duino to the Bay of Sistiana, between the sea and the SS 14 trunk road, with special attention to the ornithological aspects but not neglecting other vertebrate groups and the fauna in general. An attempt has therefore been made to develop a series of species lists (check-lists), with some comments, which might represent the basis for further investigations. It should be emphasized that this paper represents a "preliminary" study, aimed at a better understanding of an area that, in many ways, represents something unique, both in scientific and natural history terms and from a landscape perspective. If the field of investigation is extended to cover the adjacent area of the mouth of the River Timavo, to the west of Duino and in the direction of Monte Hermada, the species richness increases significantly, making the wider area overall and in many ways, one of the most remarkable and interesting in Europe. In a limited area, in fact, many faunal elements are concentrated and highly diversified, with many of the species represented here at the limit, or close to the limit of their distribution ranges. In the preparation of the report we have considered a number of literature sources together with information from many experts who have visited the area. We are particularly grateful for the information provided by Walter De Walderstein, who allowed us to use his original list of species in the marine reserve, specifically developed for this purpose. Useful information on aspects of the marine environment and with regard to the fishery were provided by Paolo Decarli. Detailed, sometimes fundamental information was also provided by Bruno Dentesani (who worked in the collection of data between 2004 and 2006) together with Matteo Zacchigna and, especially, Luigino Felcher and Tarcisio Zorzenon. The volume of information provided by these two very sharp, competent and reliable observers, working professionally within the Regional Forest Service, is so frequent that it has led us to summarize their contribution in the texts with the letters "F & Z". Also important was the support from the Environmental Monitoring Body of the Province of Trieste, especially Maurizio Rozza and Ilario Zuppani. Paul Tout, an expert ornithologist and birdwatcher (and who, incidentally, translated this book into English), but also with a knowledge of many species of invertebrates "in the field" (e.g. *Lepidoptera*), lived for some time (1989-1992) in accommodation overlooking the reserve, assigned to the teachers of the United World College of the

Adriatic in buildings that were formerly part of the Castle of Duino. Over the years he has contributed to a substantial extension of the species lists with observations of several rare, little known or entirely accidental taxa. Enrico Benussi, expert ornithologist, kindly provided valuable, recent, information as well. Luca Lapini, extremely precise in his recording, in turn, provided original data as well as the verification of data reported in the lists concerning Amphibians, Reptiles and Mammals. Giorgio Colombetta provided an unpublished species list of the *Carabidae* (ground beetles) on the Reserve (for the pine plantation) while Pietro Zandigiacomo gave his authoritative opinion on the determination of some other species of invertebrates. Franco Perco, for many years Director of the local hunting reserve and currently in charge of the Monti Sibillini National Park, provided additional notes and important observations. Finally, we are particularly grateful to the elected officials of the municipality of Duino Aurisina, who made the creation of this document possible. A special thanks go to Alessandro Fattori who stayed abreast with the development of the work whilst also providing various interesting notes and information from a range of sources, both on management aspects of the reserve as well as more specifically regarding the site's wildlife.

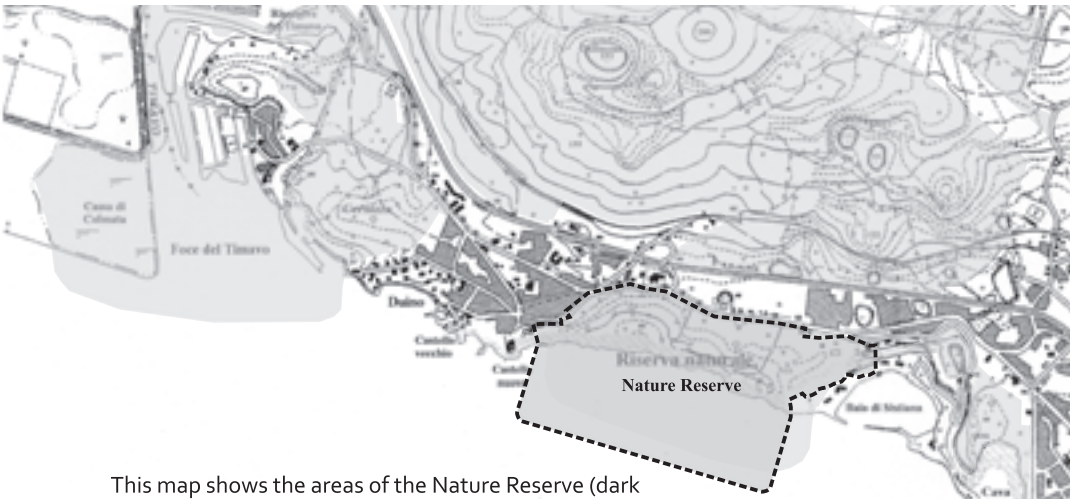


THE DUINO COASTLINE:
FROM HUNTING ESTATE TO NATURE RESERVE

The first, indelible impressions in my life related to natural environments were derived from the wide area between the mouth of the River Isonzo and the area around Duino where members of my family, residents of Trieste, usually went hunting. For our large family, it should be made clear, this did not necessarily mean wandering around with guns. Hunting took in the concept of spending time autdoors, exploring the area, an activity that, in terms of effort, far exceeded that of the hunting of game itself. For my father Dino and uncle Emo (for many years the director of the local hunting reserve) the exploration and study of nature was in fact a fundamental component of their existence. This was the uncle, a very unusual character, who, ritually, every Saturday, was a guest at lunch to discuss the activities to be programmed for the following day. With a symbolically Austro-Hungarian accuracy and reliability, he took the greatest care imaginable in the details and this habit was expressed in the reliability of his observations and in certain peculiar and, from our point of view, curious habits, such as bringing seven small bottles (no more, no less) on long excursions, each filled with a different liquid. Meticulous habits that had, however, allowed him to survive a difficult period of captivity in Africa.

One of the most-loved places, especially by we, the children (Franco, Giuliano and Fabio) and most visited was the great and magnificent *Palude del Lisert*, the marsh at Lisert, at the mouth of the River Timavo, an area unfortunately occupied by the paper-mill today but in the 1950[s] still a sort of "paradise for birds". I remember that we met by appointment at the house of Augusto Blasina, a gamekeeper or at the nearby restaurant just past the monument to the "*Lupi di Toscana*". The main hunting areas explored, in addition to the marsh mentioned above, were the karstic Cernizza and the craggy Duino coastline, where one could often make quite unusual observations. The hilly terrain was mostly bare, and back then was predominantly a barren, stony, dry grassland or *landa*, where, however, due to the gradual abandonment of grazing, the first groups of bushes were beginning to spread here and there, especially around the sinkholes or dolines. These sinkholes housed many colonies of wild Rock Doves that were then frequent, the largest colonies being those between the modern church of San Giovanni and the railway-line. Another, called, in fact the "*Grotta dei Colombi*" or the "Cave of the Rock Doves" lies just south of the road that leads to Villaggio del Pescatore. To understand how the vegetation has spread it is well worth a visit to this site, where the cave-mouth, back then surrounded by sparse grassland and rocks, is now almost completely surrounded and obscured by thick bushes and trees. It was from this precise point in August 1959 that I remember seeing a large flock of Jackdaws surrounding a solitary Egyptian Vulture on migration. My father reproduced the scene in a painting, and watching today, the landscape is very different from the current one.

Those were years when, on a Karst that was still largely denuded by centuries of intensive grazing especially by sheep and goats, to say nothing of the I World War's effects, Rock Partridges (called "*cotorni*" by the locals) and Grey Partridges were still fairly numerous, although already in sharp decline. The most popular and sought-after species by hunters was the Brown Hare whilst the Roe Deer, so commonplace today, was just beginning to be seen in the hilly and more vegetated areas. At the time the discipline of what we now call "wildlife management" was in its infancy in scientific terms and, influenced by texts that for years had been considered indisputable and by the prevailing mentality at an

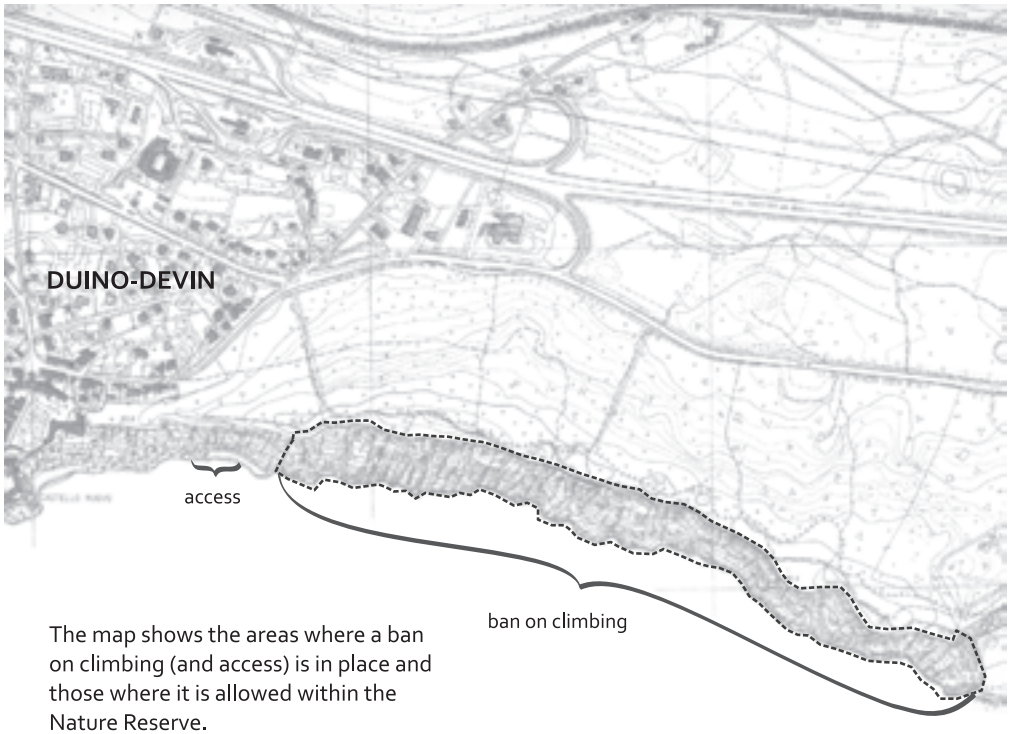


This map shows the areas of the Nature Reserve (dark grey) and those of recognized as being of conservation value at a Community level ("Natura 2000" SCI and SPA areas).

The intensive use of the land for grazing for many centuries has affected biodiversity; but only in part in a positive fashion.
The Rock Partridge, once so abundant as to be one of the most numerous quarry species for local hunters, has now been replaced by large wild ungulates.

international level, the theory of "the fight against vermin" was still considered a sound and wise policy and therefore necessary.

Back then the gamekeeper had the professional task of persecuting all predatory species that, in one way or another, could adversely affect those considered "valuable" because of their commercial value as quarry species. However, the rarity and inherent fascination of predators, to some extent mirroring human hunters, aroused the greatest interest in us. Influenced by the tradition that had been dominant for years, we took part in the systematic work of numerical containment waged against them, in the belief that we were operating in the correct fashion. One technique used by us at the time, which we had learned from the masterful, although already dated work of Emilio Scheibler entitled "*Starne, Fagiani e Leprî*" - "Partridges, Pheasants and Hares" - for example, was that of the "Eagle Owl", stuffed or fake, put out as a target on the top of a pole. In this case, various species of crows, birds of prey and even Yellow-legged Gulls are almost "fatally" attracted by this great nocturnal predator, from their point of view unable to react when out in the open in daylight. The site where we carried out this activity, at first bloody and then, gradually, more and more dedicated to pure observation, was in fact, one of the highest points along the coast at Duino. It was as a result of the experiences and observations made at this spot that the concept of "harmful" species began to waver in our minds to quickly have its place taken, by the urgency of some form of protection at least for all the birds of prey.
The legal standard in force at that time in Italy was the so-called "*testo unico del 1939*", the "single text of 1939" which, in Article 4, in fact listed as "vermin" almost all predators, recommending in essence, their numerical containment, and, ideally, their eradication. But our doubts that this activity was no longer acceptable in the light of modern research in the field of ecology, was strong. Helping to render these concerns even more acute, in particular, were the works of the Swiss Paul Geroudet and several internationally-published surveys on the diet of predators and carnivores, demonstrating the extremely complex and fundamental role of these species in the wild. It was on explicit advice of the Lawyer Dino Perco (then legal counsel of the *Federcaccia*, the Italian Hunting Federation) that the newly-formed Region Friuli Venezia Giulia by special decree forbade the killing of all diurnal and nocturnal birds of prey as early as 1970. It is also a source of personal pride to have published in 1976, together with my father and with the collaboration of my brother Franco, a then challenging book entitled "*I Rapaci: conoscerli e proteggerli*" - "Birds of Prey: how to identify them and protect them". A text that came out under the auspices of both the Italian Hunting Federation and the (then) World Wildlife Fund and that, at least to some extent I believe, influenced national legislators that in December 1977 finally passed a law (n°. 968) which ensured legal protection for birds of prey throughout the country.
Along the Rilke back then, the human presence, however, was very infrequent and only a few hikers passed through the area along a path, created, literally, by goats and much narrower and less comfortable than the one present today. The Hunting Reserve, in view of the vulnerability of the site in wildlife terms, lying as it does between the tourist facilities in the Bay of Sistiana, the village of Duino and the main trunk road, set aside this area as a "*zona di rifugio*" - a "refuge area", thus ratifying the definitive ban on hunting within it. When, in the 1990°, the Region Friuli Venezia Giulia set about identifying the various protected areas within its boundaries, its inclusion was almost automatic, making easier the definition of the "Nature Reserve", which was officially established under the terms of Law n°. 42 of 1996. Later the entire area was inserted, again by the



The map shows the areas where a ban on climbing (and access) is in place and those where it is allowed within the Nature Reserve.

The Yellow-legged Gull: a problematic species. Shown here in the confrontational behaviour of "redirected aggression"

Region and on the recommendation of the University of Trieste, into a "Natura 2000" site, now part of the larger protected area of the *Carso Triestino e Goriziano*[1], the Karst of Gorizia and Trieste. The increased popularity of the site dates back to the 1990s and the creation of the Nature Reserve and the resulting publicity it ensured. This initially increased the numbers of excursionists using the site, walking the scenic path along the cliff-edge, facilitated still further in recent years by improvements made to the path. This legal protection, on the other hand, had already begun to bear fruit and the presence of previously rare or absent species such as the Peregrine Falcon and the Raven, became more and more frequent.

An entirely new problem for the site was the start of regular rock climbing and "free climbing", theoretically harmless, if exercised by a few people at large rocky sites, but highly problematic for so restricted an area. It does not seem a coincidence that the first confirmed nesting by Peregrine Falcons on the cliffs took place in 1987, coinciding with an important by-law prohibiting climbing, issued by the Mayor of the Municipality of Duino-Aurisina. It seems likely, and attested to by the increasing frequency of observations, that the presence of adult birds of this species, now commonplace in the wider Karst of Trieste and the surrounding area, but that they are limited in the choice of suitable breeding sites by the presence of climbers who have transformed some critical and exceptionally suitable potential breeding sites into actual "rock climbing facilities". I remember participating in numerous discussions and arguments, sometimes finding myself up against many people from the world of "environmentalism" who, being climbers as well, were unwilling (or unable) to admit that their sport, which they subjectively judged to be completely harmless, could instead, objectively, represent a problem, at least locally. Today, years later, the question seems to have brilliantly resolved, with the identification of an been area of cliffs defined as the "integral" reserve where any access whatsoever is forbidden and where the birds can breed in peace, while other cliffs, less suitable for nesting, are left free for climbing. It still remains to regulate the marine area included in the Nature Reserve. But that is another story!

Fabio Perco

Mediterranean Shag
(adult)

1 -Indicated with the abbreviations: SCI - Site of Community Importance - IT 3340006; SPA - Special Protection Area – IT 3341002). The SCI and SPA, referred to in short as "Natura 2000" refer respectively to the implementation of the two EU directives, "Habitats" - n. 43/1992 and "Birds" - n.147/2009.

AN OUTLINE OF THE GEOLOGY
VEGETATION AND FLORA

The Nature Reserve of the Cliffs of Duino covers approximately 100 ha (247 acres) (107 to be exact: Musi, 1999) and is bordered to the west by the area of the castle and the village of Duino, to the east by the Bay of Sistiana and to the north by the state trunk road n° 14. The edge of the Reserve along its southern boundary is located in the sea and is not, for the time being at least, physically demarcated. A little further to the west lies the area of the springs of the River Timavo (*Reka* in Slovenian), a river that runs underground for almost 40 kilometres and is emblematic of "karstic phenomena". This expression derives from the "classic" or "historical" Karst, *Carusardius* in Latin; *Kras* in Slovene and Croatian; *Karst* in German and English; all perhaps terms derived from an ancient Indo-European word "*karra*" meaning "rock". This place-name is traditionally used to indicate the vast limestone plateau full of caves, sinkholes, dolines, free, or almost so, of surface watercourses (hypogeal, or underground karsism), which extends behind Trieste and continues into Istria and in the direction of the Dinaric Alps.
Geologically speaking (Brambati, 2006) certain elements can be highlighted in summary. The substrate is composed of Cretaceous limestone (grey or greyish-black in colour, being rather compact) and bioclastic limestones, i.e. formed from organic material within which gravel fractions can sometimes be found, the origin of which is associated with dry land. It is rich in fossil remains such as rudists and other shellfish and can form large walls due to the presence of nearly vertical rock strata (being oblique in the quarry at Sistiana), in dip-slopes, defined as "cliffs" inasmuch as they overlook the sea. Some large rock masses stand out, which, as a result of the particular inclination of the strata, and because of the corrosive and erosive action of the water, have gradually become isolated, assuming a very picturesque appearance, almost that of "stacks". These include the "*Muraglione*" ("Great Wall") to the west and the "T*orre*" or "Tower", to the east. The karst phenomena on the surface are also particularly noteworthy in this area (epigeal karsism) in the richness of forms due to the dissolution characteristics of the compact limestones, such as the limestone pavements or "*rillenkarren*" and the corrosion basins or "*kamenitza*". Also frequent are patches of more or less loose rock fragments, called "*grižе*", in Slovenian, and roughly translated as screes, with little or no vegetation. Towards Sistiana and the quarry, but also on the seabed, these rocks come into contact with

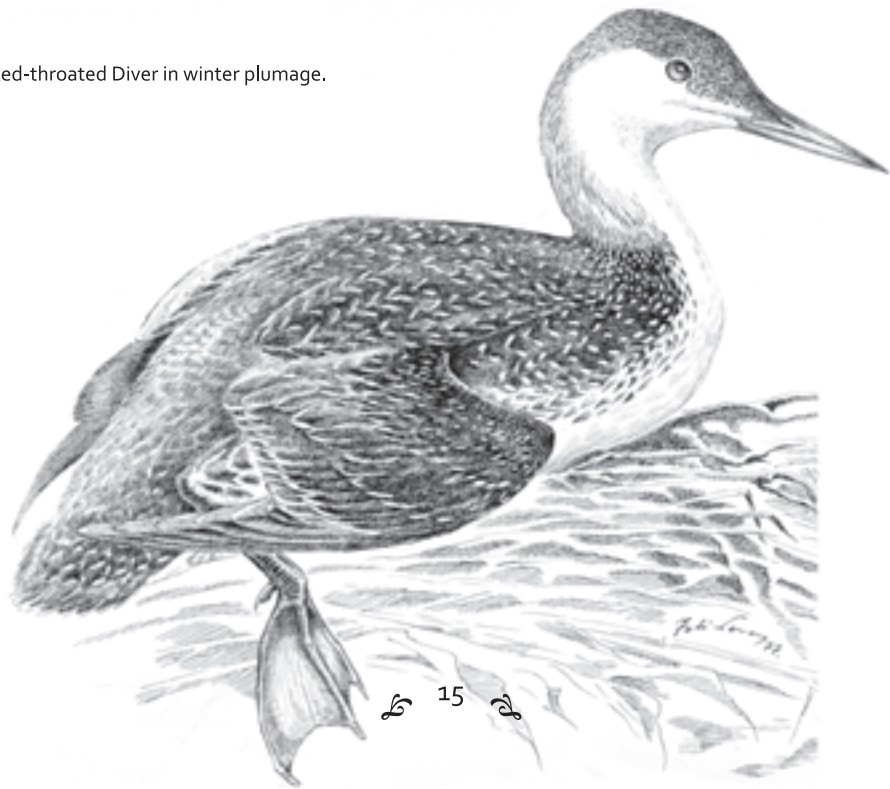
terrigenous deposits (= having their origins on land) of Eocene flysch, typical of large areas of the coastal area of Trieste. The area of the Nature Reserve reaches a maximum height of about 85 metres (280 feet) along the edge of the cliff, while the minimum height, not counting the bottom of the dolines, is located at about 55 metres above sea level, on the state trunk road 14. In addition to various bunkers made by the Austrian army during World War I, there are many known underground sites although rather limited in size and volume (Regional cadastre n°. 398, 5066, 3096, 2175 and 3709), with the latter three being located south of the Rilke Path. Some cavities, varying in size, have their entrances at the water's surface or underwater but are partially blocked or invisible because of the abundant debris and/or growth of sessile marine organisms. The sea in front of the Natural Reserve is shallow at the foot of the cliff, from about 2 metres (6.5 feet) to about 8 metres (26 feet) towards the Bay, with a maximum depth of about 13 metres (more than 42 feet) further offshore. Just outside the Nature Reserve in a westerly direction and at the foot of the rock-face holding up the castle there is a small beach made up mainly of pebbles, with other, similar ones, in the direction of Duino. At the base of the rock-face in general, one can note, under water, the presence of boulders and sediments becoming progressively finer, passing from gravel to sand particles of various sizes, as one moves out to sea. In these areas and towards Duino there are frequent freshwater upwellings, due in part to the presence of the underground River Timavo not far from the cliffs.

The flora and vegetation have been recently analyzed in depth (Merluzzi, 2006). The vegetation along the slopes (*Ostryo-Quercetum ilicis*) can be defined as Mediterranean and Illyrian-Balkan scrub, in some ways "extra-zonal" as it is clearly different from the areas inland from it, which are instead dominated by the so-called karstic scrub. In the areas most exposed to the south, the percentage of sclerophyllous vegetation (plants with typically leathery leaves) is therefore high, and in general woody species predominate over herbaceous ones. Typical tree and shrub species include the following: Holm Oak (*Quercus ilex*), Flowering (or *Manna*) Ash (*Fraxinus ornus*) and Hop Hornbeam (*Ostrya carpinifolia*). Some areas included in the Nature Reserve may also be defined as karstic scrub (*Ostryo-Quercetum pubescentis*), but this presence, with its mesophilic component, (i.e. adapted to conditions of higher humidity and lower temperatures), much more widespread elsewhere on the plateau, is mainly restricted to a few sinkholes in which the effects of the temperature inversion and the screening effect of the embankment and the pine forest can be felt. More extensive areas can be found in the area above the Bay of Sistiana and along the road leading down to the sea, in areas outside the Nature Reserve but included in the Natura 2000 site. Much of the land surface of the Nature Reserve away from the actual rock-faces themselves was actually completely bare in the early 20th century, but is however currently occupied by a plantation of Black Pine (Pinus nigra), created when the territory of Trieste was administered by Austria. After one hundred years this pine woodland, over-mature and following a series of cuts and moderate thinning, is now evolving towards a structure of karstic scrub with the abundant presence of the tree species associated with the Mediterranean scrub in some areas. Of note, among the vegetational associations found in the area, are zones with a covering of thermophilic scrub (*Pruno-mahaleb-Paliuretum spina-christi*) mainly concentrated along the strip that passes between the pine woodland and the cliffs and therefore easily observed by the visitor, as it is crossed longitudinally by the path named after the Bohemian poet Rainer Maria Rilke (1875 - 1926). Typical species in this area include, in addition to the well-established Dog or St. Lucy's Cherry

(*Prunus mahaleb*), the Turpentine Tree or Terebinth (*Pistacia terebinthus*), the characteristic and spiny Christ's Thorn (*Paliurus spina-christi*), the Broad-leaved Phillyrea (*Phillyrea latifolia*), the climbing Sarsaparilla (*Smilax aspera*), Osyris (*Osyris alba*), Wild Madder (*Rubia peregrina*) and the Eastern Hornbeam (*Carpinus orientalis*) - all more or less thermophilic species characteristic of rocky, sunny and relatively dry areas. Also noteworthy is the presence of some surviving areas of "garrigue" (overgrown dry grassland), also at risk of imminent disappearance due to increased vegetation cover. These meadowy areas, once much more extensive, are characterized by the presence of typical and fragrant Wild Sage (*Salvia officinalis*) and several other Mediterranean species, amongst which, however, striking given its size is the pretty and flashy-coloured, but non - native Snapdragon (*Antirrhinum majus*) that has "escaped" from ornamental cultivation. Finally, there are also the scree habitats, the *grižе* and limestone pavement (*karren*) often accompanied by abundant Smoke-bush (*Cotinus coggygria*), a shrubby species characteristic of the open Karst with the deep red colour of its leaves in autumn, which is, however, widespread in the very rocky areas as part of the vegetational association determined by the presence of Pyramidal Bellflower (*Campanula pyramidalis*) and the endemic knapweed *Centaurea kartschiana.* Finally, at the foot of the cliff, one can observe bands of vegetation featuring plants resistant to salinity, with the abundant presence of Sea Fennel (*Chrithmum maritimum*) in the areas most exposed to sea spray and the brown alga *Fucus virsoides* in the tidal zone.

