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MANAGEMENT PLANS OF SPA "CIRCEO NATIONAL PARK" AND SCIS INSIDE

INFORMATIVE SUMMARY

Beneficiary: Ente Parco Nazionale del Circeo

Cod. Domanda 8475909223

Per L'Ente Parco Nazionale del Circeo

SETIN Servizi Tecnici Infrastrutture S.r.l.

Data Consegna: Sabaudia, Lì 31 /12/2013

NEMO Nature and Environment Management Operators S.r.l.

Data Approvazione .....

Responsabile del procedimento:.....

1 Introduction

The report summarizes all the scientific, technical, organizational leading to the preparation of the Management Plan (MP) of the SPA IT6040015 "Circeo National Park" and the following SCIs inside:

- IT6040012 "Lakes Fogliano, Monaci, Caprolace and Pantani dell'Inferno"
- IT6040013 "Lake of Sabaudia"
- IT6040014 "State Forest of Circeo"
- IT6040016 "Promontory of Circeo (Quarto Caldo)"
- IT6040017 "Promontory of Circeo (Quarto Freddo)"
- IT6040018 "Dunes of Circeo"

The application of the "Guidelines for the preparation of management plans and sustainable regulation of SCIs and SPAs" drawn up by the Environment Department - Regional Directorate of Civil Protection of the Environment of Lazium Region (DGR 2002/1103), led to the identification the conservation integrative measures within the planning tools of the "Circeo National Park".

2 Normative references

2.1 NORMATIVE FRAMEWORK

In order to integrate the activities that affect the conservation status of the area, the Management Plan will take account of the " legislative scenario" which, starting from European, national and regional legislation has as its objective the establishment and the conservation of Special Areas of Conservation (SACs) and Natura 2000 Network.

2.1.1 International Normative Framework

– Bern Convention on the Conservation of European Wildlife and Natural Habitats in Europe, signed on 19 September 1979.

– Barcelona Convention (1979) for the protection of species in the Mediterranean. In 1995, became the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and in 1999 is adopted the Protocol of Special Protected Areas and Biodiversity in the Mediterranean (ASPIM) ;

– Ramsar Convention (1975), for the conservation and the management of wetlands

2.1.2 European Normative Framework

– Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds

– Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats, wild fauna and flora

– Directive 2009/147/EEC of 30 November 2009 , which replaces 79/409/EEC

2.1.3 National Normative Framework

- Decree of the President of the Republic, September 8, 1997, n. 357 , as amended, the "Regulation implementing Directive n.92/43/CEE on the conservation of natural habitats, wild fauna and flora"
- Decree of the Ministry of Environment and Protection of Natural Resources, 3 September 2002 , "Guidelines for the management of Natura 2000 sites " published in Official Gazette 224 of 24 September 2002;

- Decree of the President of the Republic of 12 March 2003, no. 120 , as amended, the "Regulation on amendments and additions to the Decree of the President of the Republic September 8, 1997 , n. 357 , concerning the implementation of Directive 92/43/EEC on the conservation of natural habitats, wild fauna and flora"
- Decree of the Ministry of Environment and Protection of Land of 17 October 2007 and subsequent amendments, "Minimum Criteria for the definition of conservation measures relating to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)
- Decree of the Ministry of Environment and Protection of Land of 22 January 2009 amending the Order of 17 October 2007 concerning the minimum criteria for the definition of conservation measures relating to Special Areas of Conservation (SACs) and Special Protection Areas (SPA)
- Decree of 19 June 2009. List of Special Protection Areas (SPAs) classified under Directive 79/409/EEC (Official Journal no. 157 of 9 July 2009)

3 General Framework

3.1 Physiography

The Special Protection Area "Circeo National Park" and the seven SCIs included can be generally divided into physiographical systems of land and water, one closely connected to the other:

- the coastal line that includes the dunes, the sea, the coastal lakes;
- the alluvional plain where the forest and agricultural areas are included in the waterways (rivers and canals) and wetlands of the pools;
- the cape that flows into the sea and breaks the coastline;
- Zannone island that emerges from the sea.

They represent complex portions of the territory that stand out to them for their representative nature, the spatial organization and the ecological potential characteristics. The limits of the systems are not as certain spatial extension, as the risk of degradation of the resources they hold from which it derives a sustainable management of protection as a function of anthropogenic pressure and the resulting of environmental change, natural, agricultural and urban dynamics and insist around the same SPA.

3.2 Regional and Local Climate

The climate is temperate, but are often significant differences in temperature and humidity between the coastal zone and the higher areas of the interior, where the temperature variations are more pronounced.

The local climate of the SPA IT6040015 "Circeo National Park" and SCIs falls in the warm temperate Mediterranean climate with summer drought in relation to thermo-rainfall data recorded at the meteorological station of Latina Airport. According to the average data for the period 1961-2000 and integrated data from the years ranging from 2004 to 2011 (Air Force Meteorological Service), a change in the thermo rainfall data with deviations and alternating periods of drought in humid with average values relevant is observed. For instance, in the years 2006-2007-2009 occurred rainfall higher than 800 mm/y. Over the past 30 years, the summer dryness is accentuated by the decrease in relative humidity that only in winter, with heavy rains and mild temperatures, it undergoes a further increase.

3.2.1 Geology, Lithology and Geomorphology

3.2.1.1 Geology

Geological analysis to start from the coastline, one can distinguish the following main geological structures: the Promontory, the Pontina Plain and more distant but closely linked to the area of the SPA, the mountain chain Lepini–Ausoni.

The promontory of Circeo is represented by three major tectonic slivers of Limestone Massif crossed between them, followed by a succession of strokes in evolution pelagic (mid-Lias Diogger, Umbro-Sabina Facies), the slivers are in turn superimposed on Cenozoic facies in Sabina.

Pontina Plain, included between the Tyrrhenian Sea and the western edge of Lepini - Ausoni, is covered by Neogene – postorogenic Quaternary; these soils dominate the geological substrate - which are often found in the Mesozoic sediments belonging to the same internal platform facies of the near mountain ranges.

The mountain chain of Lepini - Ausoni is represented by limestone Lazio - Abruzzo: limestone, dolomitic limestone and dolomite facies of the shelf, from the Lias to the Pleistocene. The tectonic axes are oriented NW- SE, NE folds and thrust faults , normal faults in the south- west.

3.2.1.2 Lithology

The eastern sector of the Pontina Plain, which includes the dismemberment of the ancient Mesozoic carbonate platform Latium-Abruzzo, has created a sequence (limestone and dolomite) with a great variety of fossil taxa (from algae and Paleodasycladus to freshwater plants, Charophyta, macroforaminifera, Orbitolina, Rudista, etc.).

3.2.1.3 Geomorphology

The territory of the SPA IT6040015 "Circeo National Park", including seven SCIs, develops within a large marine terrace (Agro-Pontino) between the mountain ranges of volcanism more southern Lazio (Colli Alban-Latium Volcano). The system of marine and alluvial deposits that characterize the plain begins to take shape in Neozoic, as a result of the frequent fluctuations in the level of the Tertiary Tedite Sea approximately 2,000,000 years ago. The Pontina plain was occupied by a sea of subtropical type, shallow, populated by an abundant and varied fauna. The creation of fossil sands, rich in malacological fauna (shells), sometimes crop up along the coast and in the plain confirmation of how today's landmass had been in the past a seabed. The tops of Mesozoic orogeny and Lepini-Ausoni form the eastern border of the Pontina plain. The changing geomorphological events are clearly visible along the coastline of the promontory of Circeo and are witnessed by marine fossil deposits, more or less ancient , in the plain of the sea and on the current seabed, as well as the obvious features perforations caused by bivalve mollusks , which are present in various heights along the coastal cliffs that indicate changes in the coastline during the Quaternary.

3.2.1.4 Hydrogeology

The lithological and permeability characteristics of the complexes present on the surface and in depth, highlight the reciprocal relationships that define the reading hydrogeology scale of the area.

The hydrogeology under the plane is complex, where to detect a unconfined aquifer near the surface, and confined multiple aquifers with limited extention at greater depths and at the base of the carbonate aquifer lowered below the Pontina plain, which is recharged by water circulation coming from Lepini chain. The depth of the water confined within the quaternary deposits are variable and in some cases the condition of aquifer complex. The variability of the soils is related to the Quaternary lithologic heterogeneity, specifically distinguish the main types of aquifers: those formed from the sands of ancient dunes that occupy the coastal strip and those hosted in sands deposits that fill the plane. The Continental Dune has a low permeability to interbedded silt and clay materials with the result to create an aquifer. The coastal dunes that have formed are established locally, high between 20 and 27 m form the barrier of the coastal lakes of Sabaudia, Caprolace, Monaci and Fogliano.
The hydrogeological structure of the Monte Circeo is defined by an aquifer of the Lower Jurassic flint limestone, permeable due to fracturing, stratigraphically superimposed to the dolomite and dolomitic limestones of the Jurassic. This training , which constitutes the majority of the promontory, delimits the sea to the water reservoir of the source. The threshold of infinity is probably made up of a marly horizon, overlying the cherty limestone.

