



the



future



is in



our



nature



life imagine



**The Region of Umbria** is in charge of managing Natura 2000 and, as a result, is the beneficiary coordinator of the project.

**The Sibillini Mountains National Park**, the only other operator of Natura 2000 sites in Umbria, is one of the project partners.

**The Regional Forestry Agency** works alongside the Region and the partners with practical interventions to manage and restore habitats of community importance.

**Four universities** provide the best scientific knowledge to ensure the correct intervention to preserve the species and habitats of community importance: the Universities of **Perugia, Camerino, L'Aquila and Sassari**.

**Studio Hyla** is a partner with experience in the conservation of amphibians, reptiles and bats, environmental teaching and popularization.

**Comunità Ambiente** has years of specific professional, national and community experience in the field of nature conservation.



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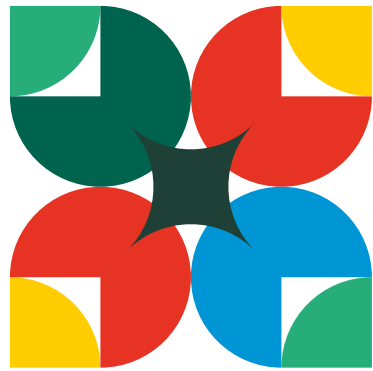
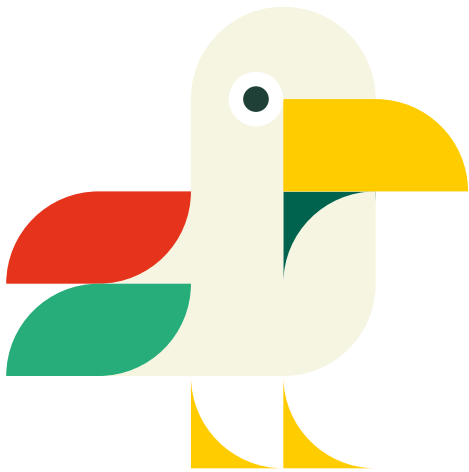
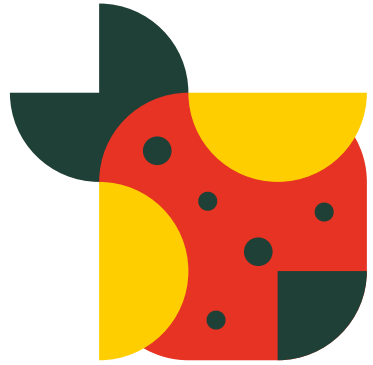
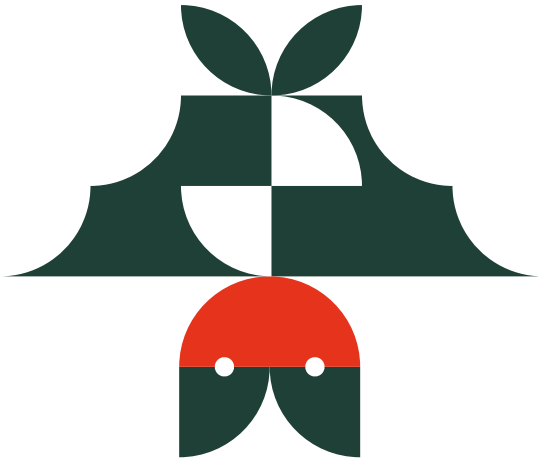


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In order to make a wide, structured project such as LIFE IMAGINE easier to understand, we decided to group the numerous actions into 5 main topics:

<b>1</b>	-----	
	<b>ANALYSIS OF THE SYNERGIES BETWEEN URBAN AND PERI-URBAN AREAS AND NATURA 2000</b>	<i>pg.6</i>
<b>2</b>	-----	
	<b>MONITORING OF TERRITORIAL TRANSFORMATIONS</b>	<i>pg.10</i>
<b>3</b>	-----	
	<b>MODELS OF GOVERNANCE</b>	<i>pg.14</i>
<b>4</b>	-----	
	<b>PATHS AND ITINERARIES FOR TOURISM AND GREEN JOBS</b>	<i>pg.18</i>
<b>5</b>	-----	
	<b>ACTIONS FOR HABITATS AND FAUNA</b>	<i>pg.22</i>



**Life Imagine** is a 7-year project, co-funded by the European Union, with the objective of implementing a strategy of integrated, unitary, coordinated partnership management for the Natura 2000 network - the most extensive network of protected areas in the world.