Among the species that are important elements of the flora is the Knapweed (*Centaurea kartschiana*), a species endemic (i.e. exclusive) to the coastline north of Trieste, described by G.A. Scopoli in 1763, and whose preservation is a priority action under the EU's "Habitats" Directive (43/1992). Other notable species present at the northern limit of their distributional range include Common Brighteyes Reichardia picroides; Prickly Goldenfleece *Urospermum picroides* and the Wild Fennel *Foeniculum vulgare piperitum.*

Red-throated Diver in winter plumage.



THE FAUNA

Background

The fauna of the area under consideration presents significant peculiarities, in particular for the presence of species, or groups of species, linked to particular biotopes or habitats. The coastal town of Duino is, along with the nearby areas of the mouth of the Timavo, the most northerly coastal site on the Adriatic. What is more, the area is also characterized by the close proximity of the continental land masses and significant mountain ranges, all of which have a major influence on the local climate and, consequently, on the distribution of the different habitats. In particular, one can note that the annual isotherms (the lines on the map linking points of identical average annual temperature) are particularly close together in this area with the result that wildlife species with a discrete Mediterranean distribution coexist alongside typically continental species in limited areas. The proximity of the Eastern Alps with its phenomenon of the lowering of altitudinal distribution limits typical of this area, the Balkans, the Italian Peninsula, and continental areas further inland, in the direction of Central Europe, means the area has a remarkable "diversity" to which one can add an equally significant species "richness" in terms of the number of species encountered within restricted areas. In other words, the phenomenon taking place in the area is diametrically opposed to that termed "insularity"[2]. In the overall area of the municipality of Duino-Aurisina the species are, in fact, not only numerous, but each tends to occupy quite limited ecological niches, forced into an incessant "struggle" to survive when facing predators as well as other similar species with whom competition is inevitable.

In the study area, despite the considerable ancient and recent modifications to its natural habitats, or sometimes, because of this, the overall framework of the fauna can therefore be considered, of great interest. The present study essentially examines the restricted area of the Nature Reserve of the Cliffs of Duino, without, however, neglecting a comprehensive analysis of the surrounding areas, with particular attention to the partly-urbanized areas of Duino (including the castle) and Sistiana. It should also be emphasized that, when visiting the coast, one's gaze inevitably takes in areas that go far beyond the narrow administrative boundaries of the protected area itself, offering ample opportunities to observe a wide range of wildlife together with a stunning landscape. For example, with a little luck on the same trip (and with the right optical equipment) the visitor may see some dolphins in the Gulf of Trieste, but also the large and long-established group (or at least part of it) of Chamois on the hills behind. Ornithologists and birdwatchers, moreover, can always enjoy the presence of species of Nordic origins, such as the Common Eider (usually present among the mussel farms) alongside decidedly southern species such as the Blue Rock Thrush and many others.

2 - On islands, few species occupy different and broader "ecological niches".

In the panoramic photo, as well as the area of the Nature Reserve, we can see the town of Duino and the area of the springs of the River Timavo in the background. Further west, with the reclaimed area and town of Monfalcone, starts the plain and the low-lying lagoon-type coastline, extending to the mouth of the River Po and

The Eider, a species of Nordic origin, can be seen on the sea in front of the cliffs, favoured by the mussel farms. Its presence in a Mediterranean setting represents an element of interest.

To the left of the castle of Duino;
Below the "Rock Dove" in its wild form

Below: Mediterranean Shag and Blue Rock Thrush

Newly-fledged Peregrine Falcon (29th May 2011).
We can see the indentation in the beak, or "tooth", by which the nape of the neck of the prey, other birds, is grabbed as well as the typical nostril, perfectly circular in shape.

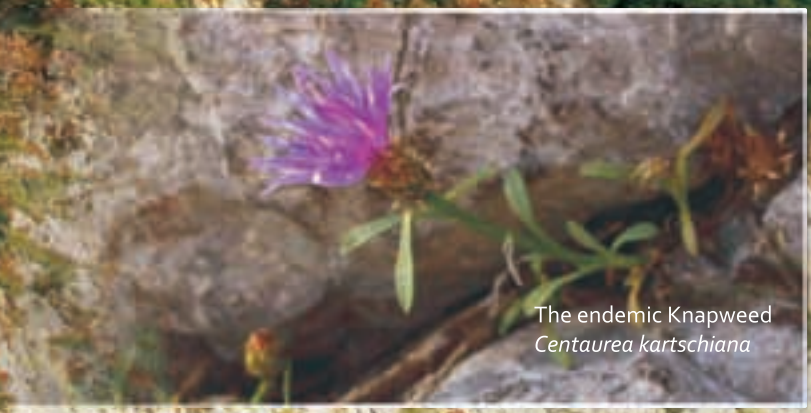
Female Peregrine Falcon delivering part of a prey to a youngster. In this case the bird bred at just one year of age, as can be seen from the brown plumage and longitudinal stripes on the undersides. In the picture below you can see two tail feathers, newly-moulted and bluish slate in colour, typical of the adult plumage it will go on to develop (14th June 2009).

Competition for prey (a Starling) between young Peregrine Falcons (June 27th 2010). In the background is the full protection area of the cliffs themselves.

Painted Comber
Serranus scriba
Photo by Gianni Mangiagli

Red-backed Shrike

Chequered Blue
Scolitantides orion



The endemic Knapweed
Centaurea kartschiana

Sardinian Warbler and
Mediterranean vegetation.

Blue-throated Keeled Lizard
Algyroides nigropunctatus

Blue Rock Thrush

Hoopoe

Brown Meagre *Sciaena umbra* and Damselfish *Chromis chromis*

Green Lizard *Lacerta viridis* with prey.

Jackdaw

Epigean Karst:
rillenkarren or "limestone pavement".:

Mediterranean Shags

Holm Oak

Turpentine Tree

Common Crane

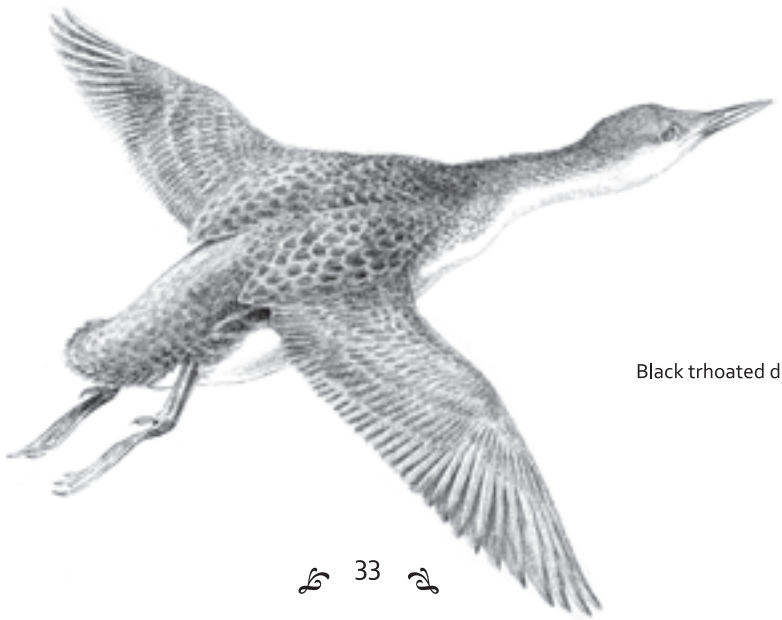
Griffon Vulture

Honey Buzzard

Common Buzzard

Historical and modern sources

Several ancient authors (e.g. Callimachus, Apollonius of Rhodes, Diodorus Siculus, Posidonius, Livy, Strabo, Polybius, Virgil, Pliny, etc., see Del Ben 2001; Pocar 1892 and Cuscito 1998), have dealt with the area of Duino, with particular reference to the mouth of the River Timavo and sometimes referring to the fauna present at the time with varying degrees of accuracy, often incorporating myths and legends (such as that of Jason and his Argonauts), historical events (starting from the "*Bellum histricum*" narrated by Livy and dating back to 178 BC), or the exceptional natural features of the site.
The Greco-Roman geographer Strabo, living at the time of Augustus, about 2000 years ago, put adequate emphasis in the area of Duino as the site of a port, with a "magnificent forest and seven sources" defined by the locals as "the spring and mother of the sea". This author reported on the existence of herds of white horses dedicated to the goddess Diana - Artemis, branded with the symbol of a wolf (and thus called "*lycophori*") and whose raising was begun by the Greek Diomedes who, according to some (see Cuscito, 1998) settled here after the Trojan War. It is also worth remembering the exact opinion of Posidonius, according to whom "the River Timavo, flowing down from the mountains, tumbles into an abyss, flows underground for 130 stades (= c. 40 km), then reappearing on the surface near the sea". More recent authors mention the flora and fauna of the general area in more detail. Giacomo Filippo Del Ben book (a work only published in 2001), lived in the second half of the 18th century (he died in 1801), contains the following interesting item relating mainly to Monfalcone, but in part also referring to the neighbouring karst areas: "But especially in the cold season hunting for marine and wetland (birds) is practiced: because here, more than elsewhere, hunters get satisfaction. In fact, at this time there are large numbers of *Mazorini* (= Mallard), *Folaghe* (= Coot), *Arcaze* (= Curlew), *Zarzegne* (= Teal), *Capirossi* (= Pochard), *Chiossi* (= Wigeon), *Palotte* (= Shoveler), *Pignole* (= Gadwall), *Svazi* (= Grebes), *Majassi* (= Pochards or Tufted Ducks), *Tarabusi* (= Bitterns), *Smerghi* (= Red-breasted Mergansers), *Frisoli* (= Black-necked Grebes), *Sgarzi* (= Herons), *Grue* (= Cranes), *Occhе* (= Geese), *Cigni* (= Swans) and other marsh- and waterfowl. In the mountains and forests one sometimes even encounters *Cotornii* (= Rock



Black trhoated diver

Partridges), *Gatti selvatici* (= Wildcats), *Tassi* (= Badgers), *Martari* (= Pine Martens), *Fuine* (= Beech Martens), *Gattopardi* (= Lynx), *Lupi cervier*i (= Wolves) and *qualche Capriolo* (=a few Roe Deer)". As far as the fish were concerned the author cited provided the following passage generally referring to the watercourses in the area, including the mouth of the River Isonzo (*Isdobbio*=Punta Sdobba) and coastal areas, "From the Isonzo in particular, as it is broader and larger than the others it produces greater catches and these include *Capesi* (= ?), Porcelette, that are a species of Sturgeon, *Lizze* (= Leerfish *Lichia amia*), up to 40 pounds or more, *Varioli* up to thirty (a Venetian name for Sea Bass), *Trutte* (= Trout) of the same weight, *Brancini* (= Sea Bass), *Boseghe* (= Thicklip Grey Mullet), *Anguille* (= Eels), as well as quantities of small fish of the progeny of *Cievoli* (= Mullets), that would take too long to list." Recalling the names of the minor watercourses described in the area (including mentioning a "Fiumetto di San Nonio"), Del Ben reminds us that: "In all these waters they also fish a lot of perfect *Anguille* (= Eels), *Lucci* (= Pike), *Barbi* (= Barbel), *Tenche* (= Tench), *Squalli* (= Chub), *Gambari* (= Crayfish), *Brussole* (= Southern European Roach), and *Scardole* (= Rudd), the author in question using the various local names in the Venetian dialect. In turn G. Pocar (1882) gives long lists of species, without adding any original information but confirming for example, the presence of species, later called into doubt by other authors, such as the Red-crested Pochard and the Mute Swan.

The great explorer and british consul Sir Richard Francis Burton who lived in Trieste for the last 19 years of his life refers to the "Deer Park" (1881, reprinted 1992) in Duino, currently located in the area called the *Cernizza* (*Črnica* in Slovene), where small populations of ungulates, probably the least problematic in captivity, Fallow Deer (*Dama dama*), were long preserved by the local Lords, "... the well-walled Wildpark, The Cernica, 'the Little Black', where holm-oaks seem to grow upon bare rocks, and where deer are preserved."

Then, if you ignore fleeting signs and insignificant documentation in various works or chronicles, you can find a range of interesting data regarding the fauna of the area including the Castle of Duino, the Cernizza, and the springs of the Timavo. For the, "wider" area which includes Monfalcone and the Trieste Karst it is particularly worth recalling the works of B. Schiavuzzi (1983, 1985, 1987) and those of other authors, e.g., in chronological order: Stammer,1932; Mueller, 1953, Sadini, 1961; Calligaris *et al.*, 1976; AA.Vv., 1980; AA.Vv., 1981; Benussi, 1983; Perco & Utmar, 1987; Dolce & Stoch, 1989; Lapini *et al.*, 1996; Stoch & Dolce, 1994; Bressi, 1995; Florit, 1997; Perco, 2000 - 2001; Aa.Vv., 2006 and, of course, many others, which are listed in the bibliography.

Symbols and abbreviations

The list of species found so far in the area is shown and, where appropriate, comments on the species' distribution, population and trend in the "restricted area" covered in the study, coinciding with the Nature Reserve (NR) and the Site of Community Importance (SCI) of the "Cliffs of Duino" and the Special Protection Area (SPA), recently merged with the SCI/SPA of the Karst of Trieste and Gorizia, extending to the adjoining sea into a roughly visible stretch from the mainland. This list, as far as the birds are concerned, also shows the species' "phenology" (a measure of their presence) roughly in the area in question using, with a few adaptations, the symbols introduced initially for the Italian works by Brichetti & Massa (see bibliography) and now widely used in the field of ornithology:

B = breeding species
S = sedentary species, used only for breeding species
M = migratory species
W = wintering species
S = summering species (but not breeding)
A = accidental species, sometimes followed by the number of reports if known
reg = regular, added to M, W, or S
irr = irregular, as above;
? = Uncertain or doubtful (added to other symbols).

The symbol ▲ indicates a species included in First Annex of the EU "Birds" or Annexes II or IV of the Habitats Directive. One to three asterisks next to B (breeding) indicate, again only for breeding species: possible, probable or confirmed nesting in the last two decades.

Sometimes, alongside the surnames cited are used abbreviations: *pers. comm.* = personal communication or *pers. obs.* = personal observation.

It should be recalled, for the uninitiated, that different species are listed according to the established convention at the international level, with two names in Latin. The first (with a capital letter) indicates the genus (and may be shared by multiple species), the second (with a lowercase initial letter) indicates the species. In some cases the subspecies or geographical race, if it exists, is given. There then follows the last name of the author that first described the species or subspecies together with the year of publication. If that last name is bracketed, this means that the name currently used is not the original one. In some cases a name previously used for the genus or species is given, in which case, the synonym is preceded by the Latin abbreviation i.e. ('*id est*') = that is.

INVERTEBRATES – *INVERTEBRATA*

An extensive study on terrestrial invertebrates has yet to be started. Here for now is listed the presence of some species among those occasionally observed or reported from sources deemed reliable[3].

DRAGONFLIES - *ODONATA*

Aeshnidae

- *Anax imperator*
- *Crocothemis sp.*

GRASSHOPPERS - *ORTHOPTERA*

Tettigoniidae

- *Meconema sp.*

Acrydidae

- *Anacrydium aegyptium*

TRUE BUGS - *HOMOPTERA*

"Cicadas" - *Cicadidae*

- *Cicada orni*

BEES, WASPS, ANTS, ETC. - *HYMENOPTERA*

Sphecidae

- *Isodontia mexicana* (tujerodna vrsta)

Apidae

- *Xylocopa sp.* (glej *iris*)

3 In the karst cavities or in the adjoining area of the springs and mouth of the River Timavo there are several species of major biogeographical importance and a wider natural history interest, especially where they are endemic to the area including *Marifugia cavatica*, *Nyphargus stygius*, *Nyphargus timavi, Troglocaris anophtalmus, Anophtalmus mayeri, Harpalus sulfuripes, Orotrechus muellerianus*, and *Vertigo angustior*.
Others such as the longhorn beetles, the Great Capricorn Beetle Cerambyx cerdo and Morimus funereus, and Europe's largest orthopteran Saga pedo, found on the Nature Reserve, are also sufficiently rare and spectacular to merit protection in the directives and local legislation.

BUTTERFLIES - *LEPIDOPTERA*[4]

Pieridae

- *Pieris brassicae*
- *Colias crocea*
- *Pontia daplidice*: the only locality known in the Region for the species present on the rocky coast of Istria (Aa. Vv., 1998 - 2000).

Papilionidae

- *Iphiclides podalirius*

Nymphalidae

- *Vanessa cardui*
- *Vanessa atalanta* (observed in flight in the middle of winter 1/10/10)
- *Polygonia c-album*

Satyridae

- *Pararge aegeria*
- *Lasiommata megera*
- *Hipparchia alcyone*
- *Satyrium ilicis* (larval foodplan: *Quercus ilex*)

Lycenidae

- *Scolitantides orion lariana* (on plants of *Sedum sp.*)

Sphingidae

- *Macroglossa stellatarum*

Zygaenidae

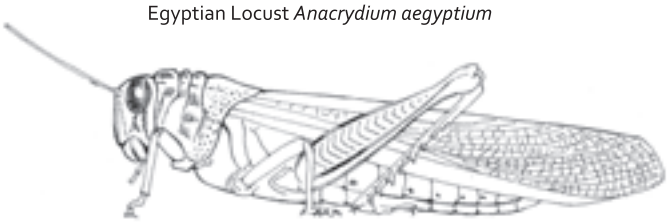
- *Syntomis phegea*

Saturniidae

- *Saturnia pyri*

4 Important species under the terms of the Habitats Directive, found in the Karst in general, including the springs of the River Timavo, but not thus far identified on the Natural Reserve include the False Ringlet *Coenonympha oedippus*, the Eggar Moth *Eriogaster catax*, Marsh Fritillary *Ephydryas aurina*, Jersey Tiger *Euplagia quadripunctaria*, Large Copper *Lycaena dispar*, Scarce Large Blue *Maculinea teleius*, Willowherb Hawkmoth *Proserpinus proserpina* and the Eastern Festoon *Zerynthia polyxena*.

Egyptian Locust *Anacrydium aegyptium*



BEETLES - *COLEOPTERA*

Cetoniidae

- *Cetonia aurata*
- *Potosia aeruginosa*

Geotrupidae

- *Geotrupes (i.e. Trypocopris) vernalis*

Carabidae

(G.Colombetta *in litteris*): species found in the *Pinus nigra* formations, *Quercus ilex* (dominant and mature) and *Acer campestre*, *Cornus mas*, *Ostrya carpinifolia*, *Robinia pseudoacacia*, *Hedera helix*, *Ruscus aculeatus* and *Laurus nobilis.*

Forest species:

- *Abax ater*
- *Leistus rufomarginatus*.

Species typical of open environments:

- *Molops ovipennis*
- *Harpalus atratus*

Species of *Quercus ilex* woodland:

- *Leistus rufomarginatus* (forest species)
- *Molops ovipennis* (more open environments)
- *Myas chalybaeus* (thermophilic species at the western limit of its distribution)

- *Carabus coriaceus* (found throughout).
- *Abax ater* is by far the most common species in the forests of the Region, while *Leistus rufomarginatus* and *Molops ovipennis* are interesting for their appearance from autumn to spring, winter included.

Cerambicidae

This is the most western site for the long-horn beetle *Parmenas pubescens hirsuta* which colonizes the stems of the large Wulfen's Spurge *Euphorbia wulfenii* (Mueller, 1953; Aa.Vv., 1998 - 2000). T
There are also observations of:
- *Cerambyx scopolii* (R. Bartoloni *pers. comm*)
- *Purpuricenus budensis* (cited in Musi, 1999).

Lucanidae

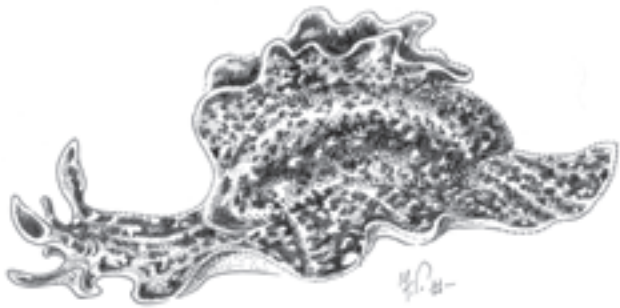
- Stag Beetle *Lucanus cervus*, ▲ II is present, although it is more common in internal areas of Karst.

Ash-tree Cicada
Cicada orni

Stag Beetle
Lucanus cervus

MARINE FAUNA

A large amount of data on the marine fauna present in the sea below the cliffs was collected and arranged in a preliminary form. The list below is largely the result of the observations by Walter de Walderstein but also includes original data. For references see in particular: Aa.Vv., 2000; Eschmeyer, 1998; Ljpej *et al.*, 2008, Luther & Fiedler, 1965; Minelli *et al.*, 1993; Riedl, 1991; Šoljan,1975.



Haplysia punctata

SPONGES – *PORIFERA*

Demospongiae

- *Suberites domuncula*
- *Suberites carnosus*
- *Oscarella lobularis*
- *Hemimicale columella*
- *Petrosia ficiformis*
- *Ircinia variabilis*
- *Chondrilla nucula*
- *Disydea avara*
- *Disydea tufha*
- *Halicliona mediterranea*
- *Anchinoe tenacior*
- *Cliona nigricans*
- *Cliona celata*
- *Tethya aurantium*

CNIDARIANS - *CNIDARIA*

True Jellyfish - *Schyfozoa*

- *Rhizostoma pulmo*

Hydrozoans - *Hydrozoa - Hydroidea*

- *Halecium beani*
- *Halecium halecinum*

Anthozoans - *Antozoa - Hexacorallia*

- *Anemonia sulcata*
- *Condilactis aurantiaca*
- *Cereus pedunculatus*
- *Calliactis parasitica*
- *Cladocora cespitosa*
- *Epizoanthus arenaceus*
- *Actinia equina*
- *Actinia cari*

Barrel Jellyfish
Rhizostoma pulmo

Bristleworm
Protula tubularia

Beadlet anemone
Actinia equina

FLATWORMS - *PLATHELMINTHES*

Flukes - *Trematoda*

- *Stylochus pilidium*
- *Pseudoceros maximus*

SHELLFISH - *MOLLUSCA*

Placophores -Placophora

- *Chiton olivaceus*
- *Acanthochitona comunis*

Gastropods - *Gastropoda*
Prosobranchs - *Prosobranchia*

- *Diodora graeca*
- *Haliotis tuberculata (i.e.. Lamellosa)*
- *Fusinus rostratus*
- *Murex trunculus*
- *Muricopsis cristatus*
- *Patella ulyssiponensis (i.e. Lusitanica)*
- *Patella caerulea*
- *Littorina neritoides*
- *Monodonta turbinata*

Sea-slugs - *Opisthobranchia*

- *Haplysia punctata*
- *Berthella ocellata*

Nudibranchs- *Nudibranchia*

- *Flabellina affinis*
- *Flabellina pedata*

Anthobranchs - *Anthobranchia*

- *Dendrodoris limbata*
- *Peltodoris atromaculata*

Bivalves - *Bivalvia*:

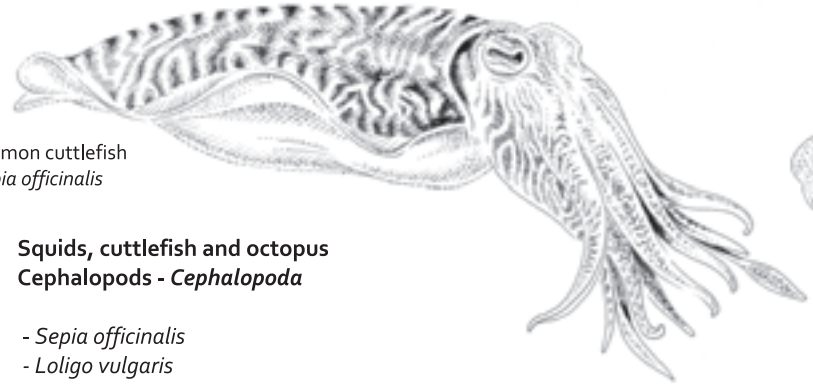
- *Lima inflata*
- *Chlamys varia*
- *Protopecten glaber*
- *Venus verrucosa*
- *Arca noae*
- *Barbotia barbata*
- *Chama gryphoides*
- *Anomia ephippium*
- *Mytilaster minimum*
- *Mytilus galloprovincialis*
- *Ostrea edulis*
- *Rocellaria dubia*
- *Litophaga litophaga* ▲II
- *Pinna nobilis* ▲IV

Particularly worth mentioning is the last species mentioned, locally called a "*Stura*" it is a bivalve mollusc that reaches a very large size and is easily observed on the seabed fixed in an upright position, like a "fan". The species is now recovering strongly in various parts of the Gulf of Trieste, including in the shallow water of the Natural Reserve.