3.2.1.5 Hydrography and Hydrology

The hydrographic network of the area is included within the basin of Rio Martino, which includes eight sub-basins, and is spread over an area of 407.99 sq km , covering the municipalities of Latina, Cisterna di Latina, Sabaudia, San Felice Circeo, Terracina and Sermoneta. Among the significant water bodies, there are the Canal of Medium Waters, the river Ninfa-Sisto, the coastal and marine waters, the transition waters represented by Lake of Fogliano.

1.3 Biological Characteristics

3.3.1 Vegetation and floristic characteristics

3.3.1.1 Sand Dune

The conservation status of dune vegetation is very critical along the coast of the park. All annual and perennial herbaceous communities are very noisy and do not have almost never the typical zonation of the vegetation of the beach. In particular, the Cakileto (habitat 1210), training

pioneer of the beaches, is almost absent and the same characteristic species (*Cakile maritima*) is very rare and often included within the consolidated dune plant communities. The ecological community of *Elymus farcuts* (Habitat 2110), whose ecological niche is large and potentially suited to a structured association, is very fragmented and with local dominances of *Cutandia maritima* and especially with *Cyperus capitatus* that testifies to the strong antrophic disorder. The same values of naturalness indicated in the sampling tests are always very low. The communities of perennial value (Ammofila and Crucianella communities, respectively, Habitat 2120 and 2210) are almost absent; the sampling tests provided exalt the few edges that are identified very disturbed. Some species such as *Anthemis maritima, Cutandia maritima, Lotus cytisoide, Ononis variegata* are with high rates of exposure in all vegetation zones. Note of merit is the discovery of a substantial population and fertile *Malcolmia littorea* on the dunes of Sabaudia. This species is included in the National Red List in the category Endengered (EN); it has an areal W-Stenomediterranean place extended along the coasts of Spain, Portugal, Gibraltar, the Mediterranean France and North Africa (Morocco, Algeria). The coast between Terracina and Circeo was until now the exclusive Lazio and Italian place, but here the species is subject to great risk and depletion for urbanization and tourism. The discovery on the dunes of Sabaudia is extremely important for the preservation of the sort and definitely deserves to be protected with appropriate interventions. On the high dune, in depressions sheltered from the wind, are established communities dominated by Poaceae annual (Brachipodietae certainly refer Habitat 2240, and in some contexts to Malcolmietalia, Habitat 2230), the dominant species: *Bromus rigidus, Cutandia maritima, Phleum arenarium, Vulpia fasciculata* and *Silene canescens*. These communities are also very disturbed, often with the ingression of species of sand dunes such as *Medicago littoralis, Lotus cytisoides, Plantago coronopus;* in other cases they come into contact with the perennial grassland dominated by *Dasypyrum villosum*. With regard to *Juniperus oxycedrus* (Habitat 2250) also this community is very disturbed and compressed towards the dunes where the roads interrupt the ecological continuity. The undulation of the dune is very eroded and often large juniper individuals have their roots exposed and are in great suffering. The pine forests (Habitat 2270) and the habitat 91B0 are highly fragmented with a poor undergrowth and ruderal type (*Rubus, Pteridium, Smilax*). In the context of alien species, *Carpobrotus acinaciformis* has become invasive definitely fitting into all of the beach community. The northern area of the coast is the most affected but now everywhere this species is a source of threat to the native flora. In the northern coastline, a new alien species (*Acacia saligna*) is also present in some individuals naturalized in the juniper scrubs, this species is very aggressive and requires immediate exploitations. *Yucca gloriosa* is present in the dune where by a very old, observed since the 80s of the last century, is now spreading in juniper scrub with young individuals from seed.

3.3.1.2 Behind the dunes and lakes

The depression behind the dunes of Circeo Park has an overall good condition vegetation. The submerged vegetation of the lakes of Circeo (Habitat 1150) is dominated by seagrasses (excluding Paola Lake). Of particular note is the presence in both Caprolace and Fogliano Lakes,

of *Cymodocea nodosa* and *Ruppia cirrhosa*; in the first lake, is also the rare *Zostera noltii*. *C. nodosa* is a good indicator of the quality of the surface sediments; it is the first to disappear when, for the processes related to the eutrophication of waters, sediments become anaerobic mainly to the accumulation of organic matter. These lagoons and in particular Caprolace thus show a good ecological quality also evidenced by the high species diversity of all the algal species present. Their future management must monitor the seagrass cover, species diversity and their evolution over time. The presence of *Ulva* and *Chaetomorpha* is a negative signal; it must be ascertained the cause of their presence (source of nutrients) and implemented any measures to eliminate it before the entire ecosystem may be affected by it. The pasture meadows behind the dunes of Circeo , referring Habitat 6420 , retain a rich and diverse flora, are dominated by different perennial species of Poaceae and Fabaceae greatly appreciated by herbivores breeding. These communities are located around the lakes, sandy- loamy moist soils, often flooded and with no or very low salinity, near the behind the dunes are in contact with the salt-tolerant community. Aspects of both annual (Habitat 1310) that perennial (Habitat 1410 and 1420) halophyte vegetation are certainly the most interesting communities of freshwater depressions. There are several species, rare or included in the National Red Lists (*Salicornia emerici , S. dolichostachya, Spergularia salina, Juncus subulatus, Puccinellia festucaeformis*). In general, these communities are well preserved and expanded, probably due to the accessibility of sampling sites and the lack of palatability for herbivores. The area is an interesting outdoor laboratory with a mosaic of vegetation affected by the interaction of groundwater salty and sweet; just in this site are the three Salicornia species. Particularly interesting is the brackish area at the SW shore of Lake Fogliano; newly formed due to the failure of the embankment of the artificial lake, it is an excellent example of environmental restoration with a variety of habitats (all falling in the types of Natura 2000) also greatly appreciated by the fauna. In the Lago dei Monaci, an single area, first colonized by Eucalipus, now presents aspects of halophyte in active recovery thanks always to breaking of the embankment and the swamping of the site. The marshy areas around the lago di Caprolace community is home to annual and perennial salt-tolerant plant species, characterized by *Atriplex portulacoides* and *Limonium narbonense*, and form a pioneer association who prepares the land for perennial Salicornia currently absent in the park. To underline the discovery for the first time in the park of *Puccinellia festucaeformis*, a characteristic species of perennial glasswort (Sarcocornietalia). The rushes (Habitat 1410) are a fully fledged reality behind the dunes of Circeo. Excluding those to *J. acutus*, favored by buffaloes overgrazing, communities dominated by *J. gerardi , J. subulatus* and *J. maritimus* are well preserved and, in some areas, expanding (Lake Fogliano). A special mention deserve Pantani dell'Inferno area. Depressed area located to the east of Lake of Caprolace reflects just little bit of the salt wedge of the water that dominate the freshwater community. Alongside the wet meadows (Habitat 6420) used as forage hay, there are reeds in sedge *Carex* sp.pl. and *Scirpus maritimus*, these communities elsewhere which have become very rare due to the scarcity of wetlands, deserve careful preservation also for the fauna that they host.

3.3.1.3 Woods

In more mesophilic forest formations of the SPA (91F0 , 91M0) occur locally of changes in floristic composition with an increase in species of *Q. robur* in *Q. frainetto* and *Q. cerris*, with reduction of floristic diversity in terms of a relatively uniform composition of the undergrowth. Below the dense tree cover, the floor is poor often due to morphological alteration for overgrazing of ungulates. Aspects of inland wetlands to woodlands, during the summer, show hydrologic surface water flows in streams virtually absent and areas of accumulation of surface water of the pools are confined exclusively to the historical areas of waterlogging. The conservation status of habitats (3170) is sufficient. In correspondence with the soil in which the stagnation of water is greater than we are witnessing a distribution catenal with *Quercus robur, Fraxinus angustifolia*, the latter not widespread within the forest. Inside the habitat defined by *Quercus cerris* and *Q. frainetto*, the species *Quercus crenata* is rare, localized with isolated units within the forest known like Cerasella. The coat also diversifies almost exclusively here at the edge of pathnames with species such as *Ligustrum vulgare, Euonymus europaeus, Mespilus germanica*. In warmer environments may originate formations thermophilic order Pistacio - Rhamnetalia or alliance Ericion arboreae, largely at the forest of Cerasella and Villa Domiziano. The woodlands are also defined by a slow process of alteration that defines a typological complexity of discernment with a through and overlapping formations thermophile forests of holm oak and cork oak (9340, 9330). In the south of the SPA and at the Promontory, the habitat 9340 (Forests of *Quercus ilex* and *Quercus rotundifolia*) is more or less thermophilic in reference to the exposure, the substrate, the protection of the forest compared to the prevailing winds. The formations dominated by *Quercus ilex* may be more or less altered by phenomena and anthropogenic impacts (building, fire, coastal and agricultural exploitation , etc). *Q. ilex* have contacts involving other forest formations and habitats as 2250 (Coastal dunes with Juniperus spp.), 5210 (Matorral arborescent Juniperus spp.) and/or subtype 32.23 . At the Promontory , the holm often comes into contact with an *Euphorbia dendroides* shrub attributable to subtype 32.22. Compared to human disturbance, from the point of view of natural habitat with the weather tends to be enriched with woody species evolving towards a sclerophyllous scrub, from surveys, it is possible to observe a strong increase of *Rosmarinus officinalis*. The plant communities are also characterized by a certain discontinuity, forming mosaic patterns in which alternate with Mediterranean shrubs also therophytes (Habitat 6220). The conservation status of holm oak is sufficient with a tendency to regress to a simplified floristic composition due to a limited renewal. The Habitat 9330: Forests of *Quercus suber* is presented as integrated training thermophilic oak woods in which the state is defined by specimens also monumental in SCI State Forest, with more degraded forms the north side of the promontory at the foot of the mountain areas in contact with the agricultural and urbanized areas. The habitat has limited areal conditions.