**Life Imagine** will enable numerous practical interventions to be carried out to increase connectivity between aquatic and land environments and the ecological corridors, which will be used by the various land and aquatic target species. Practical conservation interventions will also be conducted for many species: large carnivores, birds, amphibians, reptiles, bats, fish, invertebrates.

Work will involve all the sites of the Natura 2000 network and the Umbrian regional parks. However, many project activities will also have a positive effect outside the network. Umbria has 102 sites for the protection of 100 species of community importance, ranging from animals and plants to birds and 41 types of habitat.



# analysis of the synergies between urban and peri-urban areas and Natura 2000



the analysis and definition  
of the regional, urban  
and peri-urban areas  
to identify their possible  
role in conserving  
the habitats and species  
of community importance.




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project results



1





the Life Imagine  
project for synergy  
between the territory  
and Natura 2000

what

to analyze the various forms and extent of urban and peri-urban transformations to establish the possible relationships between these environments, conservation of the habitats and species of community importance and the functionality of the ecosystems in the areas of the Natura 2000 network (RN2000).

who with

local authorities and professionals in the sector.

for you

if you are a professional in charge of carrying out plan, program and project assessment processes in areas within or near the sites of the RN2000, follow us!



The relationships between urban and peri-urban areas and the Natura 2000 sites can have diverse forms with both positive and negative effects on the habitats and species of community importance.

The implementation of effective conservation strategies and, at the same time, the need to optimize the production of ecosystem services for our citizens requires a detailed knowledge of these interactions.

This is the only way to provide those in charge with the information required to cooperate proactively at the various levels of ordinary planning and legislation on the Natura 2000 network.

To do this, the IMAGINE project proposes to identify a methodological approach and a system of strategic options. These options will be experimented in some specifically selected areas and will become a reference for offices in charge of conducting plan, program and project assessment processes, and for the experts who will have to develop them in areas within or near the sites of the RN2000.

**The activities for this topic will be developed as follows:**

- 1** to recognize the urban and peri-urban areas in continuity with the RN2000;
- 2** to standardize the relationships of the Umbrian urban systems with the RN2000 sites: the settlement morphology, its main use, its historic evolution, its relationship with the infrastructural system, the open spaces and environmental networks;
- 3** to define the existing and potential relationships between urban and peri-urban areas and the RN2000 sites, the pressures settlements put on species and habitats, the identification of the relationships and positive synergies between the two systems;
- 4** to prepare guidelines for the offices in charge of conducting plan, program and project assessment processes, and for the experts who will have to develop them in areas within or near the RN2000 sites in order to achieve the objectives of the network in territorial plans and programs on different scales;
- 5** to experiment rehabilitation and recovery projects: on the basis of the information collected, two particularly significant contexts will be identified in the relationship between urban and peri-urban areas and the RN2000 sites in which to start up recovery and upgrading projects.

# monitoring of territorial transformations



monitoring of territorial  
transformations in Umbria and  
assessment of the effects on  
the Natura 2000 network.



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project results

# 2



# the Life Imagine project for territorial planning



## what

analysis of territorial and sectorial planning tools on a local and wider scale, which may interfere (negatively or positively) with the Natura 2000 network.

## who with

Local authorities and professionals in the sector.

## for you

if you are a professional in charge of carrying out plan, program and project assessment processes in areas within or near the Natura 2000 network sites, follow us!