Green ormer
Haliotis tuberculata

Noah's Ark shell
Arca noae

Noble pen shell
Pinna nobilis



Common cuttlefish
Seppia officinalis

Dwarf Bobtail Squid
Sepiola rondeleti

Squids, cuttlefish and octopus
Cephalopods - *Cephalopoda*

- *Sepia officinalis*
- *Loligo vulgaris*
- *Eledone moschata*
- *Sepiola rondeleti*

ROUND WORMS - ANNELIDS - *ANELLIDA*
Polychaetes - *Polychaeta*

- *Harmothoe imbricata*
- *Glycera rouxi*
- *Lagisca extenuata*
- *Marphysia sanguinea*
- *Pomatoceros triqueter*
- *Protula tubularia*
- *Serpula vermicularis*

ARTHROPODS - *ARTHROPODA*
CRUSTACEANS - *CRUSTACEA*
Barnacles - *Cirripedia*

- *Balanus eburneus*
- *Balanus trigonus*
- *Chtamalus depressus*
- *Chtamalus stellatus*

Lobsters prawns crabs etc.
Malacostracans - *Malacostraca*
Mantis shrimps- *Stomatopoda*

- *Squilla mantis*

Decapods - *Decapoda*

- *Homarus gammarus*
- *Palaemon elegans*
- *Alpheus sp.*
- *Leptomisis mediterranea*
- *Maia squinado*
- *Maia verrucosa*
- *Pinnotheres pinnotheres*
- *Porcellana platycheles*
- *Pisidia longicornis*
- *Pilumnus hirtellus*
- *Inachus phalangium*
- *Galathea strigosa*
- *Paguristes oculatus*
- *Pagurus cuane*
- *Pagurus anacoretus*
- *Eriphia spinifrons*
- *Pachigrapsus marmoratus*
- *Carcinus mediterraneus*
- *Xantho poressa*

Isopods - *Isopoda*

- *Ligia italica*

Amphipods -*Amphipoda*

- *Lysianassa longicornis*
- *Leucothoe spinicarpa*

Tardigrades - *Tardigrada*

- *Caprella acanthifera*
- *Phtisica marina*

COMB JELLIES - *TENTACULATA*
Bryozoans - *Briozoa (Ectoprocta)*

- *Bugula neritina*
- *Schizobrachiella sanguinea*
- *Lichenopora radiata*

Warty crab
Eriphia spinifrons

ECHINODERMS (sea urchins and starfish) - *ECHINODERMATA*

Sea cucumbers - *Holothuroidea*

- *Ocnus planci*
- *Trachythyone elongata*

Sea urchins - *Echinoidea*

- *Psammechinus microtuberculatus*
- *Spherechinus granularis*
- *Paracentrotus lividus*

Starfish - *Asteroidea*

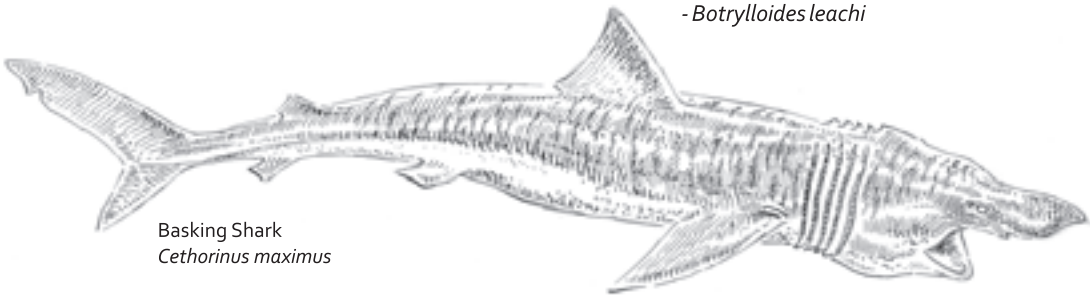
- *Marthasterias glacialis*
- *Asterina gibbosa*

Brittle-stars - *Ophiuroidea*

- *Ophioderma longicaudum*
- *Amphipholis squamata*

TUNICATES or ASCIDIANS - *TUNICATA*
Ascidians - *Ascidiacea*

- *Ascidiella aspersa*
- *Diplosoma listerianum*
- *Lissoclinum sp.*
- *Microcosmus vulgaris*
- *Phallusia mammillata*
- *Policarpa pomaria*
- *Styela placata*
- *Sidnyum turbinatum*
- *Botryllus schlosseri*
- *Botrylloides leachi*



Basking Shark
Cethorinus maximus

FISH - *PISCES*

CARTILAGINOUS FISH- *CONDRICHTHYES*

Houndsharks - *Triakidae*

- Smoothhound, *Mustelus vulgaris (common)*

Catsharks - *Scyliorhinidae*

- Lesser-spotted Dogfish, *Scyliorhinus canicula* rare
- Bull Huss, *Scyliorhinus stellaris* (Seasonal - Winter)

True Sharks - *Carcharinidae* and *Cethorinidae*

- Blue Shark, *Prionace glauca* (Present but rare inshore)

Basking Sharks - *Cethorinidae*

- Basking Shark, *Cethorinus maximus*, very rare An observation of a subject about 4 m long, in the waters of Natural Reserve by M.Basso, 25th May, 1991 (Perco, 1993).

Small Sharks - *Squalidae*

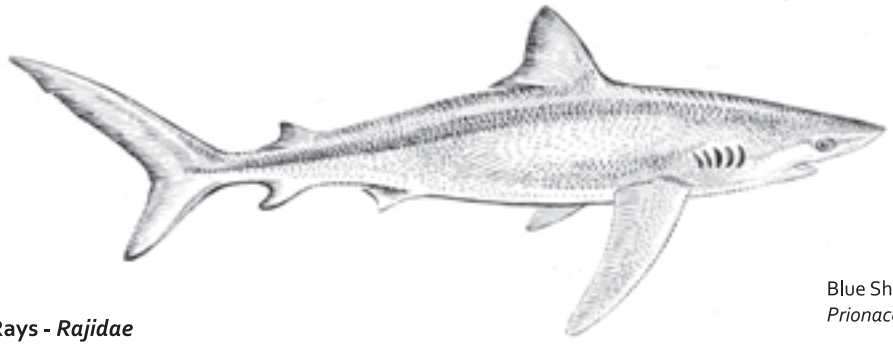
- Spurdog, *Squalus acanthias* (rare)

Angelsharks - *Squatinidae*

- Common Angelshark, *Squatina squatina* (very rare)

Torpedo Rays - *Torpedinidae*

- Marbled Electric Ray, *Torpedo marmorata* (rare)



Blue Shark
Prionace glauca

Rays - *Rajidae*

- Thornback Ray, *Raja clavata* present
- Brown Ray, *Raja miratelus* present

Whiptail Stingrays- *Trygonidae (Dasyatidae)*

- Common Stingray, *Trygon pastinaca,* (present)
- Pelagic Stingray, *Pteroplatytrygon violaceus* (very rare inshore).
  An observation of P. pelagica made by a bather was collected by F. Perco for the waters off the Natural Reserve in August 2010 (see Anonymous, 2010).

BONY FISH - *OSTEICHTYES, TELEOSTEI*

Trout and Salmon - *Salmonidae*

- Sea Trout, *Salmo trutta* (seasonal - spring)
- Rainbow Trout, *Onchorynchus mykiss* (seasonal - spring)

Sardines- *Clupeidae*

- European Pilchard, *Sardina pilchardus* (common)
- European Sprat, *Clupea sprattus* (present)

Anchovies and Mackerel - *Engraulidae*

- European Anchovy, *Engraulis enchrasicolus* (common)

Eels - *Anguillidae*

- European Eel , *Anguilla anguilla,*(rare)

Congers - *Congridae*

- Conger Eel, *Conger conger* Common

Garfish - *Belonidae*

- Garfish, *Belone belone* (seasonal, summer)

True Cods - *Gadidae*

- Poor Cod, *Trispterus minutus* (present)
- Shore Rocklingi, *Gaidropsarus mediterraneus* (present)
- Whiting, *Merlangius merlangius* (common)

Sea bass and perches - *Serranidae*

- Sea Bass, *Dicentrarchus labrax* (common)
- Painted Comber, *Serranus scriba* (common)
- Brown Comber, *Serranus hepatus* (common)

Horse Mackerel and Leerfish - *Carangidae*

- Atlantic Horse Mackerel, *Trachurus trachurus* (seasonal, summer)
- Leerfish, *Lichia amia* (seasonal, summer)

Mackerels - *Scombridae*

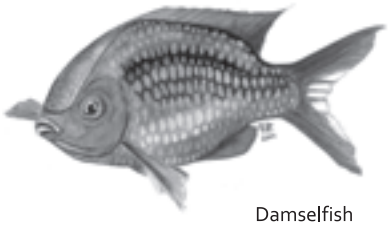
- Mackerel, *Scomber scomber* (common offshore)
- Atlantic Chub Mackerel, *Scomber colias* (rare inshore)

Croakers - *Sciaenidae*

- Brown Meagre, *Sciaena umbra* (present)
- Shi Drum, *Umbrina cirrhosa* (seasonal, autumn)

Red Mullet - *Mullidae*

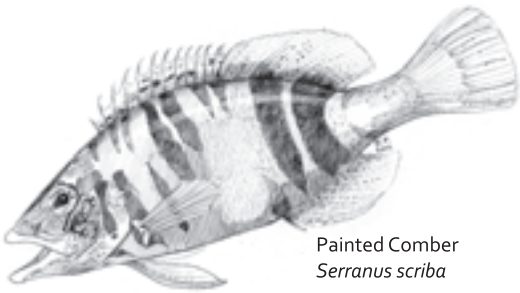
- Striped Red Mullet, *Mullus surmuletus* (rare)
- Red Mullet , *Mullus barbatus* (present)



Damselfish
Chromis chromis

Seabreams - *Sparidae*

- Annular Seabream, *Diplodus annularis* (present)
- White Seabream, *Diplodus sargus* (seasonal, summer)
- Two-banded Seabream, *Diplodus vulgaris* (seasonal, summer)
- Sharpsnout Seabream, *Puntazzo puntazzo* (seasonal, summer)
- Common Pandora, *Pagellus erythrinus* (present)
- Striped Seabream, *Lithognathus mormyrus* (common)
- Gilthead Seabream, *Sparus auratus* (common)
- Black Seabream, *Cantharus cantharus* (seasonal)
- Bogue, *Boops boops* (seasonal, summer)
- Salem, *Sarpa (=Boops) salpa* (seasonal, summer)
- Saddled, *Oblada melanura* (present)



Painted Comber
Serranus scriba

Two-banded Seabream
Diplodus vulgaris

Picarels - *Maenidae*

- Picarel, *Spicara (=Maena) smaris,* (common)

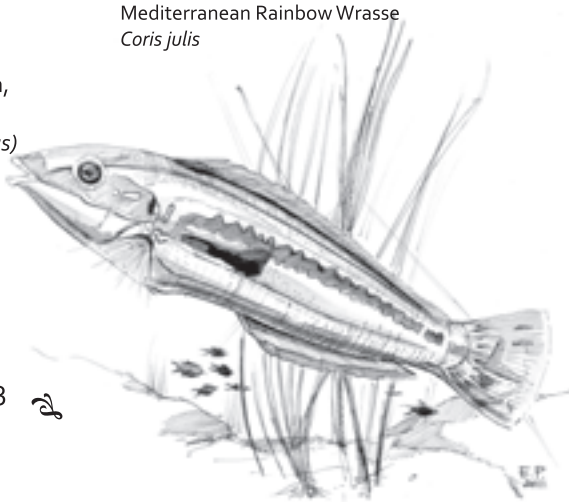
Damselfish - *Pomacentridae*

- Damselfish, *Chromis chromis* (present in recent years)

Mediterranean Rainbow Wrasse
Coris julis

Wrasses - *Labridae*

- Brown Wrasse, *Labrus merula* (common)
- Ornate Wrasse, *Thalassoma (= Crenilabrus) pavo* (common)
- Ocellated Wrasse, *Symphodus (= Crenilabrus) ocellatus* (common)
- Grey Wrasse, *Symphodus cinereus* Grey Thrush, (common)
- Five-spotted Wrasse, *Symphodus (= Crenilabrus) roissali*, (common)
- Pointed-snout Wrasse, Symphodus (= Crenilabrus) rostratus, (common)
- Mediterranean Rainbow Wrasse, *Coris julis* (present in recent years, observations 2011)



Weever fish - *Trachinidae*

- Greater Weever, *Trachinus draco* (rare)
- Lesser Weever, *Echiichthys (=Trachinus) vipera* (rare)

Uranoscopidae

- Atlantic Stargazer, *Uranoscopus scaber* (rare)

Callionymidae

- Risso's Dragonet, *Callionymus risso(=belenus)* (rare)

Blennies - *Blennidae*

- Peacock Blenny, *Blennius (=Salaria) pavo*, (common)
- Tompot Blenny, *Blennius (=Parablennius) gattorugine* (common)
- Tentacled Blenny, *Blennius (=Parablennius) tentacularis*. (common)
- Rusty Blenny, *Blennius (=Parablennius) sanguinolentus.* (common)
- Longstriped Blenny, *Blennius (=Parablennius) rouxi.* (common)
- Zvonimir's Blenny, *Blennius (=Parablennius) zvonimiri*. (common)
- Mystery Blenny, *Blennius (=Parablennius) incognitus.* (present)
- Sphinx Blenny, *Blennius (=Aidablennius) sphinx.* (common)
- Montagu's Blenny, *Blennius (=Coryphoblennius) galerita*. (present)
- Caneva's Blenny, *Blennius (=Microlipophrys/Lipophrys) canevae*. (common)
- Adriatic Blenny, *Blennius (=Microlipophrys/Lipophrys) adriaticus.* (present)
- Black-headed Blenny, *Blennius (=Microlipophrys/Lipophrys) nigriceps*. (present)

(See also Lipej *et al*. 2008)

Seahorses and pipefish - Sygnathidae

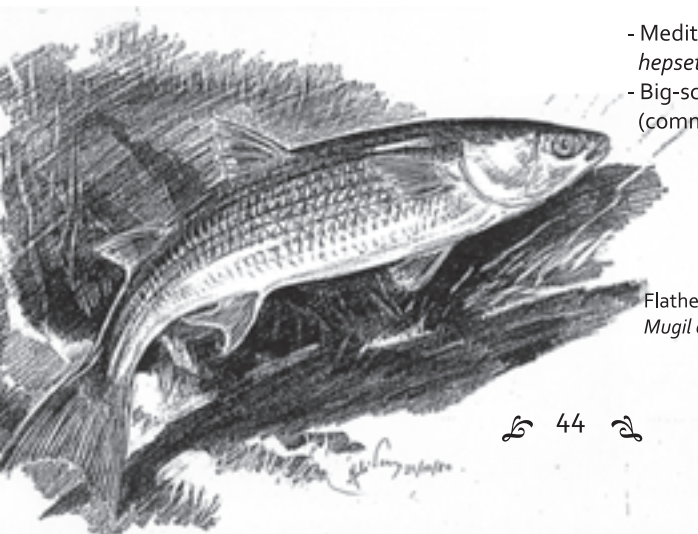
- Short-snouted Seahorse, *Hippocampus hippocampus* (present)
- Long-snouted Seahorse, *Hippocampus ramulosus* (common)
- Greater Pipefish, *Sygnathus acus* (common)
- Narrow-snouted Pipefish, *Syngnathus tenuirostris* (common)
- Broad-nosed Pipefish, *Sygnathus typhle* (present)

Mullet - *Mugilidae*

- *Flathead Grey Mulle*, *Mugil cephalus* (present)
- Golden Grey Mullet, *Liza aurata* (common)
- Thicklip Grey Mullet, *Chelon labrosus* (common)
- Thinlip Grey Mullet, *Liza ramada* (common)
- Leaping Mullet, Liza *saliens* (present)

Silversides - *Atherinidae*

- Mediterranean Sand Smelt, *Atherina hepsetus* (common)
- Big-scale Sand Smelt , *Atherina boyeri* (common)



Flathead Grey Mullet
Mugil cephalus

Clinids- *Clinidae*

- Cline, *Clinitrachus (=Cristiceps) argentatus* (present)

Triplefin Blennies - *Tripterigidae*

- Red-black Triplefin Blenny, *Trypterygion tripteronotus* (common)
- Black-faced Triplefin, *Trypterygion delaisi* (common)
- Dwarf Triplefin Blenny, *Trypterygion melanurus*, (common)

Gobies- *Gobiidae*

- Sand Goby *Pomatoschistus minutus*, (present)
- Bucchich's Gob, *Gobius bucchichii* (common)
- Red-mouthed Goby, *Gobius cruentatus* (common)
- *Rock Goby*, *Gobius paganellus* (common)
- Black Goby, *Gobius niger* (common)
- Giant Goby, *Gobius cobitis*, (common)

Suckerfish - *Gobiesocidae*

- Shore Clingfish, *Lepadogaster lepadogaster* (common)

Scorpionfish - *Scorpaenidae*

- Black Scorpionfish, *Scorpaena porcus* (present)

Gurnards - *Triglidae*

- Tub Gurnard, *Chelidonichthys (=Trigla) lucerna* (seasonal, summer - autumn)

Lefteye Flounders - *Bothidae*

- Turbot, *Scophthalmus maximus* (rare)
- Eckström's Topknot, *Zeugopterus regius (=Phynorombus unimaculatus)* (rare)

Flounders - *Pleuronectidae*

- European Flounder, *Pleuronectes flesus* (seasonal, winter)

Soles - *Soleidae*

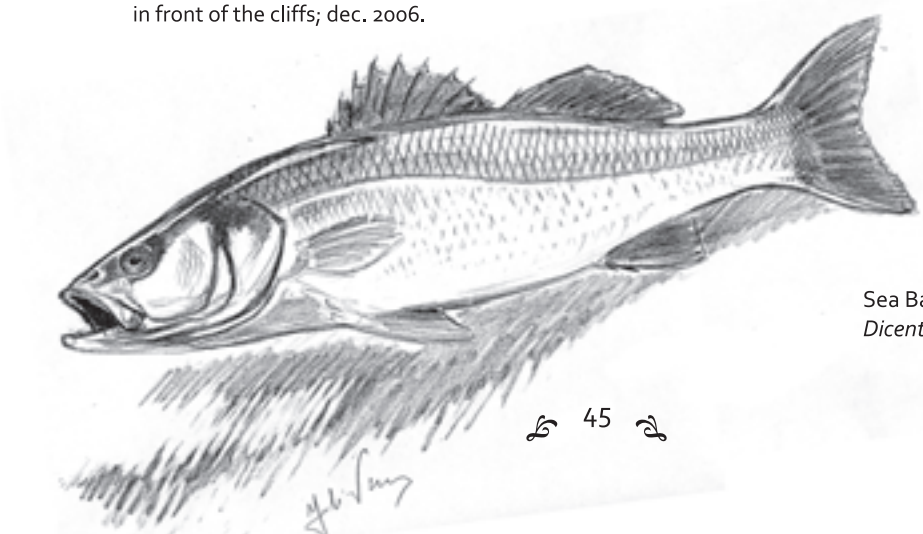
- Common Sole, *Solea vulgaris* (present)
- Sand Sole, *Pegusa (=Solea) lascaris* (present)
- Solenette, *Buglossidium luteum* (present)

Sunfish - *Molidae*

- Ocean Sunfish , *Mola mola* (very rare)

This last species, which reaches very large size (over 2 m long) has often been observed in the Gulf but rarely close to the coast.

Note - A new species for the N R is the Rudderfish-*Centrolophus niger*, fam. *Centrolophidae* recorded by R. Serafini (*pers. comm*.). A specimen was captured by F. Simone in the marine area in front of the cliffs; dec. 2006.



Sea Bass
Dicentrarchus labrax

AMPHIBIANS – AMPHIBIA

European Union is very important, the Olm *Proteus anguinus*, characterized by the complete blindness of the adults and obvious external gills, which in urodeles (newts and salamanders) are generally a juvenile character. The permanence of these juvenile attributes in adult animals capable of reproduction is due to a phenomenon known as "neoteny". In several urodeles it constitutes a response to particular environmental situations, but is usually reversible. Several neotenic newts can long remain thus but a change in the environmental conditions that led to the occurrence of neoteny in the first place can lead to completion of the metamorphosis and the re-absorption of the external gills. The Olm on the other hand is an obligate neotene, and preserves its external gills throughout life. The species is particularly important in the setting of the Reserve; being considered a priority species in the European Union that may, by itself, justify the establishment of a Site of Community Importance (SCI). Other species, not detailed below, can be found not far away, in the karst ponds (formerly for watering animals etc.) or in the wider area, including marshland where the River Timavo re-emerges, including Southern Smooth Newt *Triturus* (syn. *Lissotriton*) *vulgaris meridionalis*, Italian Crested Newt *Triturus carnifex* and members of the so-called 'Green Frog' complex *Rana* (syn.*Pelophylax*) *klepton esculenta*, *Rana* (syn. *Pelophylax*) *lessonae*. Italian Tree Frog *Hyla intermedia*. The last mentioned species is substituted on the Karst to the East by the European Tree Frog *Hyla arborea*.

Urodeles - *Caudata*
Salamanders and newts - *Salamandridae*

- Italian Crested Newt , *Triturus carnifex* (Laurenti, 1768), ▲ II IV
- Southern Smooth Newt, *Triturus vulgaris meridionalis* (Boulenger,1882)

The urodele amphibians mentioned, although found in the surrounding areas of the municipality of Duino - Aurisina, have not been found, as far as is known, within the Natural Reserve itself, although the presence of both species is possible and very likely in suitable places. The limiting factor is represented by the absence of standing water as a result of the short duration of the pools that are formed following rain.

Olm
Proteus anguinus

Olms - *Proteidae*

- Olm, *Proteus anguinus anguinus* (Laurenti, 1768), ▲II IV

A species elevated to the rank of "priority" within the meaning of the Habitats Directive (2004). An important example of Karst hypogeum endemism, widespread, inhabiting the underground waters of the plateau as a whole. The Olm has been observed on the surface at some sites of the nearby Sistiana quarry (Lapini *et al.* 1999) following heavy rains, which suggests a high likelihood of its being present in the ground below the Nature Reserve.

Anurans - *Salientia*
Fire-bellied Toads - *Discoglossidae*

- Yellow-bellied Toad, *Bombina variegata variegata* (Linnaeus, 1758), ▲II IV

A species doubtfully present on the Reserve, which may be present in marginal or neighbouring areas, especially those that are very open or subject to modification by human activity.

Toads - *Bufonidae*

- Common Toad, *Bufo bufo (*Daudin, 1803)
- Green Toad, *Bufo (*syn. *Pseudepidalea) viridis viridis* (Laurenti, 1768), ▲ IV

The habitats on the Natural Reserve are not particularly suitable for epigeal (surface-dwelling) amphibians in general, although the mobility of anuran amphibians and the ability of certain species to use water storages for temporary reproduction both represent favourable elements. Both species have been found to be present in the vicinity of the Reserve.