3.3.2 Fauna

3.3.2.1 Birds

Considering the surveys conducted in 2013 and data from the literature collected for this survey, are available in the SPA evidence of the presence of 202 species of birds belonging to 18 orders. Of these, 162 species were detected during the 2013 sampling conducted for this search. Orders consisting of multiple species are (in descending order): the passerines (n = 76 species) , the Charadriiformes (n = 48) , the Anseriformes (n = 18) , the Ciconiiformes (n = 10). Among all species (including those for which there are only bibliographic data), 54 are included in the Annex 1 of Directive 79/409/CEE. A higher number of species also falls into different categories of interest (SPEC, Bern and Bonn Conventions, regional, national and international Red Lists). The original samples made it possible to trace the presence during the breeding period of 82 nesting species (proved, probable, possible). During the winter period were recorded 107 species wintering. More than 43 species were considered pace of migration to a different scale (trans-Saharan, regional dynamics, erratic/vagrants).

3.3.2.1.1 Relationship between geographical areas and species of special interest

The following table shows a summary of the case that may be considered characteristic of the six environments that have been identified for ornithological interest in the SPA. They are also indicated the main problems (i.e. pressure, threats , activities which may interfere directly or indirectly and in a different way with the populations of species of birds. Some of the selected species may be the target of specific strategies mentioned objective , in other cases , the species listed can be carried out, according to a DPSIR approach as an indication status (quality of ecosystems), impact (a result of pressure occurred in the area), response (as a result of specific actions promoted by the park).

Forestry environments: all those environments are represented in the study area from Selva del Circeo and neighboring forest fragments.

Species of interest: Levant sparrowhawk, Hobby, Tawny Owl, Great Spotted Woodpecker, Lesser Spotted Woodpecker, Stock Dove (in winter).

Critical issues: human disturbance from uncontrolled exploitation (stray dogs, military or civil defense drills , binders woodland products : asparagus, mushrooms); alien species (Buck) and consequent stress on vegetation, cuts robbery (outside of management forestry), poaching.

Dune environments: They are represented by dune ecosystems in the broad sense (shoreline, behind the dunes, etc) extended along the coast from Torre Paola at the northern edge of the SPA.

Species of interest: Kentish Plover , Little Ringed Plover, Fan-tailed Warbler.

Critical issues: generic human disturbance, bathe, uncontrolled trampling , over-flying ultralight aircraft, recreational fishermen, kite-surfing, horseback riding, stray dogs and cats, vehicles traffic, accumulation of waste.

Lacustrine environments: they include all environments present along the lakes (Paola, Fogliano, Monaci, Caprolace and the immediate riparian sites). Environments are very different spatial and ecological characteristics (size, depth , salinity, emerged and submerged vegetation, water regime, natural and anthropogenic disturbance, etc.).

Species of interest. Lake of Paola (wintering: Cormorant, Sandwich Tern), Lakes of Fogliano, Monaci and Caprolace (wintering: Greylag Goose, Wigeon, Golden Plover, Moustached Warbler; reproduction: Shelduck, Curlew, Common Tern, Kingfisher).

Critical issues: 1) Lake of Paola: human disturbance (professionals, vessels and noise disturbance, non-native species, accumulation of inert waste, pollution and eutrophication of water); 2) Lakes of Fogliano, Monaci and Caprolace: generic human disturbance, illegal fishing, sport fishing, poaching, stray dogs wandering overflight of microlight aircraft, professional activities (breeding), presence of non-native species (*Myocastor coypus , Trachemys scripta*).

Permanent ponds and marshes: they are ephemeral environments and extension relatively small, located along the coastal area between the lakes.

Species of interest: Purple Heron, Night Heron, Ferruginous Duck, Black-winged Stilt. *Critical issues*: generic human disturbance from uncontrolled exploitation (agriculture, cutting of vegetation, collection of woodland products: asparagus), noise (polygon), overflying aircrafts.

Slopes and cliffs: Promontory of Cireo

Species of interest: Pilgrim, Audouin's Gull, Rock Thrush, Alpine Swift, Pallid Swift. *Critical issues*: generic human disorder (eg , wallets berries: asparagus and mushrooms), rock climbing, stray dogs, fire.

Slopes facing north: Corresponds to areas of Quarto Freddo

Species of interest: Honey Buzzard, Sparrowhawk, Hobby, migratory raptors.

Critical issues: generic human disturbance (asparagus and mushroom pickers), uncontrolled exploitation, stray dogs, poaching, fires.

3.3.2.1.2 Areas of special interest (specific areas) .

It concisely indicate the specific areas of greatest ornithological interest for the study area accompanied by a list of species and/or groups that characterize these sites.

Areas of particular interest for wintering

In an area such as coastal lakes, where the anthropogenic disturbance and the resulting dynamism of the birds very high (even within the same day) , it is difficult to identify specific sites and all the area has to be considered of importance. The indications that are given should therefore be considered indicative. System of marshes and meadows in the area behind the dunes and the inner side of Lake of Fogliano, Pantani Cicerchia, Laghetti dei registri, Lago dei Monaci and marshes behind the dunes, Bufalara, Lake of Caprolace, Pantani del'Inferno, Pantani S. Andrea: the presence of a large number (up to 6,000-8,000 10,000-12,000 individuals in total) of Charadriiformes, Gruiformes, Ciconiiformes, Anseriformes, Passeriformes of reedbed, marsh harrier and other species/groups. In particular, these areas represent a site of strategic importance to the foraging of a large number of individuals and species of waders, ducks and herons that differ in trophic guild as a function of food resources and the specific prevailing mode of foraging. Among the most important guild: the ichthyophagous swimmers, the ichthyophagous walkers, the ichthyophagous flyers, the omnivores, the invertebrate eater swimmers, the flightless invertebrate eaters, the prober or waders drillers, the pecker or waders, the scyther or mowers, the consumers of terrestrial animals, the top-level predators, the pests of surface, the polyphagous divers, the surface polyphagous eaters. It should be noted , finally, that the stretch of marine SPAs the most important wintering population of Red-throated Diver (*Gavia arctica*).

Areas of particular interest for nesting

Aquatic environments: include Pantani dei Masi, Pantani Cicerchia, Lake of Fogliano, Laghetti dei Registri, Fogliano - Palm district , the side behind the dunes of Lago dei Monaci , the dune of Lago dei Monaci, Caprolace behind the dunes, Pantani dell'Inferno, Pantani S. Andrea, Paludina located at the north of the Lake of Paola. All of these areas are important for nesting of some species related to aquatic environments (Gruiformes Rallidae, Anseriformes Anatidae, Charadriiformes Charadriidae, Purple Heron, reedbed passerines of the genus Acrocephalus).

Forestry environments: the State Forest Circeo is an important nesting site for Woodpeckers, Columbiformes, Falconiformes.

Rocky environments: the cliffs of the Cape and the Precipice at Punta Rossa are important nesting sites for Peregrine, Audouin's Gull, Thrush, Alpine Swift, Pallid Swift.

Dune environments: the stretch of dune where the road is cut off, between the mouth of the Rio Martino and the road known like della Lavorazione was the only breeding site of Kentish Plover .

Areas of particular interest for the migratory

The area of the promontory (Monte Circeo) is a site of national importance for migratory period. The wetlands are an important transit site for a large number of migratory species, especially Gruiformes , Charadriiformes , Anseriformes.