Green Toad
*Bufo (*syn. *Pseudepidalea) viridis*

Frogs - *Ranidae*

- Agile Frog, *Rana dalmatina* (Bonaparte), 1840, ▲IV

A widely-distributed species in the Karst area but its probable presence on the Reserve still needs to be confirmed. Other species can be found not far away, in the Karst ponds (former drinking sources for farm animals and so forth as well as in the wider including marshland where the River Timavo re-emerges including members of the so-called "Green Frog" complex *Rana* (syn. *Pelophylax) klepton* esculenta, *Rana* (syn. *Pelophylax*) *lessonae*, ▲IV.

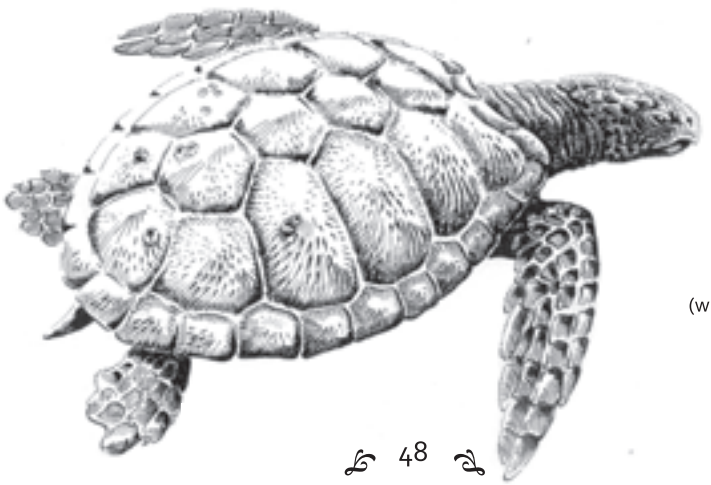
REPTILES - *REPTILIA*

Among the reptiles there is a notable presence, and not so rare during the summer months, of marine Loggerhead Turtles (*Caretta caretta*). Several terrestrial species of reptile are important because of their location from a biogeographical perspective. The area is the most westerly spot in the natural distribution of the Cat Snake (*Telescopus fallax*), which is otherwise to be found further east, being a species with a Balkan - Maltese - Western Asian chorology, according to Lapini *et al.* 1999, a specimen of which was captured in the Castle of Duino, a record indicating the presence of a species within the Nature Reserve itself which is located just to the east. In the area there are also discrete populations of the Blue-throated Keeled Lizard or Dalmatian Algyroides (*Algyroides nigropunctatus*), a species also observed in recent surveys, whose abundance is, however, at least in part less evident than in the past. Also reported here, close to the western limit of its distribution, the Horned Viper (*Vipera ammodytes*) is now very rare, being tied to rocky habitats with sparse vegetation. Of lesser importance, however, are the records of substantial populations of European Wall Lizard (*Podarcis muralis*), Eastern Green Lizard (*Lacerta viridis*: which also includes *L. bilineata*, the Western Green Lizard, as very recently suggested by various authors - Lapini, *pers. comm.*) and the European Whipsnake (*Hierophis viridiflavus*), all common species and widespread elsewhere in the Region. The Italian Wall Lizard (*P. siculus*) would seem to be rather rarer (although often encountered in the wider area) together with the widespread Aesculapian Snake (*Zamenis longissimus*). Finally, the presence of the Dalmatian Wall Lizard *P. melisellensis*, another species at the western limit of its distribution, whose consistency has clearly been reduced as a consequence of the re-vegetation of the Karst, requires further investigation.

Sea Turtles - *Testudines, Chelonidae*

- Loggerhead Turtle, *Caretta caretta caretta* (Linnaeus, 1758), ▲ II IV

The species appears quite regularly in the waters of the Gulf of Trieste, including those in front of the Nature Reserve, particularly during the summer months. Also reported in the Gulf of Trieste, although less commonly, is the Green Sea Turtle (*Chelonia mydas* ▲ II IV), of which at least one specimen was collected from the Isonzo Delta (Perco *et al.*, 2008).



Loggerhead Turtle
Caretta caretta
(with various barnacles
on its carapace)

Lizards - *Squamata*
Geckos - *Gekkonidae*

- Mediterranean House Gecko, *Hemidactylus turcicus* (Linnaeus, 1758)
- Moorish Wall Gecko, *Tarentula mauritanica* (Linnaeus 1758)

The so-called Moorish Wall Gecko is mentioned as species with a question mark for the area of Duino (Lapini *et al.* 1999) the presence of which in the study area needs to be verified. The Mediterranean House Gecko was cited for the village of Malchina, situated at no great distance, as well as for the city of Trieste. Its presence too, requires further proof. Geckos of one of these two species are present in the forestry police station in Duino (F&Z *pers. comm.*).

True Lizards - *Lacertidae*

- Blue-throated Keeled Lizard *Algyroides nigropunctatus* (Dumeril and Bibron, 1839), ▲ II IV
- Green Lizard , *Lacerta viridis* (Laurenti, 1768), ▲ II IV
- European Wall Lizard, *Podarcis muralis* (Laurenti, 1768), ▲ IV
- Dalmatian Wall Lizard, *Podarcis melisellensis fiumana* (Werner, 1891), ▲ IV
- Italian Wall Lizard , *Podarcis siculus* (Rafinesque, 1810), ▲ IV

The Blue-throated Keeled Lizard is a species with a "Dinaric-Aegean" distribution (Lapini *et al.*, 1999), widespread in the eastern Adriatic areas and typical of bare rock faces and *grižе* and here is at the western limit of its distribution along the coast. It is a relatively common and very characteristic species of the Nature Reserve (of which it is the symbol), although perhaps threatened by the progressive spread of scrubland. The widespread Green Lizard (*Lacerta viridis*) is also present at the site in question. The Western Green Lizard *L. bilineata*, although well-differentiated from the genetic point of view (Lapini *et al.* 1999), is at present prudently considered conspecific with *L. viridis* by the same author (*pers. comm.*). The European Wall Lizard (*Podarcis muralis*) is by far the most common species, including in populated areas and, within the Reserve, particularly around the campsite. The Dalmatian Wall Lizard (*P. melisellensis*) is probably present, but its certain presence on the Reserve lacks confirmation. In chorological terms the Italian Wall Lizard (*P. siculus*) is considered a "Dinaric-Albanic" element of the fauna, close to the western limit of its distribution. This species as well has been confirmed in the area in recent surveys.

Slow-worms - *Anguidae*

- Slow-worm, *Anguis fragilis* Linnaeus,1758

A rather common and generally widespread species.

True Snakes - *Colubridae*

- European Whipsnake, *Hierophis viridiflavus* Lacepede, 1789, ▲ IV
- Smooth Snake, *Coronella austriaca* Laurenti, 1768, ▲ IV

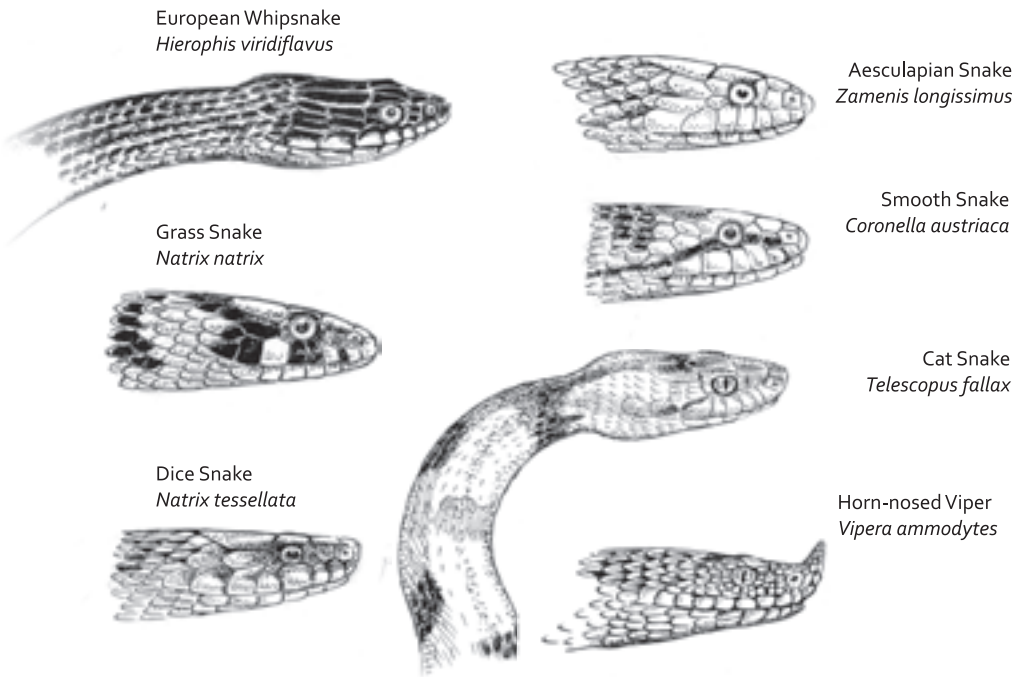
- Aesculapian Snake, *Zamenis longissimus* (Laurenti, 1768), ▲ IV
- Grass Snake, *Natrix natrix natrix* (Linnaeus, 1758)
- Dice Snake, *Natrix tessellata tessellata* (Laurenti, 1768) ▲ IV
- Cat Snake, *Telescopus fallax fallax* (Fleischmann, 1831), ▲ IV

The European Whipsnake *Hierophis viridiflavus* is the most common and widespread species throughout the Karst, where it is usually found in the melanic form. The Smooth Snake *Coronella austriaca* is present but not very common on the Karst and needs confirmation for the Nature Reserve. The Aesculapian Snake *Zamenis longissimus* is a widespread and fairly common species in general in wooded areas. The Grass Snake *Natrix natrix* is widespread but locally rare because of the lack of suitable habitat, but is commonly found in the immediate vicinity of the Reserve. The Dice Snake *N. tessellata* is a species with ecological preferences similar to those of the previous species and with a greater tendency to frequent marine areas near the coast. It is quite common in the area of Villaggio del Pescatore. The Cat Snake *Telescopus fallax* is present although rare on the Karst where it is found at the extreme north - western limit of its distribution (Lapini *et al.* 1996).
This important species, entirely absent elsewhere in Italy, has been found so far mostly in the coastal areas of the municipality of Duino - Aurisina.

Vipers - *Viperidae*

- Horn-nosed Viper, *Vipera ammodytes ammodytes*(Linnaeus, 1758), ▲IV

A species close to the western limit of its distribution, the Horn-nosed Viper *Vipera ammodytes* is widespread on the Karst but in strong decline. Its probable presence at present within the Nature Reserve requires confirmation.



BIRDS– *AVES*

As well as a Special Protection Area (SPA), the establishment of which especially concerns the protection of birds, summarized and discussed below are the species that have so far been observed in the area.
It should be emphasized that even areas of valuable habitat that are isolated and relatively distant from each other can positively influence the carrying capacity of the rather restricted area in question as a result of the fact that birds, as a result of their mobility, are able to exploit suitable environmental conditions even when these are fragmentary, having no need of terrestrial "corridors".

Mediterranean species

On the site are found at least three species close to the northern limit of their distribution (as breeding birds): The Blue Rock Thrush, the Subalpine Warbler and the Sardinian Warbler. Of these the Blue Rock Thrush, a member of the *Turdidae*, is a typical species of rock faces and the bare areas of "*grižе*" in Mediterranean areas, while the other two are rather more characteristic of scrubland or areas of scrubbed-over thermophilic grassland. There are also some recent reports, at the limit of its distribution, of the Eleonora's Falcon, a typical Mediterranean species, linked to the open sea where it breeds at a few island colonies.

Cliff-nesting species

Of particular interest is the "cliff-nesting community of the Upper Adriatic", in the sense of birds that mainly inhabit areas with steep cliffs and little vegetation. In the local context these include (as formerly or at present breeding species) the Yellow- legged Gull, Common Kestrel, Peregrine Falcon, Rock Dove, Alpine Swift, Blue Rock Thrush, Black Redstart, Black-eared Wheatear, Jackdaw and Raven. Other species (such as the Mediterranean Shag) breeding elsewhere not too far down the Adriatic coast, in Istria and Dalmatia, may eventually colonize our apparently suitable area if not subject to high levels of human "disturbance"[5]. The contemporaneous presence of some species (such as Common Kestrel, Peregrine Falcon, Eagle Owl and Raven) remains fairly improbable within such a short stretch of cliff.

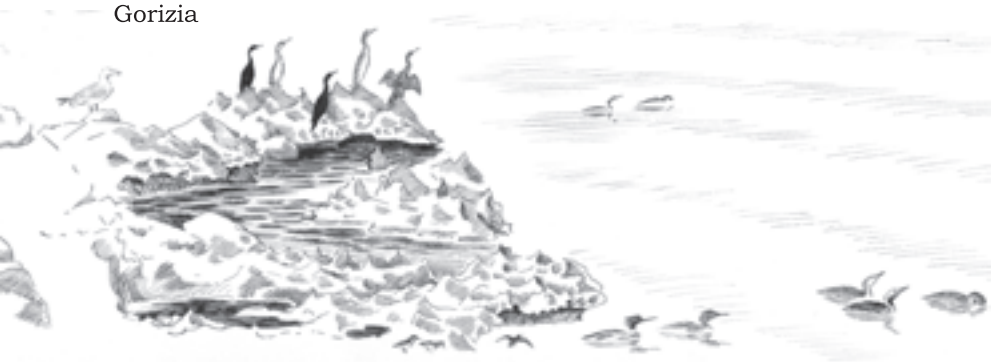
Cliff-Nesting Community of the Upper Adriatic (CNCUA):

- Mediterranean Shag , *Phalacrocorax aristotelis desmarestii*
- Yellow-legged Gull, *Larus michahellis*
- Common Kestrel, *Falco tinnunculus*
- Peregrine Falcon, *Falco peregrinus*
- Rock Dove, *Columba livia*
- Eagle Owl, *Bubo bubo*
- Scops Owl *Otus scops*

5 -The concept of "disturbance" is not-as many people think-the simple "presence" of humans which, if harmless, does not represent a problem. In small and isolated areas (such as the Nature Reserve) human presence can be tolerated if not linked to damage to the habitat and if it respects the "flight distance" (the distance at which animals take fright and flee) but this can vary depending on the species and the locality. In general, these problems are reduced or avoided if the human presence is contained within well-defined areas, also by physical means, as in our case, with access permitted only along the foot-paths.

- Alpine Swift, *Apus melba*
- Black Redstart, *Phoenicurus ochruros*
- Black-eared Wheatear, *Oenanthe hispanica*
- Blue Rock Thrush, *Monticola solitarius*
- Jackdaw, *Corvus monedula*
- Raven, *Corvus corax*
- Rock Bunting, *Emberiza cia*

The Raven has nested occasionally on the Nature Reserve since 1988 next to, or alternating with, the Peregrine Falcon, both marking a welcome return after decades of absence from the entire area covered by the provinces of Trieste and Gorizia



Species linked to open areas

Breeding Kestrels were quite regular along the "cliffs", before the arrival of the Peregrine Falcon, whilst the Rock Partridge, a typical species of the '*griže*' and a grazed, bare Karst, common during the late nineteenth century, is presumed to be virtually extinct at present. Some specimens were still present at least up until the 1970[s] (Calligaris *et al.*, 1976), when the coastal area which we are dealing with was still home to a small flock of goats that, in some fashion, hampered the re-growth of the vegetation for several years, maintaining the mosaic of rocks, grassland and scrub along the cliffs so characteristic of similar areas in Dalmatia and Kvarner, where sheep (or fires) abound. Also noteworthy, and still present but declining, are some species related to the sparse vegetation of the open thermophilic grasslands or scrubbed-over grasslands interspersed with woods, such as Nightjar, Hoopoe, Black-eared Wheatear and Rock Bunting. The Kestrel and the Black-eared Wheatear, as mentioned above, can also be included among the essentially cliff-dwelling species

Montane and Alpine species

The montane species, linked to Alpine or forested areas and found at the site during migration or in winter include:

Montane species:

- Crested Tit, *Parus cristatus*
- Coal Tit , *Parus ater*
- Robin, *Erythacus rubecula*
- Black Redstart , *Phoenicurus ochrurus*
- Black Woodpecker, *Dryocopus martius*
- Honey Buzzard, *Pernis apivorus*

Alpine species:

- Wallcreeper, *Tichodroma muralis*
- Alpine Accentor, *Prunella collaris*

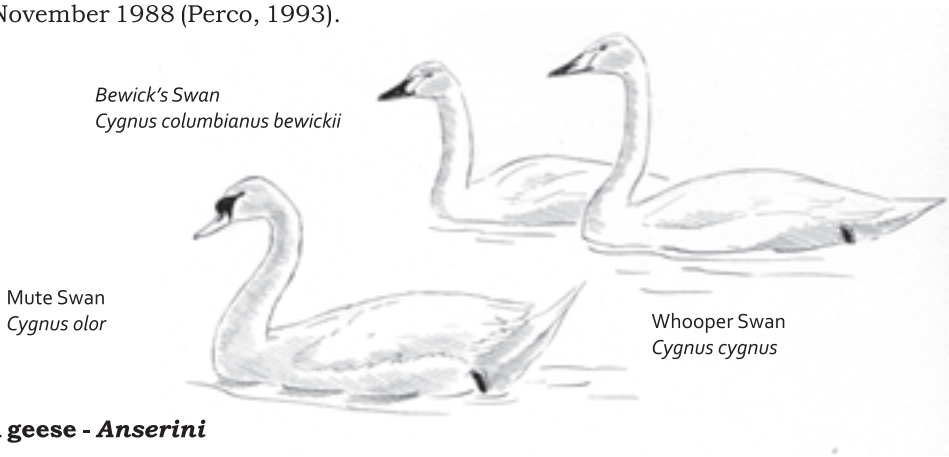
Marine and wetland species

On the sea in front of the Reserve many species are seen on migration, wintering or summering. Often these are fish - or shellfish-eating species which concentrate seasonally in various locations depending on the abundance of prey. Of particular importance at present is the large scale farming of fish and mussels, clearly visible from the Rilke foot-path just off the coast from the Duino Castle. The birds can be observed resting on the buoys and other floating structures or feeding in the water between them. Particularly noteworthy is the presence of the Common Eider, here at the southern limit of its breeding distribution and the Mediterranean Shag - which is at its northern limit instead. This phenomenon is almost certainly related to the conditions of relative peace and quiet and the wealth of food on offer in the areas in question. In recent years, the summer months have witnessed the presence close to (or on) the cliffs of species that could potentially breed were there to be reduced disturbance by boats. This is the case for the Shag as well as for the Shelduck (Benussi *pers. comm.*). Adequate regulation is therefore needed to this effect. For now the most numerous species related to the coastal zone that has become established as a breeding bird is the tolerant (to humans) and invasive, Yellow-legged Gull, whose presence, however, would be problematic were it to become more numerous. A short list of species that are characteristic of this stretch of sea (and airspace) and in the most general sense "observable from the Coast of Duino" ay the right time of year include following:

- Black-throated Diver, *Gavia artica*
- Red-throated Diver, *G. stellata*
- Great Crested Grebe, *Podiceps cristatus*
- Black-necked Grebe, *P. nigricollis*
- Red-necked Grebe, *P. grisigena*
- Gannet, *Morus bassanus*
- Great Cormorant, *Phalacrocorax carbo*
- Mediterranean Shag, *P. aristotelis desmarestii*
- Little Egret, *Garzetta garzetta*
- Great White Egret, *Casmerodius albus*
- Grey Heron, *Ardea cinerea*
- Mute Swan, *Cygnus olor*
- Greylag Goose, *Anser anser*
- White-fronted Goose, *A. albifrons*
- Mallard, *Anas platyrhynchos*
- Garganey, *A. querquedula*
- Common Eider, *Somateria mollissima*
- Velvet Scoter, *Melanitta fusca*
- Common Scoter, *M. nigra*
- Goldeneye, *Bucephalus clangula*
- Red-breasted, *Merganser Mergus serrator*
- Common Sandpiper, *Actitis hypoleucos*
- Herring Gull, *Larus michahellis*
- Black-headed Gull, *Chroicocephalus ridibundu*
- Mediterranean Gull, *Larus melanocephalus*
- Sandwich Tern, *Sterna sandvicensis*
- Common Tern, *Sterna hirundo*
- Little Gull, *Hydrocoloeus minutus*
- Black Tern, *Chlidonias niger*
- Kingfisher, *Alcedo atthis*

DUCKS, GEESE AND SWANS - *ANSERIFORMES*
Anatidae

Quite a few species of Anatidae listed below have been observed in the Gulf of Trieste and the Bay of Panzano not far away, especially towards the mouth of the Isonzo.
Species worth listing include: Whooper Swan *Cygnus cygnus*, Bewick's Swan *C. columbianus bewickii*, Brent Goose *Branta bernicla*, Barnacle Goose *B. leucopsis*, Red-breasted Goose *B. ruficollis*, Red-crested Pochard *Netta rufina*, Ferruginous Duck *Aythya nyroca*, Greater Scaup *A. marila*, Long-tailed Duck *Clangula hyemalis*, Smew *Mergellus albellus*, Goosander *Mergus merganser* and White-headed Duck *Oxyura leucocephala*. With regard to the latter very rare species, a female specimen was repeatedly observed at the mouth of the River Timavo in November 1988 (Perco, 1993).



Swans and geese - *Anserini*

- Mute Swan, *Cygnus olor* (Gmelin, 1789), Mreg, E, W
- Bean Goose, *Anser fabalis* (Latham, 1787), Mreg, W
- White-fronted Goose *Anser albifrons* (Scopoli, I769), Mreg, W
- Greylag Goose, *Anser anser* (Linnaeus, 1758), Mreg, W irr, E irr

The Mute Swan is now a very common and numerous species in the Gulf of Trieste, especially at the mouth of the River Isonzo where it also nests (more than 750 birds were present in 2011 and up to 1.400 in january 2014). Sometimes it is present at Sistiana (in the bay) and along rocky shores although this does not represent an ideal habitat. A specimen of the exotic Black Swan *C. atratus* (originated from Australia) was often observed at the beach at the Castle of Duino in the course of 1992 but at present (2014) the observation of specimens mixed with Mute swans is now more usual. Often, migrating flocks, sometimes very numerous and in formation, composed of the three species of geese, or groups thereof, fly over the Duino coastline on migration. A Canada Goose, *B. canadensis* was observed by Zorzenon in about 1985 from the Rilke, in flight over the sea.

Shelducks - *Tadornini*

- Ruddy Shelduck, *Tadorna ferruginea* (Pallas, 1764), ▲A
- Common Shelduck, *Tadorna tadorna* (Linnaeus, 1758), Mreg, B**

Since 1989 several specimens of Shelduck, in some cases possibly escapes from captivity, have been spotted frequently while moving back and forth between Valle Cavanata (Fossalon di Grado) and the mouth of the River Timavo (Duino and Monfalcone). The species has also been observed on the beach at the foot of the castle, just outside the Nature Reserve by P. Tout. The Shelduck has been seen often in the area and with increasing frequency in recent years. In 2008, during the breeding season, E. Benussi reported a specimen perched on the cliffs of the Nature Reserve while for the years 2009 to 2011 F & Z report frequent observations of individuals or pairs in summer, resting on the cliffs with behaviour suggestive of possible breeding.

Surface or dabbling ducks - *Anatini*

- Eurasian Wigeon , *Anas penelope* Linnaeus, 1758, Mreg, W
- Eurasian Teal, *Anas crecca* Linnaeus, 1758, Mreg, W
- Mallard, *Anas platyrhynchos* Linnaeus, 1758, Mreg, SB***, W
- Gadwall, *Anas strepera* Linnaeus, 1758, Mreg
- Pintail, *Anas acuta* (Linnaeus, 1758), Mreg, W irr
- Garganey, *Anas querquedula* Linnaeus, 1758, Mreg
- Shoveler, *Anas clypeata* Linnaeus, 1758, Mreg, W irr

The Wigeon is a very common species in the air and in the area in front of the Nature Reserve, but usually remains rather far offshore during the winter and on migration, roughly from (September) October to March (April). At the mouth of the River Isonzo concentrations of as many as 20,000 birds have been observed in November. The other species of "dabbling ducks" are also common, those that seem to be more easily observed from the Rilke Path being the Mallard and Garganey. The latter, as its Italian name '*Marzaiola*' implies, is especially common during spring migration in March. The Mallard nests at Miramare, the mouth of the River Timavo and various other sites along the coast, including rocky ones. The resident population, in part descended from feral domestic birds, mixing with completely wild ones. At least one pair nested unsuccessfully in 2010, presumably at the foot of "*Muraglione*" where F & Z observed the predation of all the offspring (3 or 4) by Yellow-legged Gulls

Diving ducks - *Aythyini*

- Common Pochard, *Aythya ferina* (Linnaeus, 1758), Mreg, W
- Tufted Duck, *Aythya fuligula* (Linnaeus, 1758), Mreg, W

Both species are relatively frequent on migration.

Eiders - *Somaterini*

- Common Eider , *Somateria mollissima* (Linnaeus, 1758), E, W, Mreg, B***

The species has nested at the mouth of the River Isonzo since at least 1999 (up to 6 pairs), an additional pair nesting (unsuccessfully) in the area of the reclamation of Monfalcone in 2004. This is a species of Nordic origin formerly rare in the Mediterranean basin, that has gradually become frequent and is now a permanent feature in the area with a few dozen birds around the mussel farms, particularly off the coast from the Villaggio del Pescatore, but also elsewhere along the coast. It is also observed regularly from the Rilke Path, particularly on the outer buoys towards the south-west but often also close to

the coast. An unfertilized egg, perhaps dumped without a nest by a female, was collected on the beach east of the castle by R. Valenti (*pers. comm.*) in 2009. Since the year 2011 (Benussi; Rozza; *pers. comm*) at least one pair has bred, raising a number of ducklings, near the castle. The presence of the Eider as a breeding bird is of great importance, since it is a northern species that is very rare elsewhere in the Mediterranean (Perco *et al.*, 1993).

Marine ducks - *Mergini*

- Common Scoter , *Melanitta nigra* (Linnaeus, 1758), Mreg, W irr
- Velvet Scoter , *Melanitta fusca* (Linnaeus, 1758), Mreg. W irr
- Goldeneye, *Bucephala clangula* (Linnaeus, 1758), W, Mreg
- Red-breasted Merganser, *Mergus serrator* Linnaeus, 1758, Mreg, W, E

Common and Velvet Scoter are scarce but have been observed several times on the sea in front of the Reserve. Goldeneye and Red-breasted Merganser are much more frequent (the second also during the summer months) and sometimes frequent the vicinity of the rock faces, the first feeding on shellfish, the second on small fish.

GALLIFORMS - *GALLIFORMES*
Partridges, quails and pheasants - P*hasianidae*

- Rock Partridge, *Alectoris graeca* (Meisner, 1804), ▲ B loc. extinct.
- Grey Partridge, *Perdix perdix* (Linnaeus, 1758), B loc. extinct.
- Quail, *Coturnix coturnix* (Linnaeus, 1758), M irr, B loc. extinct.
- Ring-necked Pheasant, *Phasianus colchicus* Linnaeus, 1758, SB**

Currently, the Rock Partridge, once very common on the Karst, may still survive with the odd sporadic bird in the area of Val Rosandra within the Province of Trieste. The last observation for the Nature Reserve (F. Perco), made in 1979, refers to a pair on the rocky lookout point between the Bay of Sistiana and the Duino coastline. Since then, the species has no longer been observed anywhere in the municipality of Duino Aurisina. The Alpine sub-species *saxatilis* was the one present in the area. The cause of the extinction lies in the natural and artificial reforestation of the area. It is interesting to recall that this species, a typical inhabitant of the dry open grassland, the "*landa*", was actively hunted in the Karst and abundant in the years immediately following the Second World War. In 1961 they still managed to shoot 131 birds in the Province of Trieste, yet the hunting of this species was closed in 1972, although it proved impossible to halt its decline (Calligaris, Perco & Perco, 1976). The Grey Partridge is at present considered to be restricted to non-calcareous areas of the Province of Trieste, where, however, its presence now appears to be solely as a result of releases for hunting. There are no recent observations (since 1980) attributable to the area covered by the study. Some birds have been released in the past for restocking in the area of the hunting reserves of the municipality of Duino (Duino, Malchina, Aurisina). The Quail, once regular is probably extinct as a breeding bird. The species was observed by Ann Hill in the Cernizza in Autumn 1988; L. Felcher and T. Zorzenon reported sporadic appearances on the Rilke Path and at Lisert (summer of 2000). The Pheasant, a species introduced for hunting and decorative purposes and acclimatized since ancient times, has also been observed recently within the Nature Reserve but probably as a result of restocking.

GAVIFORMS - *GAVIIFORMES*
Divers - *Gaviidae*

- Great Northern Diver, *Gavia immer* (Brunnich, 1764), ▲A (M irr?)
- Red-throated Diver, *Gavia stellata* (Pontoppidan, 1763), ▲Mreg, W
- Black-throated Diver, *Gavia arctica* (Linnaeus, 1758), ▲W, E irr

The Great Northern Diver is very rare and not easy to distinguish in the wild out on the open sea, where these fish-eating birds are usually found. It has, however, sometimes been observed in the waters of the Gulf of Trieste not far from the Nature Reserve (Parodi, 2006). The other two species, but especially the Black-throated Diver, are relatively frequent from October to March in the area of sea in question or at the mouth of the River Timavo and the latter has been repeatedly observed within the Bay of Sistiana and in amongst the boats in the marina.

left to right: Great Crested *P. cristatus*, Red-necked *P. grisegena*, Slavonian *P. auritus*, Black-necked *P. nigricollis* and Little Grebes *Tachybaptus ruficollis* All in winter plumage.

PODICIPEDIFORMS - *PODICIPEDIFORMES*
Grebes - *Podicipedidae*

- Little Grebe, *Tachybaptus ruficollis* (Pallas, 1764), Mreg, W
- Great Crested Grebe, *Podiceps cristatus* (Linnaeus, 1758), Mreg, W
- Red-necked Grebe, *Podiceps grisegena* (Boddaert, 1783), Mreg, E, W irr
- Slavonian (or Horned) Grebe, *Podiceps auritus* (Linnaeus, 1758), ▲Mreg, W irr
- Black-necked (or Eared) Grebe, *Podiceps nigricollis* C.L.Brehm, 1831, Mreg, W, E irr

The Little Grebe is the species that one can regularly encounter at the mouth of the River Timavo, where it also nests. The other species mentioned, except for the Slavonian Grebe (usually rather rare) occur quite regularly on the sea along the entire coastline. The most frequent species overall is the Black-necked Grebe. The Great Crested Red-necked and Black-necked Grebe have been repeatedly observed in the Bay of Sistiana and the waters of the Nature Reserve.

TUBE-NOSES - *PROCELLARIIFORMES*
Petrels - *Procellariidae*

- Yelkouan shearwater, *Puffinus yelkouan* (Acerbi, 1827), ▲Mreg, E, W irr

This species is observed regularly in flocks along the stretch of sea overlooked by the Nature Reserve, mainly in the open sea during the summer months and is in fact a species that approaches land unwillingly. A few colonies are known for the Kvarner Archipelago in the northern Adriatic (Croatia).

PELECANIFORMS- *PELECANIFORMES*
Gannets - *Sulidae*

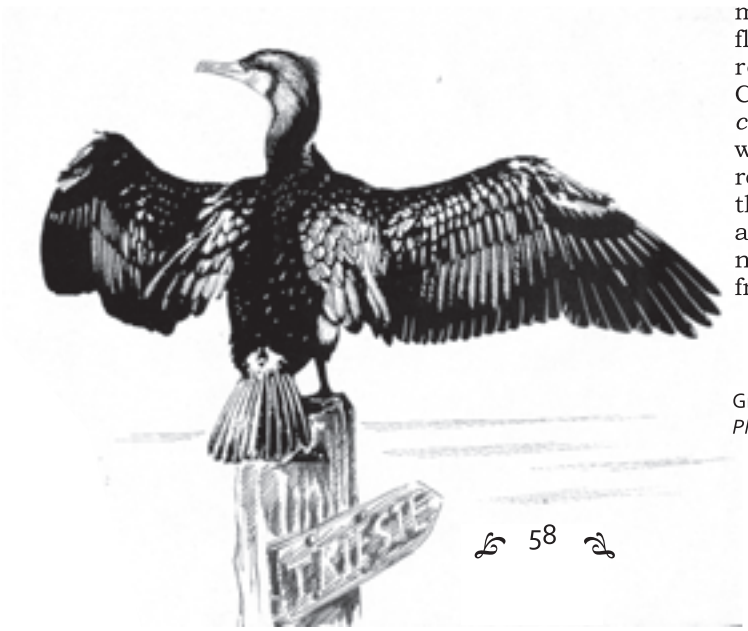
- Gannet, *Morus bassanus* (Linnaeus, 1758), E irr, M irr, W?

Frequenting the open sea, often far from land, several individuals together have been observed in the past by a range of observers on various occasions including U. Chalvien and F & Z (*pers. comm.*) from the Nature Reserve and it is probably a regular species in the Gulf of Trieste and off the Bay of Panzano, perhaps increasing in recent years, during the summer months.

Cormorants and Shags - *Phalacrocoracidae*

- Great Cormorant, *Phalacrocorax carbo* (Linnaeus, 1758), W, Mreg, E
- Mediterranean Shag, *P. aristotelis desmaresti* (Linnaeus, 1761), ▲E, W, Mreg

The most frequent species in the Region and at the mouth of the River Timavo is the first, but in the area of the Nature Reserve and along the cliffs of Duino the second has become common over the past two decades, tending to increase gradually. For the Gulf of Trieste up to 1,200 birds were recorded in the summer of 2000 and about 1,500 in November 2009 (Benussi, 2009), although in the early 1990[s] the species was considered scarce. The regular presence of birds, including adults, throughout the year and most often seen resting on rocks at the base of the cliffs at Duino makes the future nesting along the Duino coast a real possibility. It should be emphasized that the area has significant similarities with the typical breeding sites for the species along the Dalmatian coast and islands. It is especially found around the mussel farms, making use of them both as a resting site (on the floats) and for fishing. F & Z indicate the formation of nocturnal roosts on the beach to the east below the castle, consisting of hundreds of individuals (300 - 400), which, in summer, at dawn move off towards the mussel farms in small flocks. It is also worth recalling the Pygmy Cormorant *Phalacrocorax pygmaeus* which has undergone a recent sharp increase in the adjacent wetlands, although for now it has not yet been recorded from the Rilke Path.



Great Cormorant
Phalacrocorax carbo

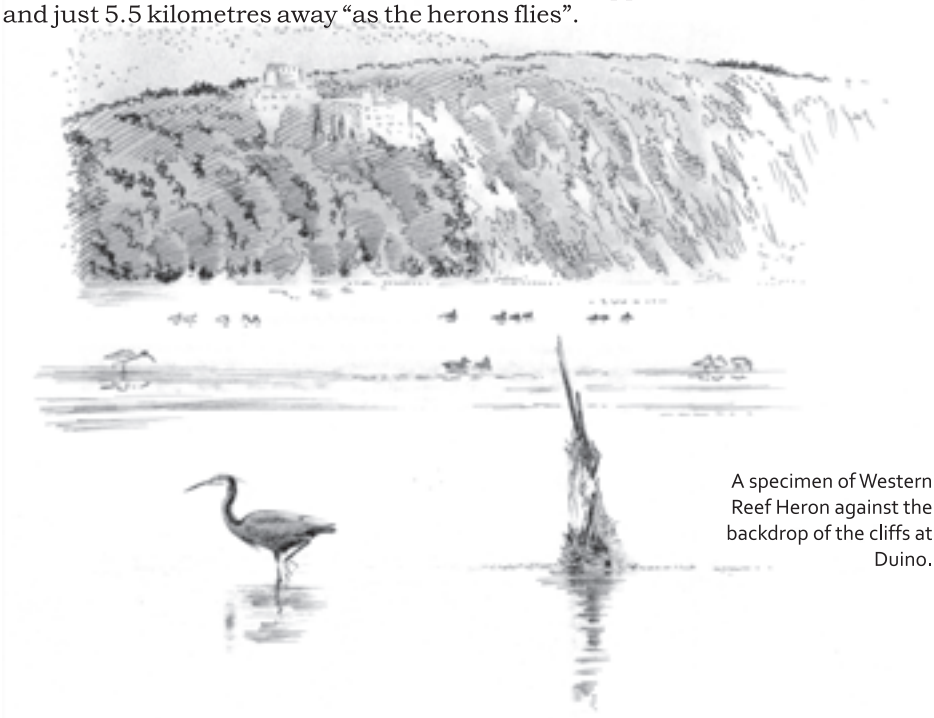
STORKS, HERONS SPOONBILLS AND IBISES - *CICONIIFORMES*

Also present or recorded in the nearby wetlands are the Eurasian Bittern *Botaurus stellaris*, Little Bittern *Ixobrychus minutus*, Western Reef heron *Egretta gularis*, Eurasian Spoonbill *Platalea leucorodia* to which one can add the Greater Flamingo *Phoenicopterus roseus*, actually belonging to the order *Phoenicopteriformes*, often observed at the mouth of the River Timavo in the reclamation area.

Herons - *Ardeidae, Ardeinae*

- Night Heron, *Nycticorax nycticorax* (Linnaeus, 1758), ▲M irr
- Squacco Heron, *Ardeola ralloides* (Scopoli, 1769), ▲M irr
- Cattle Egret, *Bubulcus ibis* (Linnaeus,1758), M irr (A?)
- Little Egret, *Egretta garzetta* (Linnaeus, 1766), ▲Mreg, W, E
- Great White Egret, *Casmerodius albus*(Linnaeus, 1758), ▲M irr, W irr, E irr
- Grey Heron , *Ardea cinerea* Linnaeus, I758, W, Mreg, E
- Purple Heron, *Ardea purpurea* Linnaeus, I766, ▲Mreg

The species of *Ardeidae* listed above are found regularly at the mouth of the River Timavo and the reclaimed wetlands close to Monfalcone. Species seen with some regularity in the limited study area include the Grey Heron (very often resting on the mussel-farm floats or even on the beaches in the Bay), the Great White Heron and the Little Egret, both in flight and on land along the coast, or on the wet ground in the Sistiana quarry. The others have been occasionally been observed on transit migration (Dentesani; Tout, *pers. comm.*). A Cattle Egret, a new species for the Province of Trieste, but present for years in Italy (arriving from the west and originally African in origin) was observed in flight by Felcher (*pers. comm.*) in autumn 2010. The rare Western Reef Heron (*Egretta gularis*) has been observed several times at the mouth of the Timavo and a bird has been present since September 2003 until February 2012 at Punta Barene at the mouth of the River Isonzo. This area is situated opposite the Natural Reserve and just 5.5 kilometres away "as the herons flies".



A specimen of Western Reef Heron against the backdrop of the cliffs at Duino.

Storks - *Ciconiidae*

-White Stork, *Ciconia ciconia* (Linnaeus, I758), ▲M irr

This is a scarce species but observed on several times in transit at various sites in the surroundings, especially at the mouth of the River Timavo and along the coastline towards Trieste. A Black Stork *Ciconia nigra* was found alive in San Giacomo in Trieste September 20th 1969 and was unsuccessfully released in the area in question three days later and then taken back into captivity (Perco, 1971).

Ibis and spoonbills - *Threskiornithidae*

- Glossy Ibis, *Plegadis falcinellus* (Linnaeus, I766), ▲Mreg

Observed several times by P. Tout (*pers. comm.*) including c. 60 flying N in May 1996. The Spoonbill Platalea leucorodia is frequent at the mouth of the River Isonzo and has been seen flying over Duino on migration P. Tout (*pers. comm.*)

Goshawk

DIURNAL RAPTORS - *FALCONIFORMES*
Vultures, buzzards, goshawks and sparrowhawks, etc.- *Accipitridae*

- Honey Buzzard, *Pernis apivorus* (Linnaeus, 1758), ▲Mreg. B*
- Griffon Vulture, *Gyps fulvus* (Hablizl, 1783), ▲Mreg
- Short-toed Eagle, *Circaetus gallicus* (Gmelin, 1788), ▲Mreg, E
- Marsh Harrier, *Circus aeruginosus* (Linnaeus, 1758), ▲Mreg, W, E irr
- Hen Harrier , *Circus cyaneus* (Linnaeus, 1766), ▲Mreg, W
- Montagu's Harrier, *Circus pygargus* (Linnaeus, 1758), ▲Mreg
- Goshawk, *Accipiter gentilis* (Linnaeus, 1758), SB*, Mreg, W
- Sparrowhawk, *Accipiter nisus* (Linnaeus, 1758), SB***, Mreg, W
- Common Buzzard, *Buteo buteo* (Linnaeus, 1758), SB*, Mreg, W

The Honey Buzzard, which feeds mainly bees and wasps, is a species that is regularly observed in transit on migration (F. Perco *pers. obs.*). Its possible nesting in wooded areas of the Nature Reserve requires confirmation. The Griffon Vulture was once thought to be extremely rare in the Province of Trieste (Valle, 1885) and has thus been the subject of particular attention (Perco, 1975). Observations collected in the area surrounding the Nature Reserve include the following: one shot in the Cernizza in 1960 (G. Varisco *pers. comm.*), one observed in Sistiana in June 1980 (G. Olivo *pers. comm.*), one observed in the 1990s' (A. Hill and "forestry police") on Monte Hermada, one observed by M. Buzziolo from Duino 29/09/87 (*pers. comm.*), one in flight along the trunk road 202 on 09/12/95 (C. Calligaris, 1997), one perched on the petrol station building - north side - roughly around the year 2000 by R. Bartoloni (*pers. comm.*). It is now firmly established, however, that this species regularly passes along the ridges of the Karst plateau and, less often, along the coast when moving between the Eastern Alps and the breeding sites in the Kvarner Gulf in Croatia (Genero & Perco 1989, 1997; Benussi, 1997). The Short-toed Eagle has been seen hunting for food (almost exclusively snakes) several times on the land close to the railway in proximity to the Nature Reserve. The Marsh Harrier is common at the mouth of the River Timavo and since a few years nests close by in the industrial area at Lisert. Several birds were observed migrating along the coast by the author. The Hen Harrier is especially common at the mouth of the River Timavo but is sometimes observed in transit along the cliffs. The Montagu's Harrier has been seen in flight by P. Tout and nested in the past in the area close to Monfalcone (Cavana). The Sparrowhawk is a very common species, which nests in the Karst in various areas and at least one pair nests within forested area included in the Nature Reserve (confirmed in 2014; Rozza and *pers. obs.*). On the Reserve appears with particular frequency during migration. The Goshawk is quite common, nesting on the Karst in various areas outside the Reserve itself. The species has been repeatedly observed in the pine forest and along the cliffs of the reserve. The Common Buzzard is very common almost everywhere and a pair probably nests north of the railway (on Monte Hermada, Coisce) quite regularly, particularly frequent on migration. On the Reserve it appears frequently on migration.

Ospreys - *Pandionidae*

- Osprey, *Pandion haliaetus* (Linnaeus 1758), ▲- Mreg?

Observed several times in migration (individuals) along the coast at Duino.

True falcons - *Falconidae*

- Lesser Kestrel, *Falco naumanni* Fleischer 1881, ▲- M irr
- Common Kestrel, *Falco tinnunculus* Linnaeus 1758, SB**, Mreg, W
- Red-footed Falcon, *Falco vespertinus* Linnaeus, 1766, Mreg
- Eurasian Hobby, *Falco subbuteo* Linnaeus, 1758, Mreg
- Eleonora's Falcon, *Falco eleonorae* Gene', 1839, ▲- M irr
- Peregrine Falcon, *Falco peregrinus* Tunstall, 1771, ▲- SB***, Mreg, W

A female Lesser Kestrel was shot in the 1960[s] by the gamekeeper A. Blasina (F. Perco *pers. obs.*). The Common Kestrel is considered common in the area, but less than it once was when at least one pair nested regularly along the cliffs, often on the outer wall of the so-called "*Muraglione*". In 2000 a pair settled in the area below the old castle. There have not, however, been any cases of confirmed breeding since at least 2004 and it is assumed that this is related with the more regular presence of Peregrine Falcon and/or Raven. The Red-footed Falcon is reported in the area by P. Tout (*pers. comm.*). The Hobby, a species that has nested elsewhere on the Karst, is considered occasional but not especially rare in the area. Several observations of the rare Eleonora's Falcon, a remarkable species, endemic to the Mediterranean and the Red Sea were collected by Felcher & Zorzenon, Chalvien & Visentin and Perco from 1983 to 1990, all relating to the Nature Reserve, mainly in the summer months. It has, however, been noted in the month of October by P. Tout. (Felcher & Zorzenon, 1997). Some observations (from the Rilke Path but also over the Forestry Police station in Duino) were again made on the 1st and 2nd August 2011 by L. Felcher and T. Zorzenon.
From 1987 to 1991 the Peregrine Falcon successfully bred several times on the Duino coast, at that time the only known site for the provinces of Trieste and Gorizia, even managing to bring off a large brood of 4 young to fledging (P. Tout, *pers. comm.*). In 1992, it nested once again (being observed bringing prey by P. Tout) but without success. This nesting failure coincided, perhaps not by chance, with the notable observation of an Eagle Owl *Bubo bubo* on the castle in Duino and its surroundings. Paul Tout, who at the time lived in the Foresteria building near the castle, assigned to teachers at the United World College, heard it call from home, having the window open, and I (F.P.) could then hear it over the 'phone! The next day we were able to watch the same bird perched below the castle (east side), disturbed by some Jays *Garrulus glandarius* (May 1992 Tout & Perco, *pers. obs.*). It seems likely that the Peregrine Falcon was also the subject of disturbance by Ravens which began nesting on the same cliffs at that time and/or by climbers who at the time often used the cliffs for rock climbing, ignoring the ban recently issued with an order by the local Mayor. In 2008 the Peregrine Falcon nested for the first time in Val Rosandra, still within the Province of Trieste but several miles away to the West. In 2009, a pair reoccupied the Duino site, made up of an adult male and a female in moult but still in the brown plumage of a first year bird, initially observed on March 22nd when mating was observed. The pair fledged at least two young that year (the first observations being made on June 13th) and in 2014; three in 2012. In 2010, four young fledged, with the same number in 2011 and 2013. Territorial behaviour of young birds in juvenile plumage may indicate a population at low

density because of the frequent loss of adult birds. The members of a breeding falcon pair are normally considered "territorial" and strictly linked to their nesting area, but recent observations show that non breeding birds (adults or sub-adults) can sometimes come to a nest with a prey, feeding the young of an unrelated pairs. An exemple of "altruism" supported by a number of observations recently recorded elsewhere in Europe by E. Guenzi (*pers.comm.*).
At a local level in the past years the species seems to be re-colonizing a range of other suitable sites in the Slovenian Karst such as the area of the Škocjan Caves and the gorge of the River Osp just over the border (A. Pittana, *pers. comm.*). It is worth recalling, however, that in the context of the time when there was a constant battle against "vermin", in 1891 a male and female of this species were taken at this extremely suitable site, (May 12th to be precise) and then preserved at the Museum of Natural History in Trieste (Sadini, 1960 - 61). Since their return to the Rilke Cliffs the Peregrine Falcons breeding on this site, well-settled at this point and with remarkable reproductive success, has been able to breed and fledge many young per year: at least 19 in the six years between 2009-2014.
The phenomenon in this case is probably related to the abundance of prey available in the surrounding area, especially when you consider that out from the cliffs of Duino, just six or seven kilometres in a straight line across the gulf, lies the Nature Reserve of the mouth of the River Isonzo and Isola della Cona, frequented by many thousands of birds. Felcher & Zorzenon (*pers. comm.*) also confirm to have witnessed and documented the bringing in of a Curlew *Numenius sp.* on at least one occasion, caught at Cona and carried to the nest below the Rilke Path. There was, in fact, an observer at Cona while the other, connected by telephone, was carrying out an inspection on the cliffs. The many prey items known to have been captured and taken to the nest over the years include the following at least: Little Gull *Hydrocoloeus minutus* (F. Perco, 01.05.1988), Mallard *Anas platyrhynchos*, Teal *Anas crecca*, Curlew (F & Z), Rock Dove *Columba livia*, Collared Dove *Streptopelia decaocto* (P. Tout, 31.05.1991), Common Swift *Apus apus*, Alpine swift *Apus melba* (N & Fa. Perco, 28.03.2012 etc.), House Martin *Delichon urbica* (M.Basso, 25.05.1991), Blackbird *Turdus merula* and Starling *Sturnus vulgaris*. Attempts to catch some bats, always in flight, have also been documented.
Recently-fledged young have also often been observed capturing large flying insects, especially Rose Chafers *Cetonia sp.* Finally, F & Z reported seeing an unsuccessful attack against a Jay that, to save itself, dived into the sea and was then able to reach the shore. A Rock Dove struck by an adult female Peregrine but still alive and struggling, fell into the water, but the falcon, with her excessive flight speed, was unable to recover the prey in spite of repeated attempts. In this case the pigeon in the water was preyed upon by a Yellow-legged Gull that had quickly reached the spot.
These observations confirm the well-known fact, however, of the extreme specialization of Peregrines in catching other birds, exclusively in flight, using their speed and the advantage provided by the height of the initial attack compared to that of the chosen prey. These in turn can survive by developing different defensive strategies, such as camouflage and the brevity (or rarity) of their flights in open airspace as in the case of the Blue Rock Thrush and by nesting in the deep recesses of rocky cavities or by their rapid flight, as is the case of swifts or pigeons, the latter being interesting example, along with falcons, of parallel evolution or co-evolution.