Other sites of interest

Other sites show a significant interest in their functional role. Among these should be mentioned the heronries dormitory and dormitories for Waders placed in the following locations : Pantani behind dunes in Fogliano, Laghetti dei Registri, ponds for phytoremediation in Fogliano Lake, area behind the dunes ofLago dei Monaci, Bufalara, area behind the dunes of Lake of Caprolace, Pantani dell'Inferno, Pantani di S. Andrea, Paludina area in the north of Lake Paola. On these sites there are aggregations of Black Crowned, Night Heron, Squacco Heron, Cattle Egret, Great Egret, Grey Heron Little Egret. The presence of active heronries for nesting has yet to be confirmed.

3.3.2.1.3 Wintering birdlife

For the six study areas investigated were obtained evidence for 107 species of which 34 are included in Annex 1 of Directive 79/409/EEC. This data also includes species known to the areas previously in the original surveys carried out for this study by the authors of sampling. Among these , 65 species (69526 individuals) were detected during the sampling provided (18 species in Annex 1 of Directive 79/409/EEC as amended).

3.3.2.1.4 Migratory, summering and erratic birdlife

During the sessions conducted during the spring by the method of listening stations were contacts 608 individuals belonging to 40 species nesting in the area. These include species of spring migratory period, migratory wintering, summering and erratic. The species with higher frequency were Sand martin and Whinchat.

During surveys conducted by the method of linear transect of sessions 500 linear meters were recorded non-breeding individuals belonging to 18 species.

3.3.2.2 Mammals

The SPA Circeo National Park, and SCIs included in it, is home to about 40 species of mammals, a considerable percentage of the total number of Italian and regional species (about 100 for Italy and around 70 for Lazium, depending on whether you consider also whether or not accidental and marine species).

The lowland forest is isolated from other significant wooded areas of Latium; the isolation at a regional level has influenced the disappearance of the species from which the squirrel (*Sciurus vulgaris*) and wild cat (*Felis silvestris*). The forest as well as being surrounded by heavily trafficked roadways is also fenced for almost its entire perimeter.

The wetlands of the park , with regard to mammals , are particularly important for the presence and diversity of bats and rodents of some species of Community interest. Among these species are considered " vulnerable " or " endangered " in the national Red List for the conservation of which are very important to maintaining the state of health of habitats and ecological balances and prudent management systems lakes and marshes, as well as the channels and both stable and temporary pools. Among the issues we have to mention *Myocastor coypus* that is thought to cause damage to the embankments. This problem is easily solved , however, because the sediment dwelling species is not required and prefer shelters in the vegetation where there is the presence of vegetation rich river banks. There is no evidence of its current ecological influence on other species.

In particular, the presence of bats in the park seems to be favored by the abundance of roost sites (caves, ruins , mature trees) and the availability of diversity of environments and feeding areas (water bodies, woods, etc.).

3.3.2.3 Amphibians and Reptiles

The SPA Circeo National Park and the SCIs included , is home to 9 species of amphibians , more than half of those in Latium and just under 25 % of those in Italy.

In the park is reported the presence of two species belonging to the urodeles (Italian crested newt and smooth newt) and 7 species belonging to the order Anura.

Among the latter, *Bufo viridis* compared to *Bufo bufo* frequents moist and warm environments. The species is particularly sensitive to the processes of habitat fragmentation because of the habit of returning to the production site, sometimes even traveling several kilometers. During these trips many reproductive individuals are killed on the roads.

Even *Hyla arbore*a is a species sensitive to fragmentation processes in close association, outside of the breeding season, the shrubs and trees. *Rana italica* is an endemic species of the Apennines. It is found mostly in cold streams in the hills or in the mountains and wooded areas, but also in damp caves, sinks, troughs or along the courses of the rivers where the water is always near. During the winter many individuals go to hibernate under the roots of trees. Little is known about his condition. *Rana dalmatina* is closely related to forest habitats and its survival in the area is closely linked to the conservation of the pools in the lowland forest. In the last decades, there are not reports of the presence of *Salamandrina perspicillata* and *Bombina pachypus*. For both species the area of the SPA is located on the edge of their range and not in an ecological optimum, so they are probably locally extinct .

In the National Park of Cicero, there are 17 species of reptiles found on 19 in Latium and 45 in Italy. There are 2 species of Chelonia and 15 species of Squamata. The climatic conditions , the abundance of wetlands and lowland forest leads to a relative abundance of populations of reptiles. In particular, the availability of wetlands allows the presence of typical aquatic species such as *Emys orbicularis, Natrix natrix, Natrix tessellata*. For the geographical distribution of the species most related to aquatic environments there may be limiting factors such as pollution and the disappearance of small wells, springs, ponds and lakes. Another major threat is from systematic mowing of riparian vegetation carried out by mechanical means that injures or kills the adult specimens and destroys the nests.

Emys orbicularis is very sensitive to the deterioration of habitat and can be considered a "biological indicator". It is found in ponds, ditches, swamps, rivers and canals, in areas rich in aquatic vegetation and where the water current is slower and the muddy bottom . You can also find it in artificial environments such as irrigation canals and ponds in city parks. To highlight the competition with invasive species *Trachemys scripta*. *Natrix tessellata* is closely linked to water. This species colonizes only rarely environments that are not located in the immediate vicinity . Particularly favors the rivers flow slow or still waters, but can also be found along rivers and streams flow cooler and faster.

In the environment of the coastal dunes, the vegetation of the low bushy scrubland in the Mediterranean shrubs and undergrowth of ilex and cork finds refuge and feeding the Hermann's tortoise (*Testudo hermanni*). Its presence is rare and restricted to certain areas and requires further investigation. The causes of its limited distribution can be attributed to a

degradation and fragmentation of its habitat. The population dynamics of this species is further complicated by the large amount of releases from captive individuals.

The environment of Mediterranean mattoral is also the habitat of *Elaphe quatuorlineata*, a rare species of considerable nature conservation interest, and *Hierophis viridiflavus* much more common.

The clearings in the forest, pastures, grassland environments are beloved for *Chalcides chalcides* and for the three species of Lacertidae (*Lacerta bilineata , Podarcis muralis , Podarcis sicula*), the latter also present in urbanized environments together with *Hemidactylus turcicus* and *Tarentola mauritanica*. The size of the populations of Lacertidae also influences the presence of their predators such as *Coronella austriaca* and *Coronella girondica*, species that are particularly demanding and therefore quite rare. *Vipera aspis* and *Zamenis longissima* seem to prefer areas with presence of forest vegetation alternating patches, meadows, fallow, rocks, waterway. *Anguis fragilis* has a wide ecological and living environments and different substrates, ranging from the peaty soil calcareous soils of arid grasslands. Most of the species described above proves vulnerable to factors of degradation and fragmentation of habitats that host them.

All non-native species naturalized in Latium belong to the order of the Chelonia (*Trachemys scripta, Testudo marginata*) and represent a threat to native species of *Emys orbicularis* and *Testudo hermanni.*

3.3.2.4 Fish

Of the 25 fish species of the Habitats Directive, 19 are reported in the Latiumm Region while one is present in the SPA Circeo National Park and in the SCIs included in it , especially in the SCI IT6040012 "Lakes of Fogliano, Monaci, Caprolace and Pantani dell'Inferno" and IT6040013 "Lake of Sabaudia".

At present, in the lakes, there are *Aphanius fasciatus* and *Knipowitschia panizzae*; the latter is considered by Zerunian (in: Calvario E. et al, 2008) as an allochthonous species. *Rutilus rubilio* is sampling in the channels.

Aphanius fasciatus maintains a viable population thanks to its high ecological value that allows him to live in environments with changing boundary conditions and not much affected by the instability of ecological ponds.

3.3.2.5 Insects

The territory of the SPA Circeo National Park and the SCIs included in it, although of limited extention, is quite heterogeneous in terms of the environment and it is home to complex communities of arthropods related to the different habitat types present therein. The species found in the area are four:

Cerambyx cerdo Linnaeus, 1758 (Coleoptera, Cerambycidae), woodboring specialized, rare but still widespread in all forest habitats of the Park with the presence of large trees of the genus Quercus (Biscaccianti, unpublished data);•

Melanargia arge (Sulzer, 1776) (Lepidoptera, Satyridae), endemic Apennines butterfly, known only on the basis of an old relic of the Circeo Promontory (see Ballet et al. 2005);

• *Euplagia quadripunctaria* (Poda , 1761) (Lepidoptera , Arctiidae) , phytophagous species quite frequently, known for a single unpublished findings of Lake of Caprolace (Zilli , pers. comm.);

• *Hesperia comma* (Linnaeus , 1758) (Lepidoptera , Hesperiidae) , infrequent butterfly (Balletto et al., 2005).