RAILS AND CRANES - *GRUIFORMES*
Rails - *Rallidae*

Water Rails *Rallus aquaticus*, Spotted Crakes *Porzana porzana*, Little Crakes *Porzana parva*, and Moorhens *Gallinula chloropus* are regularly present and observable at the mouth of the River Timavo but have never been observed thus far in the actual study area .

- Coot, *Fulica atra* Linnaeus, 1758, W. Mreg

This is an abundant species, particularly in the months between autumn and spring, which occurs regularly and in large numbers at the mouth of the River Timavo and the adjacent reclaimed wetlands (where it nests). It is also sometimes present elsewhere along the coast and in the Bay of Sistiana.

Cranes - *Gruidae*

- Common Crane, *Grus grus* (Linnaeus, 1758), ▲Mreg

Observed (or heard) repeatedly on migration, including at night, along the coastline north of Trieste and in the sky above the Natural Reserve. Large flocks of more than 100 birds together are not infrequent.


Common Crane

SHOREBIRDS, WADERS, GULLS AND TERNS - *CHARADRIIFORMES*

Quite a few species not listed below, have been observed close by in the wetlands at the mouth of the River Timavo and the reclaimed wetlands including, for example: Black-winged Stilt *Himantopus himantopus*, Avocet *Recurvirostra avosetta*, Little Ringed Plover *Charadrius dubius*, Ringed Plover *C. hiaticula*, Kentish Plover *C. alexandrinus*, Golden Plover *Pluvialis apricaria*, Grey Plover *P. squatarola*, Knot *Calidris canutus*, Sanderling *C. alba*, Little Stint *C. minuta*, Temminck's Stint *C. temminckii*, Curlew Sandpiper *C. ferruginea*, Jack Snipe *Lymnocryptes minumus*, Common Snipe *Gallinago gallinago*, Great Snipe *G. media*, Black-tailed Godwit *Limosa limosa*, Bar-tailed Godwit *L. lapponica*, Spotted Redshank *Tringa erythropus*, Greenshank *T. nebularia*, Marsh Sandpiper *T. stagnatilis*, Green Sandpiper *T. ochropus*, Turnstone *Arenaria interpres*, Arctic Skua *Stercorarius parasiticus*, Kittiwake *Rissa tridactyla* and Caspian Tern *Sterna caspia.*

Oystercatchers - *Haematopodidae*

- Oystercatcher, *Haematopus ostralegus* Linnaeus, 1758, Mreg

Heard passing over at night on passage by P. Tout.

Pratincoles - *Glareolidae*

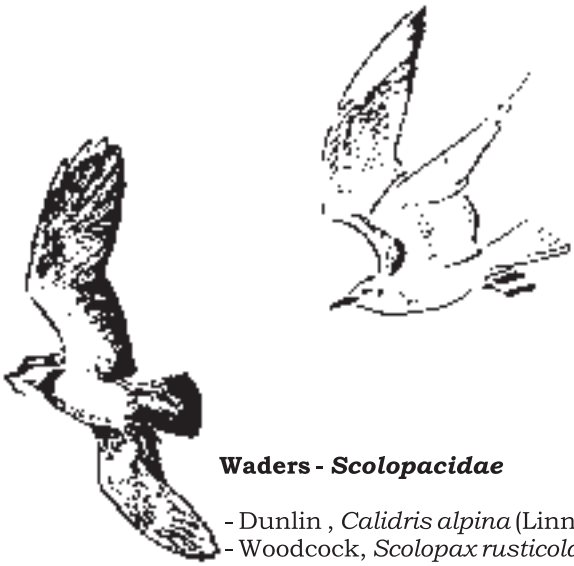
- Pratincole, *Glareola pratincola* (Linnaeus, 1758), ▲Mirr

Two birds seen in flight by T. Zorzenon (1980[s]).

Lapwings and plovers - *Charadriidae*

- Lapwing, *Vanellus vanellus* (Linnaeus, 1758) Mreg, W

Observed several times in the area in flight on migration or displacement, the species nests at the mouth of the Isonzo and winters in numbers in the plains and wetlands west of the Timavo.



Lapwing (left) and Black-headed Gull

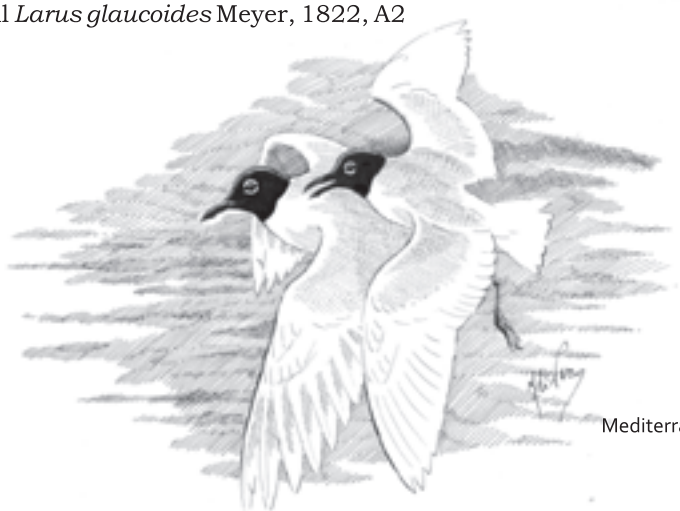
Waders - *Scolopacidae*

- Dunlin , *Calidris alpina* (Linnaeus, 1758), Mreg, W
- Woodcock, *Scolopax rusticola* Linnaeus, 1758, Mreg, W irr
- Whimbrel, *Numenius phaeopus* (Linnaeus, 1758), Mreg, E
- Curlew, *Numenius arquata* (Linnaeus, 1758), Mreg, W, E ir
- Common Sandpiper, *Actitis hypoleucos* (Linnaeus, 1758), Mreg, W, E
- Wood Sandpiper, *Tringa glareola* Linnaeus, 1758, ▲Mreg, E irr

Numerous and compact flocks of Dunlin migrating or engaging in local movements are frequently observed at the mouth of the River Timavo and sometimes above the sea overlooking the cliffs. Woodcock are relatively common on migration and occasionally in winter. The species appears with some regularity in wooded areas including those within the Nature Reserve where it was once hunted on a fairly regular basis. It has also been observed during recent surveys (Dentesani, *pers. comm.*). Curlews and other sandpiper species are regularly observed, especially on the migration and are generally common in the coastal areas surrounding the lagoon. Large flocks of Curlew are often seen, especially towards the Bay of Panzano, while the Common Sandpiper is a regular visitor, albeit with just a few birds, in the tidal strip at the base of the cliffs.

Gulls - *Laridae*

- Black-legged Kittiwake *Rissa tridactyla* (Linnaeus, 1758) M irr
- Little Gull *Hydrocoloeus minutus* (Pallas, 1776) ▲Mreg, E, W irr
- Mediterranean Gull *Larus melanocephalus* Temminck, 1820, ▲E, Mreg, W
- Black-headed Gull *Chroicocephalus ridibundus* (Linnaeus, 1766), Mreg, W, E
- Common (or Mew) Gull *Larus canus* Linnaeus, 1758, Mreg, W, E irr
- Lesser Black-backed Gull *Larus fuscus* Linnaeus, 1758, Mreg, E irr
- Herring Gull *Larus argentatus* Pontoppidan, 1763, Mreg, W irr
- Yellow-legged Gull *Larus michahellis* Naumann, 1840 B***, Mreg, W
- Great Black-backed Gull *Larus marinus* Linnaeus, 1758, A
- Iceland gull *Larus glaucoides* Meyer, 1822, A2



Mediterranean Gull

The Kittiwake, a pelagic species in its habits, has been observed in the vicinity of the castle. A Little Gull on migration was observed in 01.05.1988 (by M. Ounsted, F.Perco and P. Utmar, from a boat) brought to the cliffs and plucked by an adult Peregrine Falcon. All the *Laridae* benefit from the floating buoys of the mussel farms on which they often settle. Among the species listed above the most regularly observed, in order, are the Yellow-legged Gull (which has nested on the cliffs since 2009 with 2-4 pairs), Black-headed Gull, the Mediterranean Gull and the Common Gull. The Yellow-legged Gull is a recent colonist as a breeding bird and also nests on the roofs of the city of Trieste (with certainty since 1987, with about 90 pairs in 1992 and 200 in 2009) as far as Barcola and up onto the Karst plateau as far as Opicina and Sežana (Benussi *et al.* 1993; Benussi *pers. comm.*) Recently, what was the subspecies breeding in the Adriatic and Western Mediterranean (*Larus cachinnans michahellis*) has been split by some authors and has been accorded the name of *Larus michahellis*. If this is the case then the so-called Pontic or "Caspian" Gull, *Larus cachinnans* has also probably occurred in the coastal marine area concerned with birds wandering from the areas of the Black Sea where it occurs. Also worthy of mention is the Great Black-backed Gull, a locally very rare species and usually only present in the coldest winters. The species was observed repeatedly at the mouth of the River Timavo during the winters of 1989 and 1990. At the same site Felcher and Zorzenon also observed a rare Iceland Gull on 4.2.1985.

Terns - *Sternidae*

- Little Tern *Sternula albifrons* (Pallas, 1764), ▲Mreg
- Gull-billed Tern *Gelochelidon nilotica* (J.F.Gmelin, 1789) ▲M irr?
- Whiskered Tern *Chlidonias hybridus* (Pallas, 1811), ▲Mreg
- Black Tern *Chlidonias niger* (Linnaeus, 1758), ▲Mreg
- White-winged Tern *Chlidonias leucopterus* (Temminck, 1815), Mreg
- Sandwich tern *Sterna sandvicensis* Latham, 1787 ▲Mreg, W
- Common Tern *Sterna hirundo* Linnaeus, 1758, ▲Mreg. E reg

Among these species mentioned above, those observed regularly are the Sandwich Tern and the Common Tern. The first species often visits the coast in winter but does not breed nearby, whilst the Common and Little Terns nest or have nested in the reclaimed area at the mouth of the River Timavo in the municipality of Monfalcone (Cassa di colmata).

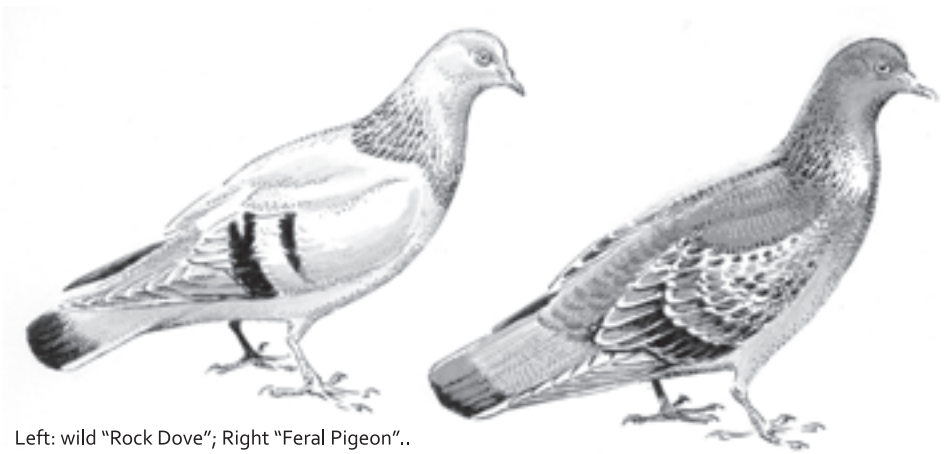
Common Terns

COLUMBIFORMS - *COLUMBIFORMES*
Pigeons and doves - *Columbidae*

- Rock Dove, *Columba livia* Gmelin 1789, SB***
- Stock Dove, *Columba oenas* Linnaeus, 1758, M irr.
- Wood Pigeon, *Columba palumbus* Linnaeus, 1758, Mreg, W irr. B**
- Collared Dove, *Streptopelia decaocto* (Frivaldsky, 1838), SB***
- Turtle Dove, *Streptopelia turtur* (Linnaeus, 1758), Mreg, B*

The Wild Rock Dove (*C. l. livia*), for which we estimate perhaps 30 to 60 pairs for the entire municipality of Duino-Aurisina, is still present. The original "wild" subspecies however, is much less common than in 1982, when one of us (F. Perco) estimated 200-250 pairs for the municipality of Duino Aurisina, spread between the Cava Romana and other smaller quarries, caves at San Giovanni di Duino, the cave at Torri di Slivia and other cavities (now deserted), the Duino cliffs as far as the border of the municipality to the east.
A similar decline has occurred in other karst areas. One cause for the decrease is the increase in the bushes and trees near the mouth of caves. The cliffs at Duino and the quarry at Sistiana are still an important breeding site although the populations often prove to be mixed, intermediate between wild Rock Doves and town pigeons and perhaps limited in their number locally by the presence

of the Peregrine Falcon, Eagle Owl, Raven , the Jackdaw etc.
Many pigeons of the hybrid or "city" form are settled in the built-up areas and have tended to expand their presence. The restricted area of the Nature Reserve includes a few pairs of the wild form that appear, at least phenotypically, pure- (25-40) and are found in caves overlooking the sea or along the most inaccessible rock-faces. The presence of the original subspecies or wild form *Columba livia livia*, once almost the only type found locally and widespread throughout the karst areas, today can be considered of great importance and the various surviving populations should be given special attention and protection, including, possibly carrying out work to ensure the prevention of the increasing genetic pollution to which they are subject. Also very common and increasing is the Wood Pigeon, which, however, has not yet been confirmed nesting for now, on the Reserve.
The Collared Dove is very common and almost a "pest" throughout the built-up areas, where it nests on buildings or in urban green spaces. The initial presence of the species, which then spread widely both locally and nationally, dates back to around the end of the Second World War (1945-46) and the first Italian areas to be colonized were precisely those of Trieste and its surroundings. Within the Nature Reserve the species is always present around the campsite.
The Turtle Dove, once known by the epithet of "common", though absent in winter, nested and was regularly shot during hunting (F. Perco, *pers. obs.*) within the Duino - Aurisina municipality. It is still believed to be present with a few pairs.



Left: wild "Rock Dove"; Right "Feral Pigeon"..

CUCULIFORMS - *CUCULIFORMES*
Cuckoos - *Cuculidae*

- Cuckoo, *Cuculus canorus* (Linnaeus, 1758, B**, Mreg

Although it is especially frequent in spring it is questionable whether the species breeds within the limited area in question. Elsewhere it is present and breeds even if it cannot be said, strictly speaking, to be "nesting" as it is well-known as a parasite of other birds in whose nests it lays its eggs.

Eagle Owl

STRIGIFORMS - *STRIGIFORMES*
Owls - *Strigidae*

- Scops Owl, *Otus scops* (Linnaeus, 1758), B***, Mreg
- Eagle Owl, *Bubo bubo* (Linnaeus, 1758), ▲M irr
- Little Owl, *Athene noctua* (Scopoli, 1769), SB*, Mreg?
- Tawny Owl, *Strix aluco* Linnaeus, 1758, SB**
- Long-eared Owl, *Asio otus* (Linnaeus, 1758), SB*, Mreg, W

The Scops Owl is very common, but perhaps in slightly lower numbers than in the past. It is particularly abundant (up to 4-5 singing males) in the quarry west of Sistiana (Caravella). It is also present in the area of the campsite, the pine plantation and along the coast, including urban areas. The Eagle Owl was occasionally observed in May 1992, just below the Castle of Duino (Perco & Tout *pers. obs.*), just outside the Natural Reserve It nests in some areas of the Karst with suitable cliffs, including some partially active stone quarries. The Little Owl is a scarce or uncommon species found outside the built-up areas and is localized in towns including Duino itself, Barcola, Trieste, Muggia and the suburbs). The Tawny Owl is found in areas that are wooded or can provide rock cavities in the area in question. It nests and is common elsewhere in the Karst. The presence of this species in some urban areas is possible or probable but generally not close to the sea, with certain exceptions. The Long-eared Owl is occasionally present in the Nature Reserve and nests in various wooded sites (usually pinewoods) but with marked discontinuity as it is linked to the existence of open areas.

NIGHTJARS - *CAPRIMULGIFORMES*
True Nightjars - *Caprimulgidae*

- European Nightjar, *Caprimulgus europaeus* Linnaeus, 1758, ▲B**, Mreg

This species is still common or very common in the Karst, although today it is less frequent than previously. It is generally linked to the areas of grazed land.

SWIFTS AND HUMMINGBIRDS - *APODIFORMES*
Swifts - *Apodidae*

- Swift, *Apus apus* (Linnaeus, 1758), B***, Mreg
- Alpine Swift, *Apus melba* (Linnaeus 1758), B***, Mreg

As a nesting species the Swift is very anthropophilic and is especially common in urban or urbanized areas. It nests in very large numbers in rather old high buildings, both in the city of Trieste and in the smaller towns and (at the appropriate time of year) is abundant in the sky, wherever it can feed on the aerial "plankton" made up of small flying invertebrates. The possible presence of Pallid Swift *Apus pallidus*, reported recently as a breeding species for the area of Trieste (Benussi, *pers. comm.*), requires further confirmation locally. The Alpine Swift, especially remarkable for its size and abundance in the few suitable colonial nesting sites, is locally numerous as a breeding bird along the cliffs, particularly in the Bay of Sistiana (the east quarry rock-face), where about 30-50 pairs (2014) are still present, in spite of the ongoing work in the area below. In 1982, for the entire municipality of Duino-Aurisina, the species' population was estimated at 300-350 pairs. This number is now reduced (to about 100 pairs), perhaps in part because of the work of securing the walls along the coastal road. The experimental creation of openings in the containment netting and the construction of artificial nests started recently in the Bay of Sistiana.

Alpine Swift

ROLLERS, BEE-EATERS, KINGFISHERS AND HOOPOES - *CORACIIFORMES*
Kingfishers - *Alcedinidae*

- Eurasian Kingfisher , *Alcedo atthis* (Linnaeus, 1758), ▲Mreg, W, E

Common along the coast, especially in winter, it appears quite regularly along the cliffs and in the Bay of Sistiana.

Kingfisher

Bee eaters - *Meropidae*

- European Bee-eater , *Merops apiaster* (Linnaeus, 1758), Mreg

Observed in transit on migration.

Hoopoes - *Upupidae*

- Hoopoe Hoopoe , *Upupa epops* Linnaeus, 1758, B*, Mreg

A species that at one time (up until the 1970[s]) was much more common and breeding in mixed areas of heath, woodland and scrub. Today it is found, in small numbers involving just a few pairs and is usually very localized outside the Nature Reserve.

WOODPECKERS AND ALLIES - *PICIFORMES*
Woodpeckers - *Picidae*

- Wryneck *Jynx torquilla* Linnaeus, 1758, B*, Mreg
- Green Woodpecker *Picus viridis* Linnaeus, 1758, SB**, M irr?
- Black Woodpecker *Dryocopus martius* (Linnaeus, 1758), ▲ Mreg, W, B*
- Great spotted woodpecker *Dendrocopos major* (Linnaeus, 1758), *** SB, Mreg, W
- Middle spotted woodpecker *Dendrocopos medius* (Linnaeus, 1758), A1
- Lesser Spotted Woodpecker *Dendrocopos minor* (Linnaeus, 1758), Mirr, Wirr
- White-backed Woodpecker *Dendrocopos leucotos* (Bechstein, 1803), ▲ A1

Amongst the woodpeckers on the Reserve itself, the two most common species are the Green and Great Spotted Woodpeckers, although the Black

Woodpecker, now common in more wooded areas
can also often be seen (or heard) in the area, including the pine plantation of the Nature Reserve where, possibly, a pair may soon settle. This is a species that once upon a time was rare or even entirely absent but is rapidly expanding in numbers and range. The first reports for the area of Duino date back to November 23rd 1958 (Fr. Perco). The first nesting north of the railway was already proven around the years 2000 or 2001. A specimen of the rare White-backed Woodpecker was observed by L. Felcher along the path Rilke on December 18th 2001. So far there are only two records of this species for the Region Friuli Venezia Giulia (Parodi, 2006). A Middle Spotted Woodpecker was observed and photographed just outside the study area at the mouth of the River Timavo by Flavio Consonni on 26th January 2013 (via the email list of A.ST.O.R.E-FVG)

Black Woodpecker

PASSERINES - *PASSERIFORMES*

Species observed outside the Reserve itself in the area towards Lisert include: Short-toed Lark *Calandrella brachydactyla*, Crested Lark *Galerida cristata*, Shorelark *Eremophila alpestris*, Black-bellied Dipper *Cinclus cinclus*, Zitting Cisticola *Cisticola juncidis*, Grasshopper Warbler *Locustella naevia*, Savi's Warbler *L. luscinioides*, Moustached Warbler *Acrocephalus melanopogon*, Aquatic Warbler *A. paludicola*, Sedge Warbler *A. schoenobaenus*, Marsh Warbler *A. palustris*, Reed Warbler *A. scirpaceus*, Great Reed Warbler *A. arundinaceus*, Penduline Tit *Remiz pendulinus*, Lesser Grey Shrike *Lanius minor,* Great Grey Shrike *L. excubitor*, Snow Bunting *Plectrophenax nivalis* and Black-headed Bunting *Emberiza melanocephala.*

Larks - *Alaudidae*

- Woodlark, *Lullula arborea* (Linnaeus, 1758), ▲B***, Mreg, W?
- Skylark, *Alauda arvensis* Linnaeus, 1758, Mreg, W. B loc. extinct

Among the *Alaudidae*, the most species (present perhaps occasionally on the Reserve) are the Woodlark and the Skylark, scarce elsewhere in the area and typical of arid soils and sparse, mostly herbaceous vegetation.

Swallows - *Hirundinidae*

- Sand Martin, *Riparia riparia* (Linnaeus, 1758), Mreg
- Crag Martin, *Ptyonoprogne rupestris* (Scopoli, 1769), Mreg
- Barn Swallow , *Hirundo rustica* Linnaeus, 1758, B***, Mreg
- Red-rumped Swallow *Cecropis daurica* (Laxmann, 1769), E, Mirr.
- House Martin, *Delichon urbicum* (Linnaeus, 1758), B***, Mreg

These are species that exploit the aerial plankton and are visible almost everywhere in the sky at the appropiate time of year. The Crag Martin, once considered absent from the Karst, has recently been observed several times within the Nature Reserve and has nested repeatedly in the Cava Romana at Aurisina. The Barn Swallow, a species typical of grazed rural areas, is in sharp decline. A few pairs still nests in Duino and Sistiana (including the Castle and the campsite). Red-rumped Swallows were seen occasionally on spring migration close to the cliffs in the 1990s (Paul Tout, *pers. comm.*) and summer records 2011 at Doberdò (Gorizia) and Villaggio del Pescatore presaged the breeding of the species, discovered by Ignazio Zanutto and Ariella Trotti, on a viaduct close to the River Timavo just within the municipality of Monfalcone in summer 2013; the pair rearing at least two broods. The House Martin is well established and quite common, breeding on houses in urban centres.

Pipits, and wagtails - *Motacillidae*

- Tree Pipit, A*nthus trivialis* (Linnaeus, 1758), Mreg, E?
- Meadow Pipit , *Anthus pratensis* (Linnaeus, 1758), Mreg, W
- Water Pipit, *Anthus spinoletta* (Linnaeus, 1758), Mreg, W
- Yellow Wagtail, *Motacilla flava* Linnaeus, 1758, Mreg
- Grey Wagtail , *Motacilla cinerea* Tunstall, 1771, Mreg, W
- White Wagtail, *Motacilla alba* Linnaeus, 1758, SB**, Mreg, W

These species are mainly observed on migration. The Tree Pipit and White Wagtail also nest respectively in karst sites and populated areas not far away. The other species are more typical of wetlands.

Waxwings - *Bombycillidae*

- Bohemian Waxwing, *Bombycilla garrulus* (Linnaeus, 1758), M irr, W irr

The species, Nordic in origin, is subject to invasive irruptions in certain winters during which, many individuals can be seen almost everywhere.

Wrens - *Troglodytidae*

- Winter Wren, *Troglodytes troglodytes* (Linnaeus, 1758), W, Mreg, B*

Common in bushy, wooded and populated areas in winter, to our knowledge the species has not nested with certainty in the area.

Accentors - *Prunellidae*

- Dunnock, *Prunella modularis* (Linnaeus, 1758), W, Mreg
- Alpine Accentor, *Prunella collaris* (Scopoli, 1769), Mreg, W irr

While the first species is common in winter almost everywhere, the Alpine Accentor is more rarely observed and only in bare rocky areas such as the coastal section of the Natural Reserve, quarries and so forth, the most recent record being two birds observed on the cliffs of the Natural Reserve on 12th February 2013 by Paolo Utmar.

Thrushes - *Turdidae*

- Robin, *Erithacus rubecula* (Linnaeus, 1758), W, SB***, Mreg
- Nightingale Luscinia megarhynchos C. L. Brehm, 1831, B***, Mreg.
- Black Redstart Phoenicurus ochruros (S. G. Gmelin, 1774), Mreg, W irr, B***
- Common Redstart Phoenicurus phoenicurus (Linnaeus, 1758), Mreg, B*
- Whinchat Saxicola rubetra (Linnaeus, 1758), Mreg.
- Stonechat Saxicola torquata (Linnaeus, 1766), Mreg, W irr.
- Wheatear Oenanthe oenanthe (Linnaeus, 1758), Mreg.
- Black-eared Wheatear Oenanthe hispanica (Linnaeus, 1758), B*** loc. extinct, Mreg.
- Blue Rock Thrush Monticola solitarius (Linnaeus, 1758), B***, Mreg, W irr
- Ring Ouzel Turdus torquatus Linnaeus, 1758, M irr?
- Blackbird Turdus merula Linnaeus, 1758, SB*** Mreg, W
- Fieldfare Turdus pilaris Linnaeus, 1758, Mreg, W
- Song Thrush Turdus philomelos C.L.Brehm, 1831, Mreg, W
- Redwing Turdus iliacus Linnaeus, 1766, Mreg
- Mistle Thrush Turdus viscivorus Linnaeus, 1758, Mreg, W, E (B*?)

The Robin nests on the Nature Reserve and in the coolest areas and most wooded parts of the bay. The Nightingale is very common, nesting in all the bushy and wooded areas. The Black Redstart has been found nesting along the cliffs (and elsewhere) since 1988. It is an Alpine-montane species whose presence at lower altitude as a breeding bird is considered noteworthy. However, it has not been confirmed as such more recently along the Rilke but is present in the Bay of Sistiana and in towns not far away as well as in the city of Trieste, almost at sea level (N & F. Perco *pers. obs.*). The Black-eared Wheatear, a species typical of the Mediterranean, has repeatedly nested in the cliff areas with 2-5 pairs being present in the more favourable years between the Castle and the Costa dei Barbari. It has however decreased in recent years, perhaps because of the progressive increase in the vegetation. It should be emphasized that the species was noted at the time when some goats were present, greatly influencing the vegetation on the cliffs in the late 1970s. The Blue Rock Thrush (like the Black-eared Wheatear) is here close to the northern limit of its distribution. In the study area itself there are, as a rule, from 5 to 8 pairs, of which at least 2 or 3 are on the Nature Reserve or in the immediate vicinity. These are also distributed in areas of old quarrying, such as along the cliff-faces above the western part of the bay and sometimes on

Black-eared Wheatear

the rock ledges located between the Caravella and the quarry east of Sistiana. Among the species of the genus *Turdus*, the most common and widespread is obviously the Blackbird. Among the other species observed on the Nature Reserve and its environs is the rather rare Ring Ouzel (P. Tout, *pers. comm.*) and, nesting elsewhere in Italian territory on the Karst, the Song Thrush, along with the more numerous Mistle Thrush. The thrushes are generally common (and sometimes abundant), during migration, while the Fieldfare can be very common, especially during cold winters.

Warblers - *Sylviidae*

-Cetti's Warbler *Cettia cettii* (Temminck, 1820), E, Mreg, W
-Marsh Warbler *Acrocephalus palustris* (Bechstein, 1798), Mreg
-Melodious Warbler *Hippolais polyglotta* (Vieillot, 1817), Mreg, B**
-Garden Warbler *Sylvia borin* (Boddaert, 1783), Mreg
-Blackcap *Sylvia atricapilla* (Linnaeus, 1758), *** SB, Mreg, W
-Lesser Whitethroat *Sylvia curruca* (Linnaeus, 1758), Mreg
-Orphean Warbler *Sylvia hortensis* (J.F. Gmelin, 1789), Mirr
-Whitethroat *Sylvia communis* (Latham, 1787), B**, Mreg
-Subalpine Warbler *Sylvia cantillans* (Pallas, 1764), Mreg, B**
-Sardinian Warbler *Sylvia melanocephala* (J.F. Gmelin, 1781), Mreg, B***, W irr
-Hume's Warbler *Phylloscopus humei* (Brooks, 1878) A-1 (M irr?)
-Wood Warbler *Phylloscopus sibilatrix* (Bechstein, 1793), Mreg
-Chiffchaff *Phylloscopus collybita* (Vieillot, 1817), B***, Mreg, W irr
-Willow Warbler *Phylloscopus trochilus* (Linnaeus, 1758) Mreg
-Goldcrest *Regulus regulus* (Linnaeus, 1758) Mreg, W
-Firecrest *Regulus ignicapillus* (Temminck 1820), Mreg, W

The Cetti's Warbler and Marsh Warbler, species typical of wetlands, have been noted on migration in bushy areas of the bay in the area occupied by quarrying (Dentesani, *pers. comm.*). The Melodious Warbler is an uncommon species, found in bushy areas, often close to vegetable plots, gardens, farmland and grassy areas that has sometimes nested in the Bay of Sistiana. The Subalpine Warbler, along with the Sardinian Warbler (which is more common and widespread) is a typical Mediterranean species. The two species are present throughout the Study Area with the exception of the more thickly wooded areas. Both nest or nested (for the Subalpine Warbler only this needs to be confirmed at present) in bushy areas with Mediterranean or simply thermophilic vegetation and are also found in the vegetation of the Bay of Sistiana in the eastern quarry. The Orphean Warbler is a rare species, for which we report an observation in the eastern quarry (in thermophilic vegetation) in June 1997 (Tout, *pers. comm.*). Elsewhere on the Karst in Italian territory the species has been reported as breeding at Gropada by E. Benussi (*pers. comm.*) and on the Slovenian Karst by I. Zanutto (*pers. comm.*). The Lesser Whitethroat and Garden Warbler nest elsewhere in the Karst area, but can be seen everywhere on migration, while the Whitethroat nests in the Nature Reserve although it is not very common, being mostly found in

Sardinian Warbler

areas of scrubbed-over grassland close to cultivated areas, vegetable plots, gardens etc. The Blackcap is very common and found in the same habitat as the Nightingale, but is more abundant and widespread, being found not only in forested but also in bushy areas, while the Chiffchaff whose song is unmistakable, even to inexperienced observers, is localized as a breeding species. Extremely rare on the other hand (but also difficult to identify) is Hume's Warbler, reported for the area of the castle and heard singing from 13.2.1990 to 02.04.1990 by Paul Tout & Adam Wilson (Tout, *pers. comm.*). The other species mentioned are observed mainly on migration.
In summary: the Chiffchaff and Robin are localized as breeding species, the latter particularly in cool and shaded areas. In addition to these species the Whitethroat and the Melodious Warbler are well distributed and nesting in some areas. The presence of Blue Rock Thrush, Sardinian Warbler, Subalpine Warbler and Black-eared Wheatear, all Mediterranean elements of the fauna can be found nesting (or have nested) here and are linked to open, rocky and barren areas.

Flycatchers - *Muscicapidae*

- Spotted Flycatcher, *Muscicapa striata* (Pallas, 1764), Mreg, B*
- Pied Flycatcher, *Ficedula hypoleuca* (Pallas, 1764),Mreg

Both species can be seen during migration. The former, more common at one time, sometimes nests, especially in towns and nested just outside the Reserve in 1990 in a creeper on the wall of the *Foresteria* of the castle (P. Tout *pers. comm.*)

Long-tailed tits - *Aegithalidae*

- Long-tailed Tit, *Aegithalos caudatus* (Linnaeus, 1758), SB***, Mreg, W

A fairly widespread and common breeding bird in wooded and bushy areas, including the Natural Reserve (the pine plantation and surrounding area), the white-headed nominate form is frequently seen together with the locally more common subspecies *A. c. europaeus*.

Tits - *Paridae*

- Blue Tit *Cyanistes caeruleus* (Linnaeus, 1758), SB*** Mreg, W
- Great Tit *Parus major* (Linnaeus, 1758), SB*** Mreg, W
- Crested Tit *Lophophanes cristatus* (Linnaeus, 1758), SB***
- Coal Tit *Periparus ater* (Linnaeus, 1758), SB*** Mreg, W
- Marsh Tit *Poecile palustris* (Conrad, 1827), Mreg, W, E?

The Great Tit and Blue Tit are very common, while the Coal Tit and, especially, the Crested Tit, are sometimes observed locally, even in the breeding season. In particular the second nests (or nested) in Pineta Rilke, close to the area of the cliffs, in a site very unusual for a montane species. It is, next to the presence of the black woodpecker, Robin and Coal Tit, a further example of "dealpinism". The generic synonyms used are those suggested in Aa.V.v, 2009.

Nuthatches - *Sittidae*

- Eurasian Nuthatch, *Sitta europaea* (Linnaeus, 1758), SB***, Mreg,

Uncommon. A typical species of mature or over-mature wooded habitats; relatively localized and more abundant elsewhere on the Karst.

Wallcreepers- *Tichodromadidae*

- Wallcreeper, *Tichodroma muraria* (Linnaeus, 1766), Mreg, W

This rare and remarkable Alpine species often frequents the cliffs and quarry faces in winter or during migration where single individuals have been repeatedly observed in the past, sometimes until early spring.

Treecreepers - *Certhiidae*

- Short-toed Treecreeper, *Certhia brachydactyla* C.L.Brehm, 1820, SB*, Mreg, W

A scarce species in the Study Area.

Penduline Tits - *Remizidae*

- Penduline Tit , *Remiz pendulinus* (Linnaeus, 1758), Mreg

A species typical of tree-lined water-courses. Observed on migration.

Old World Orioles - *Oriolidae*

- Golden Oriole, *Oriolus oriolus* (Linnaeus, 1758), B***, Mreg

A common species of African origin, which is found in deciduous forests, particularly in the area of the Bay of Sistiana, the species is easily detected by virtue of its typical song.

Shrikes - *Laniidae*

- Red-backed Shrike, *Lanius collurio* Linnaeus, 1758, ▲B***, Mreg

A species that was once much more common in areas of dry grassland and other open areas the species is still present but localized or perhaps even locally extinct in many areas due to the gradual reforestation and the disappearance of grazing animals. It was found nesting in the quarry of Sistiana (Dentesani, *pers. comm.).*

Ravens, crows, magpies and jays - *Corvidae*

- Eurasian Jay, *Garrulus glandarius* (Linnaeus, 1758), SB***, Mreg, W
- Magpie, *Pica pica* (Linnaeus, 1758), SB***
- Nutcracker, *Nucifraga caryocatactes* (Linnaeus, 1758), A-1
- Jackdaw, *Corvus monedula* Linnaeus, 1758, SB***, Mreg, W
- Rook, *Corvus frugilegus* Linnaeus, 1758, M irr

- Hooded Crow, *Corvus corone* Linnaeus, 1758, SB**, Mreg, W
- Raven, *Corvus corax* Linnaeus, 1758, SB***

The Jay is a very common bird everywhere in the Karst, while both the Rook (Tout, *pers. comm.*) and the Nutcracker (Rilke Duino-before 1960, Perco *pers. obs.*) are both very rare locally. The Magpie has recently spread (1970^{s}-1980^{s}), especially within populated areas. The Jackdaw nested up to the 1990^{s} with a colony of 20-30 pairs on the eastern wall of the quarry at Sistiana and a few others located on the castle of Duino. Once upon a time more widespread as a nesting species, it seems to have become more localized following the arrival of the Peregrine Falcon and the Raven, or perhaps for other reasons that are not clear. Other colonies exist outside the Study Area further along the coast (the area of the natural "tunnel") and in the larger quarries (such as the Cava Romana). In 1982, the situation of the recorded breeding pairs was as follows: Duino Castle: 10-15, cliffs at Sistiana: 10-15; quarry Sistiana: 30-35, the coast between the Hotel Europa and the *filtri*: 70-100 and 4-7 pairs in the Cava Romana, in total an estimated 100-150 pairs, reduced in the period 2004-2009 to less than 100. However, it seems that the species has not seen a reduction in its overall population size in the Province of Trieste, having, in the meantime, colonized urban areas with considerable success, (Benussi *pers. comm.*). The Hooded Crow is an invasive species, now almost ubiquitous and closely associated with human presence. The Raven, completely absent at one time from the province of Trieste (at least since World War II), began to be observed, roughly, at the end of 1977, evidently benefiting from the legal protection it had been granted. It became established as a breeding species with a pair on the cliffs between Duino and Sistiana from 1988 (Perco & Utmar, 1987: an update inserted just before the publication!), apparently entering into competition with the Peregrines but without the abandonment of this nesting site, which occurred in 1992 or 1993, being clearly due to this presence. Since 2004, however, although birds in transit have often been observed, successful nesting has not been confirmed, although some old nests are clearly visible. At least one pair is now established in Cava Romana in Aurisina


Raven

Starlings - *Sturnidae*

- Common Starling, *Sturnus vulgaris* Linnaeus, 1758, SB**, Mreg, W

This is a very common and numerous species, mainly in association with human beings although breeding within the Natural Reserve requires confirmation.

Sparrows - *Passeridae*

- House Sparrow, *Passer domesticus* (Linnaeus, 1758), SB***
- Tree Sparrow, *Passer montanus* (Linnaeus, 1758), SB***, Mreg, W

- Snow Finch, *Montifringilla nivalis* (Linnaeus, 1766), M irr?

The sparrows in general are often linked to human presence and on the Natural Reserve are seen mainly on the campsite and surrounding areas. *Passer domesticus* is present in the continental form or subspecies-the House Sparrow *P.d. domesticus* while the Italian Sparrow *Passer d. italiae* (*P. italiae* according to some authors,) is usually encountered in the lowland areas just to the west. The observation of Snow Finch (Utmar, *pers. comm.*; Eggenhoeffner in Schiavuzzi, 1883) testifies to the occasional presence along the coast and within the Province of this typically Alpine and high altitude species, like, for example, the Alpine Accentor and the Wallcreeper.

Finches - *Fringillidae*

- Chaffinch *Fringilla coelebs* Linnaeus, 1758, SB*** Mreg, W
- Brambling *Fringilla montifringilla* Linnaeus, 1758, Mreg, W
- Serin *Serinus serinus* (Linnaeus, 1766), SB***, Mreg
- Greenfinch *Carduelis chloris* (Linnaeus, 1758) *** SB, Mreg, W
- Goldfinch *Carduelis carduelis* (Linnaeus, 1758) SB***, Mreg, W
- Siskin *Carduelis spinus* (Linnaeus, 1758) Mreg, W
- Linnet *Carduelis cannabina* (Linnaeus, 1758), Mreg, W
- Common Redpoll *Carduelis flammea* (Linnaeus, 1758) Mirr?
- Crossbill *Loxia curvirostra Linnaeus*, 1758, Mreg, W, B**
- Bullfinch *Pyrrhula pyrrhula* (Linnaeus, 1758), Mreg, W
- Hawfinch *Coccothraustes coccothraustes* (Linnaeus, 1758), Mreg, W irr, B***

Rock Bunting

The Chaffinch, Serin and Goldfinch are very common. There also appears to be the sharp increase in the Hawfinch, despite the species listed above often being subject to nest predation by the Magpie in built-up areas. The Crossbill, which nests elsewhere on the Karst, was observed at least once on the Nature Reserve by F & Z carrying food suggestive of nesting (though perhaps only sporadically). The Bullfinch and Linnet nest in the other areas of the Karst while the Common Redpoll has occasionally been recorded flying over (Tout *pers. comm.*).

Buntings - *Emberizidae*

- Yellowhammer, *Emberiza citrinella* Linnaeus, 1758, Mreg
- Cirl Bunting, *Emberiza cirlus* Linnaeus, 1766, Mreg, W, B*
- Rock Bunting, *Emberiza cia* Linnaeus, 1766, SB***, Mreg, W
- Reed Bunting, *Emberiza schoeniclus* (Linnaeus, 1758), Mreg
- Corn Bunting, *Miliaria calandra* Linnaeus, 1758, Mreg, W

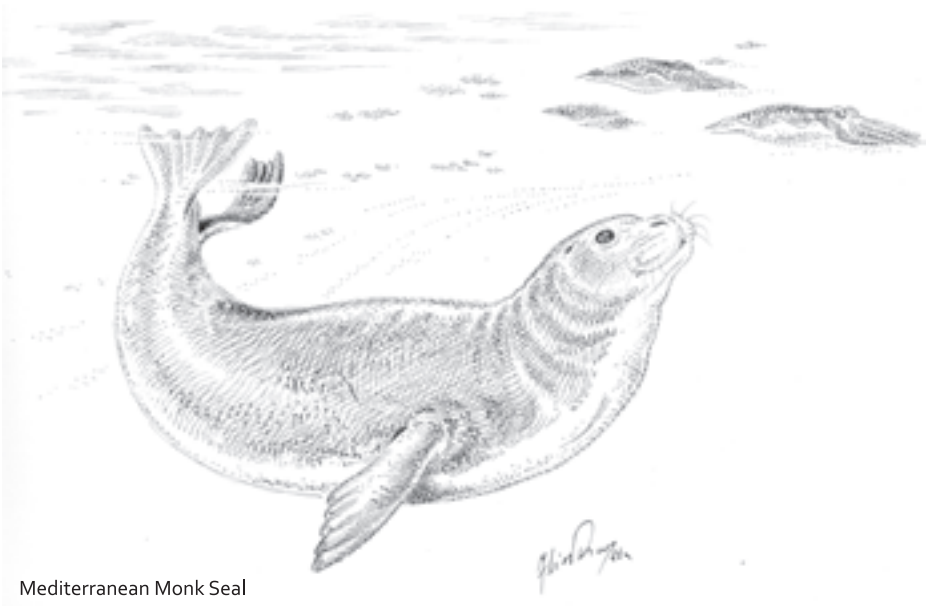
A locally common and characteristic species of the cliffs, bushy and barren areas is the Rock Bunting but which seems to be present in slightly lower numbers than before. The widespread presence of this species on the cliffs of Duino and the Karst area in general, justified the inclusion of the Karst among the IBA (i.e. Important Bird Areas) when these were being drawn up. The other species mentioned are present locally, essentially on migration, but the Cirl Bunting nests not far from the Natural Reserve.

MAMMALS- *MAMMALIA*

Among the mammals particularly worthy of mention as far as the frequency of observations is concerned (although often limited to the signs of presence) are Wild Boar *Sus scrofa*, Roe Deer *Capreolus capreolus* and Red Squirrel *Sciurus vulgaris*. Also of particular interest, however, is the existence of a population of Chamois *Rupicapra rupicapra* which, in recent years, has spontaneously colonized the area just the other side of the railway line at an exceptionally low altitude to the extent that is unique at a European level, and is increasing in number. Of relevance in natural history terms, at least for the area surrounding the Nature Reserve, is the long established presence of the Wild Cat *Felis silvestris* and the Golden Jackal *Canis aureus*.

Probably the most notable recent news concerns the reports, in marine areas adjacent to the Nature Reserve, of the Mediterranean Monk Seal *Monachus monachus*, among the species most threatened with extinction at worldwide level. For the area in question at least 5 reports have emerged so far (see checklist), but the most convincing seems to be that made by Paola Alberi and Chiara Capolicchio in November 2008 in a small cave accessible both from the sea and from the land, adjacent to the port of Duino.

Also very interesting is the sporadic presence of individuals of some dolphin species, namely the Bottlenose Dolphin *Tursiops truncatus* and the Striped Dolphin *Stenella coeruleoalba* in the waters off the coast of Duino, mainly in transit, although the waters within the Nature Reserve are clearly too small to accommodate these species, even only occasionally, except in exceptional circumstances. Recently, the Common Dolphin *Delphinus delphis* has been repeatedly sighted, which, despite its name, the species appears to be the least common of the three species in the Gulf of Trieste (Perco, 2010). Also of importance is the record of Greater Horseshoe Bat *Rhinolophus ferrumequinum* in some caves just outside the Reserve.



Mediterranean Monk Seal

INSECTIVORES - *INSECTIVORA*
Hedgehogs - *Erinaceidae*

- Eastern European, *Erinaceus roumanicus* (syn.*concolor*) (Barrett-Hamilton, 1900)
- Western European Hedgehog, *Erinaceus europaeus italicus* (Barrett-Hamilton, 1900)

Both species, similar to one another, have been found in areas very close by and it is assumed, on the basis of findings relating to the Duino area, that one or other is still present, with a greater probability of the Eastern Hedgehog that seems more tied to the Karst. It should be noted that this important species, whose presence has only been confirmed for a few years in Italy, is found in these areas, up as far as the Gorizia Karst at Doberdò, the western limit of its distribution (Lapini & Perco 1987). For hedgehogs in particular the problem of casualties along the railway and the trunk road, the SS 14, as well as the completely fenced motorway route, and the resulting isolation of the areas they inhabit to the east and west, are of particular importance.

Shrews - *Soricidae*
- Common shrew, *Sorex araneus* Linnaeus, 1758
- Pygmy shrew, Sorex minutus Linnaeus, 1766
- Etruscan Shrew, *Suncus etruscus* (Savi, 1822)
- Bicoloured White-toothed Shrew, *Crocidura leucodon* (Hermann, 1780)
- Lesser White-toothed Shrew, *Crocidura suaveolens* (Pallas, 1811)

Various other species have been cited, mainly found elsewhere on the Karst, whose presence is possible or very likely (but require confirmation) in the area in question.

Moles - *Talpidae*

- Mole, *Talpa europaea* Linnaeus, 1758

This is a common species and is also present in the area of Nature Reserve.

BATS - *CHIROPTERA*
Horseshoe Bats - *Rhinolophidae*

- Greater Horseshoe Bat, *Rhinolophus ferrumequinum* (Schreiber, 1774), ▲II IV

The species is widespread in various suitable cavities in the surroundings and has been found, in particular, in the nearby area of Sistiana (Dolce, 1991). Therefore it was also considered likely to be present on the Nature Reserve.

Bats - *Vespertilionidae*

- Kuhl's Pipistrelle *Pipistrellus kuhli* (Natterer in Kuhl, 1819), ▲ IV
- Common Pipistrelle *Pipistrellus pipistrellus* (Schreber, 1774), ▲ IV
- Savi's Pipistrelle *Hypsugo savii* (Bonaparte, 1837), ▲ IV

- Nathusius's Pipistrelle *Pipistrellus nathusii* (Keyserling & Blasius, 1839, ▲ IV
- Common Bent-wing Bat, *Miniopterus schreibersii* (Natterer in Kuhl, 1819), ▲ IV
- Common Noctule Nyctalus noctula (Schreber, 1774), ▲ IV

Various species of bats are cited as being reported in the Karst although their presence on the Reserve needs be verified (Lapini *et al.*, 1996). F & Z have noted various unsuccessful attempts to capture "bats" at dusk by a Peregrine Falcon.

LAGOMORPHS - *LAGOMORPHA*
Hares and rabbits - *Leporidae*

- Brown Hare, *Lepus europaeus* Pallas, 1778

The Brown Hare is a generally fairly widespread species, traces of which have been observed recently in the Nature Reserve, despite the current lack of suitable habitat and the growing state of isolation for terrestrial species, which the entire area suffers.