3.3.2.6 Alien Species

The territory of the SPA and the SCIs included, is hosting a large number of alien species, as detected by the Project PASAL of the Latium Region. The main species are included in the following list:

• *Rhynchophorus ferrugineus*

• *Procambarus clarkii*

• *Rana catesbeiana*

• *Trachemys scripta*

• *Mauremys sp.*

• *Psittacula krameri*

• *Myiopsitta monachus*

• *Amandava amandava*

• *Miocastor coypus*

3.3.3 Ecological characteristics

As the degree of prior knowledge and updated the fauna and flora of the aquatic environments of the territory covered by this management plan (MoE , 1996; Calvario et al. , 2008; Rossi et al, 2013) and extrapolated data from the database Natura 2000 (MoE , 2012), an investigation was carried out modeling, according to the ecosystem approach, which starts from the network analysis, aimed at the resolution of the underlying food webs in aquatic each patch. The results of the analysis show the following comparison on the basis of stability:

Fogliano < Sabaudia < Monaci < Caprolace

It is therefore clear that the Fogliano Lake is, in terms of ecosystem conditions, unstable. The remaining lacustrine environments are all in equilibrium since the value of connectivity is not diverged significantly from the respective values of the average strength of interaction. It should be noted, moreover , that no structure/function relationship shows a significant condition of stability.

The vertical pressures identify both external pressures (bottom-up such as nutrient input and top-down such as withdrawals from fisheries) and the endogenous pressures (bottom-up such as the availability of plant debris and top-down such as predation pressure). The data show the following comparison based on vertical pressures:

Monaci < Fogliano < Caprolace < Sabaudia

The comparison shows that the Lago dei Monaci tends to be unstable. The Lake of Fogliano shows a tendency to instability for the same reasons the Lago dei Monaci with an increase of the importance of bottom-up pressures. The ecosystem of Lake of Caprolace and the lake of Sabaudia is for their greater extent dependent on exogenous bottom-up pressures (input of nutrients and pollutants).

The ingression of nutrients is not metabolized by the autotrophic component (phytoplankton, aquatic macrophytes and riparian vegetation)and has a cumulative effect on the chemistry of sediments (change in the redox potential, hypoxia phenomena) with significant effects both in terms of biodiversity (decrease of specialists; decrease of the same biodiversity) that biomass (increase of generalist).

The salification of the sediments due to exogenous inputs combines with the salt wedge (Aguzzi L., 2013) resulting from the erosion of the coastline , accentuating and accelerating the depletion of ecological functions.

3.4. Landscape characteristics

3.4.1. The local architectural and archaeological heritage

The territory included in the SPA contains a scenario of historical and archaeological interest with exhibits that highlight the attendance of these places since prehistoric times:

- The sites of prehistoric age
- The Acropolis
- The Temple of Maga Circe
- The remains of the Roman age
- The Porto Canale of Torre Paola
- The towers system
- The flagship of the Navy of Capo Circeo
- Fisherman's House
- Fort Napoleon
- The Church of S. Maria Sorresca
- The Church of San Felice Martire
- The Church of the Immaculate Conception
- The Villa Aguet (formerly Villa Poniatowsky)
- The historic center of San Felice Circeo
- The historic center of Sabaudia

3.4.2 The Landscape

Concerning the environmental components, the landscape of the SPA National Park of Circeo and SCIs included in it, is divided into geographical units.

The natural landscape includes sites of natural interest in the natural and/or semi-natural conditions of substantial integrity; in the context of high natural values, we identified the wooded territories, the semi-natural environments, the agricultural land, the water bodies, the wetlands. In such contexts, the areas in which the history and the human settlement have highlighted the changes and uses, are integrative part.

In relation to the value of natural and anthropogenic landscape, we can interpret the different geographical units in the SPA "Circeo National Park " and SCIs included in areas in which the goods are hierarchically defined by the overall knowledge of the environment, as a mix of natural ecosystems, of human society and technology , in a system where dynamic modification of a parameter feedback on others.

3.4.3 Ecosystem services

Ecosystems sustain life and human activity as a whole. The goods and services they provide are vital to the welfare and development of the economic and social future. The benefits of ecosystems include, in particular food, water, timber, purification of the air, soil formation and pollination. In particular, for the SPA "Circeo National Park" and included SCIs, it is possible to identify all of the ecosystem services.

4 Evaluation Analysis (EA)

4.1 Physiographical characteristics

The carried out evaluations show that the threats connected to abiotic aspects of the SPA and included SCIs have the follkowing main topics:

- Pollution of surface waters
- Changes in hydraulic conditions induced by human pressures
- Erosion
- Intrusion of salt into groundwater
- Changing the structure of inland waters
- Sewer and water diversions
- Landfills , land reclamation and drainage schemes
- Eutrophication (natural)

These critical issues, affecting the conservation status of species and habitats, are of community interest and mainly due to wet environments, including water quality and water balance in relation to the water control. From this it also follows an interaction with the marine waters in terms of ingression of saline wedge and coastal erosion .

The LIFE project REWETLAND has addressed these issues in detail and produce specific guidelines for the water management.

4.2 Biological Characteristics

4.2.2 Fauna characteristics

To interpret the territory of the SPA and SCIs included in a view of the vocation of wildlife, has been called a vocation faunal index calculated on the basis of the reports collected from the surveys carried out and bibliographic data. The vocation of wildlife has been defined on the basis of the number of species detected in each environmental category, thus giving a weight to each category of species richness that is able to accommodate.

The results show that the area has a strong vocation for wildlife humid environments, arable land and wooded areas. To detect the value of the populated areas, which should be considered for the narrow mosaic with natural areas and trophic contribution of anthropogenic nature in urban areas.

Overlap with the threats it detects that the vocation of wildlife is affected by human disturbance in wetlands and the presence of alien species in a diffuse manner and on a large scale in all environmental categories taken thoughtlessness.

4.3 Ecological Characteristics

The sets of data resulting from the vegetation and floristic aspects combined with the results of the network analysis have allowed to provide input to the long-term management of the species of Community and national interest of the SPA in the National Park of Circeo.

Environmental Characteristics	Critical Issues	Species Delection	Functional and Structural Effects
Behind the dunes and dune environments	Alien species, human pressures	*Carpobrotus*	Stabilization trophic structures based on native plant species
Forestry habitats	Fragmentation, overgrazing by ungulates, reduced groundwater	*Robinia, Dama dama, Sus scrofa*	Stabilization of trophic structures based on native plant species in the undergrowth
Aquatic environments	Fragmentation, overgrazing by ungulates, weakening of riparian and embankments	*Alternantera, Sus scrofa, Myocastor*	Stabilization of trophic structures based on aquatic and riparian species of native fauna
Lacustrine environments	Organic pollution, non-native fish species	*Trachemis, Procambarus*	Stabilization of trophic structures based on aquatic and riparian species of native fauna
Agricultural environments	Human pressures, urbanization	Species of birds	Simplification and trivialization of the trophic structures
Circeo Promontory	Alien species; building development; fire	*Senecio, Ipomea, Carpobrotus, Agave, Opuntia, Ailanthus, Rhynchophorus*	Stabilization of trophic structures based on native plant species
Quarto freddo	Soil erosion and fires	*Ipomea, Opuntia*	Stabilization of trophic structures based on native plant species
Quarto caldo	Soil erosion and fires	Alien plant species	Simplification and trivialization of the trophic structures

The Millennium Ecosystem Assessment (MEA) defines ecosystem services as those "multiple benefits provided by ecosystems to humankind".

From the quantitative point of view, expressed as a percentage (100% max - min 0%), the ecosystem services of the main lacustrine and water patches show a differentiation of the four categories summarized below:

	Quality of Ecosystem services			
	Supply	**Regolation**	**Cultural**	**Support**
Lake of Fogliano	**75**	**75**	**50**	**0**
Lago di Monaci	**50**	**75**	**50**	**0**
Lake of Caprolace	**50**	**75**	**50**	**0**
Lake of Sabaudia	**75**	**75**	**75**	**0**
Pantani di Cicerchia	**0**	**25**	**25**	**25**
Laghetti dei Registri	**0**	**25**	**25**	**25**
Pantani dell'Inferno	**0**	**50**	**25**	**50**
Pantani di S. Andrea	**0**	**25**	**25**	**25**

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4.5 Socio –Economic characteristics

The SWOT analysis (Strenghtness, Weaks, Oppurtunities, Threats) rappresented valuation model that allows you to have an overall synthesis of the situation based on four factors: Strengths, weaknesses, opportunities and threats. Each of them is assigned one or more beneficiaries or affected representatives.