RODENTS - *RODENTIA*
Squirrels and marmots - *Sciuridae*

- Squirrel, *Sciurus vulgaris* Linnaeus, 1758

The species is present and is also fairly numerous in the pinewoods. Several "nests" or dreys as well as individuals with both black or reddish mantles have been observed. Breeding has been confirmed several times in the past by animals whose offspring were often taken and reared by people in the village of Duino.

Dormice and allies - *Myoxidae (Gliridae)*

- Edible Dormouse, *Glis glis* (Linnaeus, 1766)
- Hazel Dormouse, *Muscardinus avellanarius* (Linnaeus, 1758), ▲IV

The Edible Dormouse is present and fairly numerous in the forested areas. The Hazel Dormouse species is widespread on the Karst plateau and is probably present, although unconfirmed at present on the Nature Reserve.

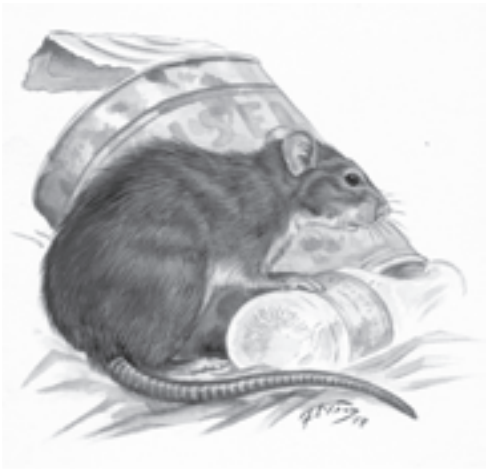
Voles - *Arvicolidae*

- Common Vole, *Microtus arvalis* (Pallas, 1779)
- Liechtenstein's Pine Vole , *Microtus liechtensteini* (Wettstein, 1927)
- Snow Vole, *Chionomys nivalis* (Martins, 1842)

Three species found elsewhere on the Karst are cited and likely to be present in the area. Of particular interest, if confirmed, would be the presence of populations of Snow Vole, since the species is normally present at much higher altitudes than here and is therefore a typical example of "dealpinism" (Gerdol *et al.*, 1981, Gerdol *et al.*, 1982). It should be emphasized that the specimens so far examined, and which are mentioned in the bibliography (and partly collected by the author of this study) refer to similar areas of pine forest in the area of Prosecco (Trieste) and found in Long-eared Owl pellets.

Mice and rats - *Muridae*

- Striped Field Mouse, *Apodemus agrarius* (Pallas, 1771)
- Yellow-necked Field Mouse, *Apodemus flavicollis* (Melchior,1834)
- Wood mouse, *Apodemus sylvaticus* (Linnaeus, 1758)
- Brown Rat, *Rattus norvegicus* (Berkenhout, 1769)
- Black rat, *Rattus rattus* (Linnaeus, 1758)
- House Mouse, *Mus musculus* Linnaeus, 1758



Brown Rat

Species mentioned and certainly present on the Reserve include the Brown Rat (in the areas surrounding the village) and the House Mouse in the area of the campsite. The other species, present elsewhere in the area (the Striped Field Mouse being reported for the wetlands area of Villaggio del Pescatore), need to be confirmed as occurring on the Reserve. It is worth noting that the Black Rat is cited by Lapini *et al.* (1995) for the karst areas of "*griže*" ("*karren*", limestone pavement and screes) under non-synanthropic conditions, this being relatively unusual for the species in question. In the area of Duino and other very karstic areas of the surroundings the latter species is a frequent prey of the Wild Cat (L. Lapini *pers. comm.*).

CARNIVORES - *CARNIVORA*
Canids - *Canidae*

- Red Fox , *Vulpes vulpes* (Linnaeus, 1758)
- Golden Jackal, *Canis aureus moreoticus* I. Geoffroy Saint Hilaire, 1835

The Red Fox is widespread and is present more or less continuously, consistent with the small size of the area, including the areas of the Natural Reserve itself.

Golden Jackal

A subadult male Golden Jackal was found dead at Sistiana (a roadkill) on February 25th 2009 along a section of Trunk Road, not far from the Natural Reserve (Lapini *et al.*, 2009). The species, which has only recently arrived in Italian territory from coastal Croatia (Lapini & Perco, 1988), is now thought be established in the Karst, albeit in small numbers.

Mustelids - *Mustelidae*

- European Badger , *Meles meles* (Linnaeus, 1758)
- Least Weasel, *Mustela nivalis* Linnaeus, 1766
- European Polecat, *Mustela putorius* Linnaeus, 1758
- Beech Marten, *Martes foina* (Erxleben, 1777)

The Badger is present, albeit rare and limited in movement by the state of isolation that has been repeatedly emphasised for the area in question. The other three species of *Mustelidae* listed above are certainly present in the wider area. A Weasel was observed by F & Z along the Rilke Path many years ago (around 1990). An adult Polecat, the least common species, was found dead along the SS 14 at San Giovanni di Duino on 28th August 1962 (Perco).

Cats - *Felidae*

- Wildcat, *Felis silvestris* (Schreber, 1777), ▲ IV

A young animal was found near the Nature Reserve as a result of a roadkill along the route of the current motorway (which at the time had not yet been fenced) on November 15th 1973 (Perco). The presence of this remarkable species in the area of the Reserve, moreover, is currently presumed to be frequent. In 2008, in fact, one male and one female were knocked down close to the entrance to the Rilke Path (L. Lapini, *pers. comm.*)

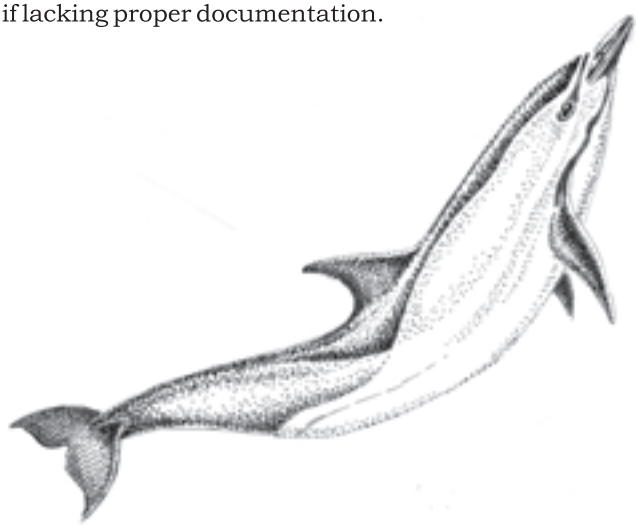
Wildcat

PINNIPEDS - *PINNIPEDIA*
Seals - *Phocidae*

- Mediterranean Monk Seal, *Monachus monachus* (Hermann, 1779), ▲II IV

A summary of the status of this species is reported in Klinger & Perco, 2010. More recently, the overall assessment of the surviving population (from the Mediterranean to the north-west coast of Africa) is relatively stable, with perhaps 500 or more individuals. A number of observations of specimens of this species have been made in the last decade along the eastern Adriatic coast, from Rovinj in Istria and further south along the entire coast and the Dalmatian islands in Croatia. From eyewitness accounts, varying in their reliability, and now numerous photographic records it would appear that the Monk Seal is continuously present in this area, which, moreover, is extremely suitable. It would appear that a relatively greater attention to the protection of endangered species has led to a recent increase in a relict and underestimated population

(it being already considered extinct by certain sceptical observers) or the greater visibility of subjects that in some way have become less wary than in the recent past. The recent observations gathered from the waters of the Gulf of Trieste and Duino facing are as follows: M. Lazzari, one individual, July or August 1999; R. Varisco, more or less late spring 1997; G. Mazzalors and A. Frausin, mid-September 2008 , I. Stoppani, end of July 2009; P. Alberi and C. Capolicchio, November 2008 (Klinger & Perco, 2010). The latter observation was set in a cave close to the port of Duino, which suggests the possible occasional visit of the species elsewhere in caves with underwater entrances along the Trieste coastline and, in particular, on the Natural Reserve. Possible confusion with Sea Turtles (*Caretta c.*) or with the Coypu (*Myocastor coypus*-a much increased alien species in Adriatic coastal wetlands, although not yet seen within the study area), invite a cautious consideration of "seal" records in any case, if lacking proper documentation.



Common Dolphin

CETACEANS - *CETACEA*
Dolphins - *Delphinidae*

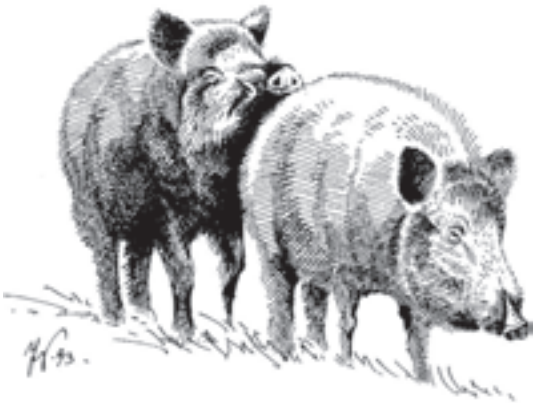
-Bottlenose dolphin, *Tursiops truncatus* (Montagu, 1821), ▲II IV
-Striped Dolphin, *Stenella coeruleoalba* (Meyen, 1833), ▲IV
-Common dolphin, *Delphinus delphis* Linnaeus, 1758, ▲IV

The first two species mentioned are observed relatively frequently in the Gulf of Trieste and the observation of specimens is not rare from the Nature Reserve itself, especially in the case of the Bottlenose Dolphin. The Common Dolphin has been observed many times with one or two specimens (perhaps an adult female with a youngster) between 2009 and 2011 (e.g. on 23/07/2010 - F &Z; Zuppani, *pers. comm.*, in the waters of the Natural Reserve). The two animals spent long periods of time inside the Port of Monfalcone and, later, the adult moved to the waters off the coast of Trieste (Perco, 2010) but often also in the marine area of the Nature Reserve. In principle from such a particularly favourable position it would be possible to observe other marine mammal species, although only more rarely are those cited the ones that approach the coast, becoming clearly visible and identifiable.

UNGULATES - *ARTIODACTYLA*
Pigs - *Suidae*

- Wild Boar, *Sus scrofa* Linnaeus, 1758

The species, once rare, has become increasingly common since the early 1990s in karst areas, especially on the far side of the trunk road (SS 202). At present it is believed to be present sporadically in the area, including on the Nature Reserve itself.



Deer - *Cervidae*

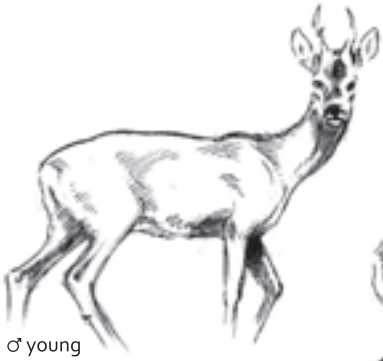
For areas not too far away, close to the border with Slovenia, the increasingly frequent appearance of Red Deer (*Cervus elaphus*) should also be mentioned although it has never been found south of the main road SS. 202.

- Roe Deer, *Capreolus c. capreolus* (Linnaeus, 1758)

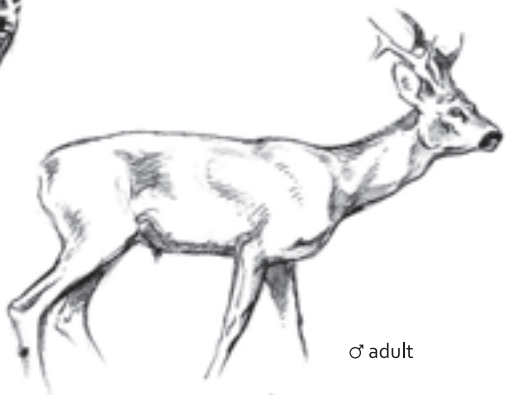
This species is always present in varying numbers, including good counts, about ten individuals, within the Nature Reserve itself, despite the site's isolation. Roe Deer are also found in the steep areas of the so-called Costa dei Barbari, to the east of the Sistiana quarry from which it can easily reach all areas of the cliffs passing through the wooded areas included in the Site of Community Importance to the south of Sistiana. The ability of this species to move easily through the towns at dawn, dusk and during the night is also worthy of note. Nevertheless, the construction of wildlife passes, which would allow a greater permeability towards the north is considered highly desirable.

- Fallow Deer, *Dama dam*a (Linnaeus, 1758)

Some animals, presumably originating from a group liberated in 1971 at Sežana in Slovenia subsequently appeared in the area of Duino and were observed on several occasions by Fa. and Fr. Perco near the train halt just north of the Natural Reserve. Some individuals were reported in the eastern part of the Province of Trieste (near Basovizza) until 1977 and then gradually disappeared entirely, perhaps due to poaching. Some occasional observations of individual animals continued until about 1985 (Perco F. & Fr. 1985).



♂ young



♂ adult

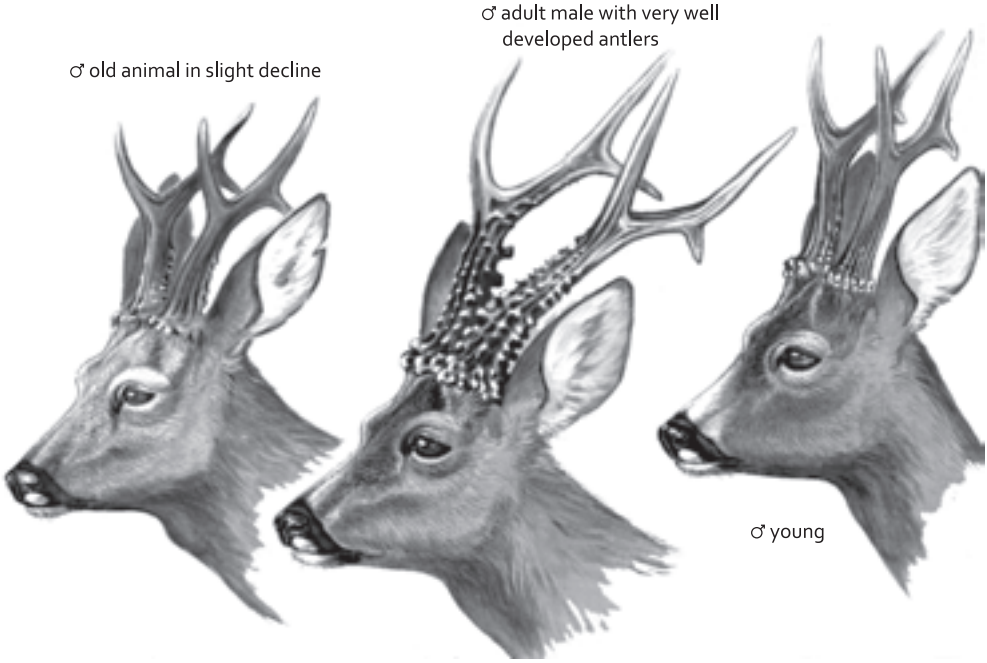
♀in winter

Roe Deer

♂ in winter

♂ adult male with very well developed antlers

♂ old animal in slight decline



♂ young

Bovids, cloven-hoofed ruminants - *Bovidae*

- Chamois , *Rupicapra rupicapr*a (Linnaeus, 1758)

The presence of the species to the north, but also to the south of the SS 202 road, although it was already completely fenced at the time, was reported for the first time in 1989, when a young female, subsequently transferred and released on the Julian Alps at Venzone, was, somewhat surprisingly, recovered by a holiday-maker in a rubber dinghy while swimming towards the open sea close to the *filtri* at Aurisina (F & Z *pers. comm.*; Perco Fr. *et al.*, 1997). Following this, a small population, growing numerically (estimated between 10 and 20 individuals in 2004, from 50 to 60 in 2009 and more than 100 animals in 2011, about 130 in 2014 - Fr Perco, *pers. comm.*) spontaneously colonized the hilly area between Medeazza and Malchina within the municipality of Duino-Aurisina. The ability of this species to cross rivers and obstacles of various kinds is also shown by the prolonged presence of a subject (later translocated in 1995) on a hill beyond the Locavaz channel, a tributary of the River Timavo, in the municipality of Monfalcone (Perco Fr., 1991; Perco Fr. *et al.*, 1997). The population is still in the process of expansion and the colonization of new low altitude sites in the Karst, with animals present to the east in the Province of Trieste (Val Rosandra) and to the west (Jamiano, Sagrado, Redipuglia, Pietrarossa and Doberdò del Lago in the Province of Gorizia). Some animals (usually between 5 and 10 but sometimes more than 20) are commonly observed a short distance from the Nature Reserve just across the motorway and the railway line.

Species of Community Importance

The following tables summarize, among the above listed species, those of "community importance", according to the EU "Habitat" and "Birds" Directives.

Allegato II Dir. Habitat	Allegato IV Dir. Habitat
Mollusca	
Lithophaga lithophaga	
Pinna nobilis	
Insecta	
Lucanus cervus	
Amphibia	
Triturus carnifex	*Triturus carnifex*
Proteus anguinus (priority species)	*Proteus anguinus*
	Bufo viridis
	Rana dalmatina

Allegato II Dir. Habitat	Allegato IV Dir. Habitat
Reptilia	
Caretta caretta	*Caretta caretta*
Chelonia mydas	*Chelonia mydas*
Algyroides nigropunctatus	*Algyroides nigropunctatus*
Lacerta viridis	*Lacerta viridis*
	Podarcis muralis
	Podarcis melisellensis
	Podarcis sicula
	Coluber viridiflavus
	Coronella austriaca
	Elaphe longissima
	Natrix tessellata
	Telescopus fallax
	Vipera ammodytes
Mammalia	
	Microchiroptera (tutte le specie)
	Pipistrellus kuhlii
	Pipistrellus pipistrellus
	Hypsugo savii
	Pipistrellus nathusii
Miniopterus schreibersii	
	Nyctalus noctula
	Muscardinus avellanarius
	Felis silvestris
Monachus monachus	*Monachus monachus*
	Cetacea (tutte le specie)
Tursiops truncatus	*Tursiops truncatus*
	Stenella coeruleoalba
	Delphinus delphis

Aves: all. I Dir. Uccelli

Tadorna ferruginea	*Alectoris graeca*
Gavia immer	*Gavia stellata*
Gavia arctica	*Podiceps auritus*
Puffinus puffinus	*Phalacrocorax aristotelis*
Nycticorax nycticorax	*Ardeola ralloides*
Bubulcus ibis	*Egretta garzetta*
Egretta alba	*Ardea cinerea*
Ardea purpurea	*Ciconia ciconia*
Plegadis falcinellus	*Pernis apivorus*
Gyps fulvus	*Circaetus gallicus*
Circus aeruginosus	*Circus cyaneus*
Circus pygargus	*Pandion haliaetus*
Falco naumanni	*Falco eleonorae*
Falco peregrinus	*Grus grus*
Glareola pratincola	*Tringa glareola*
Larus minutus	*Gelochelidon nilotica*
Sterna sandvicensis	*Sterna hirundo*
Sterna albifrons	*Chlidonias hibridus*
Chlidonias niger	*Bubo bubo*
Caprimulgus europaeus	*Alcedo atthis*
Dryocopus martius	*Dendrocopos leucotos*
Lullula arborea	*Lanius collurio*

ASPECTS AND PROBLEMS
IN THE MANAGEMENT OF THE NATURE RESERVE

A series of specific suggestions is contained in the reports that are part of the study prepared for the Plan of Conservation and Development of the Nature Reserve, to which reference should be made as far as the project details are concerned (Aa.VV, 2006). With regard to the effects on the fauna some brief remarks are summarized here.

As we have seen, there are many species of great value, including those identified as such by the EU as part of its Directives. Most of these species appear to be related not so much to the "woodland" but to "open areas" and have therefore suffered as a result of the increase in vegetation cover that, in the total absence of management work, has tended to spread, meaning any residual grassland or garrigue habitats have tended to disappear. While the pine plantation over time requires periodic "targeted" thinning, aimed at its conversion to forest and scrubland dominated by native species, on the other hand it would seem appropriate to begin similar initiatives in order to maintain, albeit in limited areas and essentially as examples, some areas free of shrubs and trees, so as to enhance and preserve the ecological characteristics typical of a Mediterranean cliff. This action can be accomplished in two main ways: by manual cutting or, in a less expensive and simpler fashion (given the sometimes extreme slope in places) using the rigidly-controlled grazing of a few individuals belonging to an appropriate and well-managed ungulate species. Previous experience suggests the use of the domestic (and therefore easily-managed) goat, but recently, given the presence of a spontaneously settled population a short distance away, the "Chamois option" has been suggested, at least experimentally.

In order to maintain or encourage certain species of amphibians and reptiles (as well as many invertebrates) linked to fresh water, it is proposed to establish at least one pond, with technical characteristics similar to those traditionally used for watering domestic animals, once very widely used for cattle.

With regard to the human presence, however, it is necessary to point out that the Nature Reserve of Duino Cliffs is very small: only about 1 km2, half of which is a very busy patch of sea used by vessels of all kinds, especially in summer as well as a relatively large area on the eastern boundary, occupied for many years by a campsite. The area of natural interest south of the SS 14, the scope of Natura 2000, on the other hand, is much larger (about another 30 ha), but suffers the presence of ever-expanding infrastructure, built-up areas, tourism and related structures (the development area in the Sistiana quarry), all of which go to make the "natural" area more isolated, including in landscape terms. Inevitably, in such a setting, increasing numbers of people are using the core of the protected area. Under these conditions, the winning choice at a management level, in order to save, so to speak ... "falcons and mass tourism" can only be the application of planning and legislation that take these different needs, and seek to find the right balance as well as achieving certain minimum

targets. The problem of the growing number of visitors (and related disturbance) was, in fact, quite well solved with the final restoration and maintenance of the "Rilke Path", which currently goes to make up almost all the land access, while reducing the public presence in adjacent areas. This trail is located in such a way as to enable all the most important places to be visited, but prohibits the leaving the marked path, maintaining the most sensitive areas completely intact and the more timid species beyond "flight distance". In some cases, in order to accentuate this feature the original route of the path has been slightly modified so as to hide some recesses that are particularly frequented by the wildlife species of greatest value. Also planned are some management works aimed at "green screening" or re-naturation of areas that had previously been transformed with works that are now useless (some sections of trail or road) or that have an appearance that is difficult to reconcile with the Nature Reserve (as in the case of the campsite).

The effect of climbing activities has been attenuated and largely cancelled out on the basis of the same principle, using "zoning" by identifying, a "full protection" area while leaving large adjacent areas of cliff free for climbing. Similar criteria remain to be applied in the marine stretch of the Nature Reserve to distinguish the "full protection" area with appropriate buoys. The report also suggests the creation of "artificial underwater barriers" (so-called FADs-Fish Attracting Devices) similar to schemes already tried with success in other sea areas of the Gulf of Trieste. Finally, special care must absolutely be accorded to monitoring to avoid the phenomena of "sound and light pollution" that, as is known, can sometimes compromise the presence of certain species. In this way, this small, but for the same reason, precious jewel represented by the Nature Reserve will remain intact in the future, with a minimal sacrifice on the part of some numerically small user groups but a great and lasting benefit to the population as a whole.

Scops Owl

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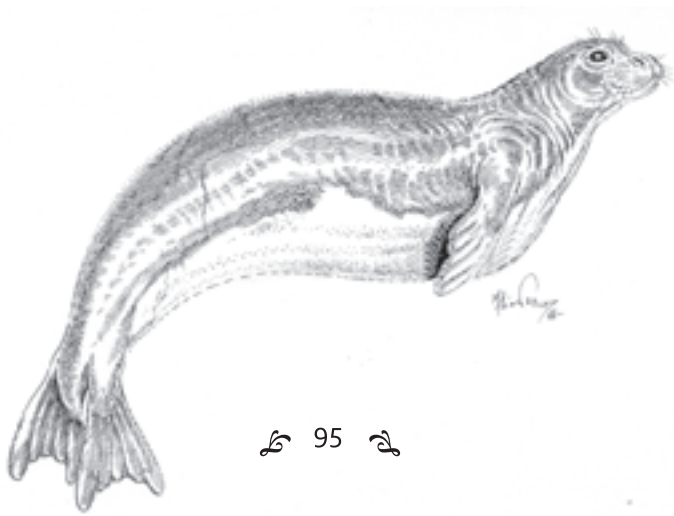

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