A) STRENGTHS

Large diversity of environments	Turism
Presence of a large diversity of species, especially plants and birds	Turism, Residents
Bottleneck of bird migration	Turism
Great tourist attraction, especially in the summer season	Turism
Extention of Natural Landscape (sea, headland lakes, forest and dunes)	Turism, Residents
Proximity to large urban centers	Turism, Residents

B) WEAKNESSES

Dispersion of the reception system	Turism
Lack of access by public transport and rails	Turism, Residents
Relative difficulty of viability	Turism, Residents
Complexity of the legal situation of land ownership	Turism Residents Breedings, Farmers

Overlapping jurisdictions	Turism Residents Breedings, Farmers
Shortage of supply of infrastructures of tourism	Turism, Residents
Tourist season with a strong peak in the summer time	Turisms, Residents
Local introduction of invasive alien species for ornamental purposes	Turisms Residents

C) OPPORTUNITIES

Proximity to major urban centers (Latina, Frosinone, Rome, Naples)	Turism, Residents farmers
Accessibility from/to international airport (Fiumicino)	Turism, Residents
The presence of large archaeological and historical values	Turism, Residents
Proximity to other protected areas (Ausoni - Campo Soriano, Astura, Ninfa)	Turism, Residents
Presence of architectural values (Città di Fondazione)	Turism, Residents
Great value of goods and archaeological sites	Turism, Residents
Presence of a training facility on the regional and national parks	Turism, Residents

D) THREATS

Human pressure and pollution due to urban development and urbanization, illegal building	Turism, Residents, Breedings, Farmers
Water pollution due to industrial discharges (Rio Martino)	Turism, Residents, Breedings, Farmers
Water pollution due to intensive agriculture	Turism, Residents, Breedings
High pumping fresh water in deep too	Residents, Breedings, Farmers
Ingression of saline wedge and salinization of lakes	Breedings, Farmers
Tourist pressure	Residents
Problems related to mobility and parking lots in the summer	Turism, Residents

Invasive and alien species	Turism, Residents, Breedings, Farmers

The valuation of ecosystem services has seen the application of the guidance in "The toolkit for assessing the socio-economic benefits of Natura 2000 sites" (Kettunen et al. (2009), articulated in the identification of ecosystem services (and a quantitative estimate of ecosystem services). This assessment was conducted for each of the SPAs and SCIs included.

4.6 Determining Factors of Pressure and Threats

The factors of pressure and threats in a Natura 2000 site were consolidated by the European Union Commission to a rational inclusion in the standard forms of SCIs and SPAs.

An analysis of the threats it can be said that most of the threats comes from two main pressures acting with varying degrees throughout the SPAs and SCIs included. These factors are recognized ecological isolation and strong anthropogenic pressure.

The ecological isolation is determined by an agricultural matrix that allows low levels of connectivity due to the greenhouses and the water drainage channels.

In addition, the road network adjacent to the SPA is also characterized by a large viability, adjacent to the lowland forest, constituting an important ecological barrier.

The ecological isolation impoverish the fauna causing local extinctions, as it probably was for the squirrel and helping synanthropic and invasive species, able to overcome those barriers.

The strong anthropic pressure leads to a series of threats ranging from the introduction of invasive alien species brought to the site for ornamental purposes, the strong pressure on the dunes because of beach tourism, the contamination with waste, contamination of water.

5 Management Plan

5.1 General Objectives

The general objectives are the objectives to be achieved in order to strive for the attainment of the purpose for which they have been identified as sites of Community interest. Beside the objective of conservation, other objectives must aim to develop and promote knowledge and research, public reception and the maintenance of traditional activities. The cognitive framework and threats, real and potential, possible to identify the general objectives related to SPAs and SCIs included.

GO1 - Maintain and improve the level of biodiversity of habitats and species of Community interest for which the sites have been designated;
GO2 - Keep a check and limit the activities that affect ecological integrity of ecosystems;
GO3 - To harmonize the plans and projects planned for the area in question;
GO4 - Locate and activate the processes needed to promote the development of economic activities compatible with the conservation objectives of the area;
GO5 - Activate the socio-political and administrative mechanisms to guarantee a homogeneous and active management of Natura 2000 sites;
GO6 - Identify actions to enhance communication and promote environmental awareness and knowledge on the sites;
GO7 - Develop and promote the research, knowledge and hospitality.

5.2 Identification of targets coherent with the ecological requirements of Natura 2000 sites

Compared to the general objectives is possible to identify the specific objectives, which will be identified with respect to the lines of action and / or intervention plan . Each specific objective can be functional at the same time more general objectives:

5.2.1.SCI IT6040012 “Lakes of Fogliano, Monaci, Caprolace and Pantani dell’Inferno”

5.2.1.1 Specific objectives in the short term

SO 1. Adopt management criteria of the bands of vegetation around the lake related to regeneration of existing habitats and / or the creation of new habitat potentially present.
SO 2. Eradication and / or maintain populations under control of invasive alien species.
SO 3. Minimize the degradation consists of waste scattered within the SCI
SO 4. Regulate the use of areas inside the SCI in order to improve the quality and to limit the negative effects on habitats and species.
SO 5. Make compatible human activities in terms of noise and bright enough to cancel or reduce the disorder in relation to species of conservation interest on the site.

SO 6. Raise public awareness about the presence of the Natura 2000 site, on the naturalistic and critical conditions.
SO 7. Prevent grazing in sand dune environments (dune areas adjacent to the business or grazing practices of the public domain).
SO 8. Protect the relict population of *Salicornia* and *Puccinellia dolichostachya festucaeformis*

5.2.1.2 Specific objectives in the medium and long term

SO 9. Improving the awareness of local communities with respect to environmental values of areas inside the SCI.
SO 10. Reduce the presence of pollutants in the effluent loads of settlement and industrial origin.
SO 11. Reduce the presence of pollutant loads from agriculture and livestock.
SO 12. Redevelopment of the river and channels in order to increase the purifying capacity.
SO 13. Increase the compatibility of pasture within the wetlands and salt-tolerant freshwater present in the dune areas and in neighboring lakes.
SO 14. Improve scientific knowledge on the size of the populations of species of greatest conservation concern in the SCI and on invasive alien species.
SO 15. Prepare an emergency service for the rapid removal of invasive alien species.
SO 16. Reduce the isolation of the site in relation to the ecological network of provincial and fragmentation of habitats present within the site.
SO 17. Limit the disturbance created by the passing air at low altitude.
SO 18. Limit the phenomena of poaching.
SO 19. Improve infrastructure for environmental use, dissemination, education and sustainable tourism and awareness.
SO 20. Reduce the spread of fire by negligence and intentional.
SO 21. Encourage the observation of the sites.
SO 22. Reduce the threat posed by feral stray pets (dogs and cats).

5.2.2 SCI IT6040013 “Lake of Sabaudia”

5.2.2.1 Specific objectives in the short term

SO 1. Adopt management criteria of the bands of vegetation around the lake and perifluviale related to regeneration of existing habitats and / or the creation of new habitat potentially present .
SO 2. Protect the relict population of SOmunda regalis and Hydrocotyle vulgaris.
SO 3 . Eradication and / or maintain populations under control of invasive alien species .
SO 4. Minimize the degradation consists of waste scattered within the SCI.
SO 5. Regulate the use of areas inside the SCI in order to improve the quality and to limit the negative effects on habitats and species.
SO 6. Make compatible human activities in terms of noise and bright enough to cancel or reduce the disorder in relation to species of conservation interest on the site.

SO 7. Raise public awareness about the presence of the Natura 2000 sites, on the naturalistic and critical conditions.

5.2.2.2 Specific objectives in the medium and long term

SO 8. Improving the awareness of local communities with respect to environmental values of areas inside the SCI .
SO 9. Reduce the presence of pollutants in the effluent loads of settlement and industrial origin.
SO 10. Reduce the presence of pollutant loads from agriculture and livestock.
SO 11. Redevelopment of the river and channels in order to increase the purifying capacity .
SO 12. Assess the compatibility of the fishing in the lake of Sabaudia with the objectives of consevazione site .
SO 13. Improve scientific knowledge on the size of the populations of species of greatest conservation concern in the SCI and on invasive alien species .
SO 14. Prepare an emergency service for the rapid removal of invasive alien species.
SO 15. Limit the disturbance created by the passing air at low altitude.
SO 16. Improve infrastructure for environmental use, dissemination, education and sustainable tourism and awareness.
SO 17. Reduce impacts on habitats and species exercised by a large number of vessels present seasonally in the lake of Sabaudia.
SO 18. Reduce the spread of fire.
SO 19. Encourage the observation of the sites.
SO 20. Reduce the threat posed by stray pets (dogs and cats).

5.2.3. SCI IT6040014 "Foresta Demaniale del Circeo"

5.2.3.1Specific objectives in the short term

SO 1. Increase the value of natural forest habitats.
SO 2. Eliminate / reduce the impacts of ungulates.
SO 3. Protect the population of *Lepus corsicanus*.
SO 4. Protecting / retrain formations dominated by *Quercus suber*.
SO 5. Eradication and / or maintain populations under control of invasive alien species
SO 6. Minimize the degradation by waste scattered within the SCI.
SO 7. Regulate the use of areas inside the SCI in order to improve the quality and to limit the negative effects on habitats and species.
SO 8. Raise public awareness about the presence of the Natura 2000 site, on the naturalistic and critical conditions.
SO 9. Increase control to reduce instances of excessive anthropic pressure and withdrawal of woodland products.

5.2.3.2 Specific objectives in the medium and long term

SO 10. Improving the awareness of local communities with respect to environmental values of areas inside the SCI.
SO 11. Improve scientific knowledge on the size of the populations of species of greatest conservation concern in the SCI and on invasive alien species.
SO 12. Prepare an emergency service for the rapid removal of invasive alien species.
SO 13. Improve infrastructure for environmental use, dissemination, education and sustainable tourism and awareness.
SO 14. Reduce the threat posed by stray pets (dogs and cats).

5.2.4. SCI IT6040016 "Promontory of Circeo (Quarto Caldo)"

5.2.4.1 Specific objectives in the short term

SO 1. Eradication and/or maintain populations under control of alien invasive flora.
SO 2. Regulate the use of areas inside the SCI in order to improve the quality and to limit the negative effects on habitats and species.
SO 3. Raise public awareness about the presence of the Natura 2000 site.
SO 4. Protect and / or rehabilitate the relict formations of coastal juniper.
SO 5. Protect and / or rehabilitate the relict formations of dwarf palm.
SO 6. Improve infrastructure for environmental use, dissemination, education and sustainable tourism and awareness.
SO 7. Make compatible human activities in terms of noise and bright enough to cancel or reduce the disorder in relation to species of conservation interest on the site.

5.2.4.2 Specific objectives in the medium and long term

SO 8. Improving the awareness of local communities with respect to environmental values of areas inside the SCI.
SO 9. Improve scientific knowledge on the size of the populations of species of greatest conservation concern in the SCI and on invasive alien species.
SO 10. Prepare an emergency service for the rapid removal of invasive alien species.
SO 11. Reduce the spread of fire.
SO 12. Reduce the threat posed by stray pets (dogs and cats).

5.2.5. SCI IT6040017 “Promontory of Circeo (Quarto Freddo)”

5.2.5.1 Specific objectives in the short term

SO 1. Increase the value of natural forest habitats.
SO 2. Protect / rehabilitate the habitat of *Quercus suber*.
SO 3. Improve infrastructure for environmental use, dissemination, education and sustainable tourism and awareness.
SO 4. Valuing the inland areas to the SCI in order to improve the usability by limiting the negative effects on habitats and species.
SO 5. Raise public awareness about the presence of the Natura 2000 site, on the naturalistic and critical conditions.
SO 6. Eradication and / or maintain populations under control of alien invasive flora.

5.2.5.2 Specific objectives in the medium and long term

SO 7. Improving the awareness of local communities with respect to environmental values of areas inside the SCI.
SO 8. Improve scientific knowledge on the size of the populations of species of greatest conservation concern in the SCI and on invasive alien species.
SO 9. Stimulating the development of cork with productive purposes through the recovery of the economic chain linked to the trade of *Quercus suber*.
SO 10. Reduce the number of illegal fires.
SO 11. Reduce the threat posed by feral stray pets (dogs and cats).

5.2.6 SCI IT6040018 "Dunes of Circeo"

5.2.6.1 Specific objectives in short term

SO 1. Develop and implement a comprehensive strategy to combat the spread of alien invasive plant species.
SO 2. Counteract coastal erosion.
SO 3. Regulate the tourism flows.
SO 4. Prepare and adopt guidelines for the sustainable management of the "cleansing" of the beach.
SO 5. Protect Malcolmia littorea.
SO 6. Retrain the dune vegetation.
SO 7. Minimize the degradation consists of municipal and special waste scattered within the SIC
SO 8. Make compatible human activities in terms of noise and bright enough to cancel or reduce the disorder in relation to species of conservation interest on the site.
SO 9. Raise public awareness about the presence of the Natura 2000 site, on the naturalistic and critical conditions.

SO 10. Prevent grazing in sand dune environments (dune areas adjacent to the business or grazing practices of the public domain).

5.2.6.1 Specific objectives in the medium and long term

SO 11. Improving the awareness of local communities with respect to environmental values of areas inside the SCI.

SO 12. Improve scientific knowledge on the size of the populations of species of greatest conservation concern in the SCI .

SO 13. Prepare an emergency service for the rapid removal of invasive alien species.

SO 14. Improve infrastructure for environmental use, dissemination, education and sustainable tourism and awareness.

SO 15. Implement a detailed and complex monitoring and reporting of long - term average .

SO 16. Reduce the spread of fire by negligence and intentional.

SO 17. Reduce the threat posed by feral stray pets (dogs and cats).

5.2.7 SPA IT6040015 " Circeo National Park "

5.2.7.1 Specific objectives in the short term

SO 1. Raise public awareness about the presence of the Natura 2000 site, on the naturalistic and critical conditions.

SO 2. Develop and implement a comprehensive strategy to combat the spread of alien invasive plant species.

SO 3. Regulating the use of the inland areas to the SPA in order to improve the quality and to limit the negative effects on habitats and species.

SO 4. Counteract coastal erosion.

SO 5. Prepare and adopt guidelines for the sustainable management of the "cleansing" of the beach.

SO 6. Eliminate / reduce the impacts of ungulates.

SO 7. Adopt management criteria of the bands of vegetation around the lake and perifluviale related to regeneration of existing habitats and / or the creation of new habitat potentially present.

SO 8. Minimize the degradation consists of municipal and special waste scattered within the SPA .

SO 9. Make compatible human activities in terms of noise and bright enough to cancel or reduce the disorder in relation to species of conservation interest on the site.

SO 10. Protect the population of Lepus corsicanus.

SO 11. Prevent grazing in sand dune environments (dune areas adjacent to the business or grazing practices of the public domain).

SO 12. Protect *Malcolmia littorea*.

SO 13. Protect the relict populations of *Salicornia dolichostachya, Puccinellia festucaeformis, Osmunda regalis, Hydrocotyle vulgaris*.

SO 14. Increase the value of natural forest habitats.

SO 15. Protecting / retrain formations dominated by cork.

SO 16. Increase control to reduce instances of excessive anthropic pressure and withdrawal of woodland products .

SO 17. Protect and/or rehabilitate the formation of relict juniper coastal landlocked built-up areas.

SO 18. Protect and / or rehabilitate the relict formations of dwarf palm.

SO 19. Retrain the dune vegetation.

5.2.7.2 Specific objectives in the medium and long term

SO 20. Improving the awareness of local communities with respect to environmental values of areas inside the SPA.

SO 21. Reduce the presence of pollutants in the effluent loads of settlement and industrial origin .

SO 22. Reduce the presence of pollutant loads from agriculture and livestock.

SO 23. Retrain the river environment and channels in order to increase the purifying capacity.

SO 24. Increase the compatibility of pasture within the wetlands and salt-tolerant dulcacquicole present in the areas retrudunali and in neighboring lakes.

SO 25. Encourage the conversion of existing agricultural production processes towards more compatible process.

SO 26. Improve scientific knowledge on the size of the populations of species of greatest conservation concern present in the SPA and on invasive alien species .

SO 27. Prepare an emergency service for the rapid removal of invasive alien species .

SO 28. Reduce the isolation of the site in relation to the ecological network of provincial and fragmentation of habitats present within the site.

SO 29. Improve infrastructure for environmental use , dissemination, education and sustainable tourism and awareness.

SO 30. Limit the disturbance created by the passing air at low altitude.

SO 31. Limit the phenomena of poaching.

SO 32. Reduce the illegal fires.

SO 33. Reduce the threat posed by feral stray pets (dogs and cats).

SO 34. Assess the compatibility of the fishing in the lake of Sabaudia with the objectives of nature conservation site.

SO 35. Stimulating the development of cork with productive purposes through the recovery of the economic chain linked to the trade of *Quercus suber*.

SO 36. Reduce the impact of the hooded crow on biotic communities in the SPA.

5.3 List of conservation measures

The following tables lists the overall measures site by site:

SCI IT6040012 "Lakes of Fogliano, Monaci, Caprolace and Pantani dell'Inferno"			
Kind of measures	Description	Priority	Measure of Plan of Park
IA_01	Eradication and / or control of invasive alien species	Very high	D3, D4
IA_02	Interventions for the protection of the relict population of Salicornia dolichostachya and Puccinellia festucaeformis	Very high	B1
IA_03	Intervention removal of solid waste and / or hazardous waste	Medium	
IA_04; RE_02	Regulation of enjoyment and active interventions to streamline access to the areas most sensitive to disturbance	High	
IA_05; RE_04	Participatory management of the water system on the basis of memoranda of understanding defined within the Project LIFE REWETLAND	Very high	A1
IA_07; PD_02	Design and implementation of a program of infrastructural , educational projects and local marketing	High	
IA_08	Capture and transfer stray animals	Medium	C1
MR_01	Implementing the Monitoring Program of the Management Plan	Very high	
MR_02	Provide an emergency service for the rapid removal of invasive alien species	High	D3, D4
PD_01	Design and implementation of a program to raise awareness of the resident population to the issues of nature conservation	Very high	
RE_01	management of riparian vegetation of rivers and channels appropriate to the conservation objectives of the site	Very high	B1, A2
RE_03	Develop a plan for the use of areas for feed purposes	High	
RE_05	Regulation of flight	Medium	C1
RE_06	Intensified checks for hunting purposes	Low	C1
RE_07	Increased controls to defense against forest fires	Medium	

SCI IT6040013 “Lake of Sabaudia”			
Kind of measures	Description	Priority	Measure of Plan of Park
IA_01	eradication and / or control of invasive alien species	Very high	C
IA_02	Intervention removal of solid waste and / or hazardous waste	Medium	B1
IA_03; RE_02	Regulation of enjoyment and active interventions to streamline access to the areas most sensitive to disturbance	High	B1
IA_04	Interventions for the preservation of relict populations of Osmunda regalis and Hydrocotyle vulgaris	Very high	C
IA_05; RE_03	participatory management of the water system on the basis of memoranda of understanding defined within the Project LIFE REWETLAND	Very high	A1
IA_06; PD_02	Design and implementation of a program of infrastructural , educational projects and local marketing.	High	
IA_07	Capture and transfer stray animals	Medium	B1
MR_01	Implementing the Monitoring Program of the Management Plan	Very high	
MR_02	Provide an emergency service for the rapid removal of invasive alien species	High	C
MR_03	Devise and implement a monitoring program aimed at assessing the impact of fishing on the ecosystem of the lake.	Medium	A1
PD_01	Design and implementation of a program to raise awareness of the resident population to the issues of nature conservation.	Very high	
RE_01	management of riparian vegetation of rivers and channels appropriate to the conservation objectives of the site.	Very high	
RE_04	Regulation of flight	Medium	B1
RE_05	Increased controls to defense against forest fires	Medium	

SCI IT6040014 “State Forest of Circeo”			
Kind of measures	Description	Priority	Measure of Plan of Park
IA_01	Implement actions of intensive control of complete eradication of deer and wild boar	Very high	F, G
IA_02	Implement interventions for the protection of Lepus corsicanus	Very high	
IA_03	Eradication of and / or keep under control the populations of flora and fauna.	Medium	
IA_04	Intervention removal of solid waste and / or hazardous waste	Low	
IA_05; RE_02	Regulation of enjoyment and active interventions to streamline access to the areas most sensitive to disturbance.	Medium	A, H
IA_06; PD_02	Design and implementation of a program of infrastructural , educational projects and local marketing	High	

MR_01	Implementing the Monitoring Program of the Management Plan	High	
PD_01	Design and implementation of a program to raise awareness of the resident population to the issues of nature conservation	Very high	
RE_01	Draft the forest management plan	High	B, C, D

SCI IT6040016 "Promontory of Circeo (Quarto Caldo)"			
Kind of measures	Description	Priority	Measure of Plan of Park
IA_01	Eradication and / or maintain populations under control of alien invasive flora	Very high	
IA_02; RE_01	Regulation of enjoyment and active interventions to streamline access to the areas most sensitive to disturbance	High	A
IA_03; RE_02; MR_02	Implement interventions for the protection and rehabilitation of coastal juniper landlocked built-up areas	High	B
IA_04; MR_03	Implement interventions for the protection and rehabilitation of relict formations of dwarf palm	Media	
IA_05; PD_02	Design and implementation of a program of infrastructural , educational projects and local marketing	Very high	
IA_06	Capture and transfer stray animals	High	
MR_04	Implementing the Monitoring Program of the Management Plan	Very high	
MR_05	Provide an emergency service for the rapid removal of invasive alien species	Very high	
PD_01	Design and implementation of a program to raise awareness of the resident population to the issues of nature conservation	Very high	
RE_03	Increased checks defense against forest fires	High	

SCI IT6040017 "Promontory of Circeo (Quarto Freddo)"			
Kind of measures	Description	Priority	Measure of Plan of Park
IA_01; PD_02	Design and implementation of a program of infrastructural , educational projects and local marketing	Very high	
IA_02	Eradication and / or maintain populations under control of alien invasive flora	Medium	
IA_04	Capture and transfer stray animals	Medium	
MR_01	Implementing the Monitoring Program of the Management Plan	High	
PD_01	Design and implementation of a program to raise awareness of the resident population to the issues of nature conservation	Very high	
RE_01; IN_01	Regolary silvicultural activities toward meeting the goals of conservation through incentives	High	
RE_02	Increased checks defense against forest fires	Elevata	

SCI IT6040018 “Dunes of Circeo”			
Kind of measures	Description	Priority	Measure of Plan of Park
IA_01; RE_01; MR_01;	Develop and implement a comprehensive strategy to combat the spread of alien invasive plant species that provide interventions to control / eradication , training , information, awareness and dissemination , drafting guidelines ornamental plantings , control, disposal , etc.	Very high	A
IA_02	Reduce the degradation of dune habitats through effective action to combat erosion aimed at the recovery of the original morphology and vegetation typical of the series	Very high	A
IA_03; RE_02	Regulate the use , currently uncontrolled , both during periods aflluenza maximum seasonal than in those with a lower presence (especially spring).	Very high	
IA_04	Protection of the only known station in peninsular of Malcolmia littorea	Very high	
IA_05	Retrain the dune vegetation through a program of production and planting of species psammophilous	High	
IA_06	Intervention removal of solid waste and / or hazardous waste	Medium	
IA_07; PD_03	Design and implementation of a program of infrastructural , educational projects and local marketing.	Very high	
IA_08	Capture and transfer stray animals	High	
MR_02	Implementing the Monitoring Program of the Management Plan	Very high	
MR_03	Provide an emergency service for the rapid removal of invasive alien species	Very high	
PD_02	Design and implementation of a program to raise awareness of the resident population to the issues of nature conservation	Very high	
RE_03	Elaborate and adopt guidelines for the sustainable management of the "cleansing" of the beach.	Very high	
RE_04	Develop a plan for the use of areas for feed purposes	Medium	
RE_05	Increased checks defense against forest fires	High	

SPA IT6040015 “National Park of Circeo”			
Kind of measures	Description	Priority	Measure of Plan of Park
IA_01; RE_01; MR_01; D203	Develop and implement a comprehensive strategy to combat the spread of alien invasive plant species that provide interventions to control / eradication , training , information, awareness and dissemination , drafting guidelines ornamental plantings , control, disposal , etc. .	Very high	A (**IT6040018)**
IA_02; RE_02	Regulation of enjoyment and active interventions to streamline access to the areas most sensitive to disturbance	Very high	A, H (**IT6040014**)
IA_03	Reduce the degradation of dune habitats through effective action to combat erosion aimed at the recovery of the original morphology and vegetation typical of the series	Very high	
IA_04	Implement actions of intensive control of complete eradication of deer and wild boar	Very high	F, G

			(**IT6040014**)
IA_05	Intervention removal of solid waste and / or hazardous waste	Medium	
IA_06	Implement interventions for the protection of *Lepus corsicanus* .	Very high	
IA_07	Protection of *Malcolmia littorea*	Very high	
IA_08	Interventions for the Protection of the relict populations of *Salicornia dolichostachya Puccinellia festucaeformis* , *Osmunda regalis, Hydrocotyle vulgaris*	Very high	
IA_09; RE_07; MR_02	Implement interventions for the protection and rehabilitation of coastal juniper landlocked built-up areas	High	
IA_10; MR_03	Implement interventions for the protection and rehabilitation of relict formations of dwarf palm	Medium	
IA_11	Retrain the dune vegetation through a program of production and planting of species psammophilous	High	
IA_12; RE_08	participatory management of the water system on the basis of memoranda of understanding defined within the Project LIFE REWETLAND	Very high	
IA_13; PD_03	Design and implementation of a program of infrastructural , educational projects and local marketing	High	
IA_14	Capture and transfer stray animals	Medium	B1 (**IT6040013**)
IA_15	Program interventions to contain the hooded crow	Media	
IN_02	Stimulating the conversion of existing agricultural production processes towards more compatible (development of organic farming)	High	
MR_04	Implementing the Monitoring Program of the Management	Very high	
MR_05	Provide an emergency service for the rapid removal of invasive alien species	Very high	
MR_06	Devise and implement a monitoring program aimed at assessing the impact of fishing on the ecosystem of the lake	Mediium	A1 (**IT6040013**)
PD_01	Design and implementation of a program to raise awareness of the resident population to the issues of nature conservation	Very high	
RE_03	Elaborate and adopt guidelines for the sustainable management of the "cleansing" of the beach	Very high	
RE_04	management of riparian vegetation of rivers and channels appropriate to the conservation objectives of the site	Very high	
RE_05	Develop a plan for the use of areas for feed purposes	High	
RE_06; IN_01	Draft the forest management plan	High	B, C, D (**IT6040014**)
RE_09	Regulation of flight	Medium	C1 (**IT6040012) B1 (IT6040013)**
RE_10	Intensified checks for hunting purposes	Low	
RE_11	Increased checks defense against forest fires	Medium	