The IMAGINE project aims to identify a unique tool that integrates each individual plan and enables the potential for environmental transformation to be monitored and the particularly critical areas compared to environmental continuity to be identified. The main objectives are:

1

to create a set of indicators to control and monitor territorial transformations by continually updating existing data and using a strategic, multi-scale approach;

2

to integrate these techniques in the local and wider planning procedures via legislative standards (Harmonization of legislation) and voluntary agreements (Gate Agreement).

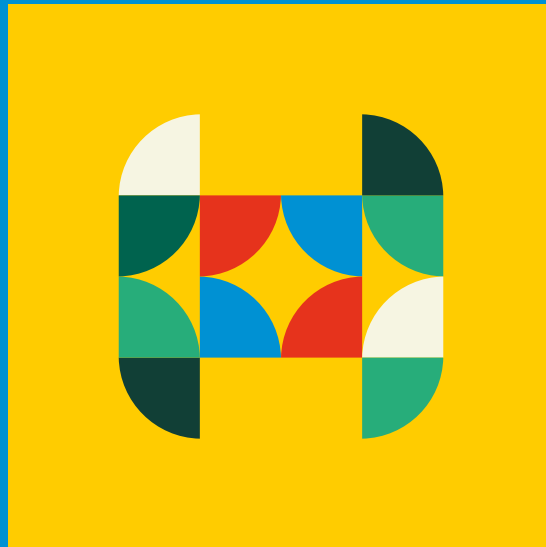
This intervention approach will be conducted according to the following methodology:

- recognize not only of local and wider town planning plans and programs, but also of sector plans, programs and regulations adopted or pre-adopted in the five years between 2016-2021;
- create a database to collect the main information and legislative aspects of each of the plans analyzed. This tool may be used by the Region in various areas and will play a key role for its future informative potential;
- thanks to the database, it will be possible to recognize the urban-territorial transformations, which have had a major impact on the environment and the landscape involving RN2000 sites across the region, especially during the five years from 2016-2021, and those which are located in areas near the sites (within a 5 km limit).

This approach will help us gain an updated, analytical picture of Umbrian planning tools for the sites of the Natura 2000 network, which will facilitate the harmonization of the environmental assessment procedures (especially the Strategic Environmental Assessment SEA).

Lastly, it will provide knowledge of the areas which have undergone major changes following the 2016 earthquake, and will support the development of experimental models of governance.

# models of governance



to improve the performance  
of government agencies  
and the experience of public, private  
and economic management  
to achieve greater efficiency  
and sustainability  
of the Natura 2000 network.



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project results





3



# the Life Imagine project for sustainable management of the Natura 2000 network



## what

Definition of 5 innovative models of governance to manage the Natura 2000 network in Umbria that will aim to fulfill the specific requirements found in Umbria and include the management of the RN2000 within a wider policy for sustainable development.

## who with

local public and private authorities

## for you

if you are a stakeholder that manages the N2000 network, follow us!

Models of governance are support tools for sustainable management and planning that will guarantee the overall consistency of the Natura 2000 network, [even with neighboring territories](#). These models will be structured to improve not only the current performance of the governing bodies, but also the experience of public, private and economic management in order to achieve an efficient, sustainable Natura 2000 network:

**1** the “*Payment for Ecosystems Services*” (PES) model aims to accelerate the practical application of Payments for Ecosystem Services in Umbria. It also aims to guarantee the European objective to give ecosystem services an economic value and ensure they materialize will be achieved. PES are tools that aim to reward the **operators of natural resources** for their work to service and improve the provision of ecosystem services.

**2** the “*Territorial sustainability*” model enables sustainability to be assessed and monitored by using an integrated, multi-criteria method in a GIS environment. The three aspects of sustainability (economic, social and environmental) are analyzed separately and a ratio is calculated for each aspect and aggregated in an overall ratio of sustainability. This method is a useful planning tool for the **Region and the local Authorities**.

**3** The “*Landscape for Biodiversity Agreement*” model wishes to start a participatory process aimed at an agreement between the **parties involved in landscape management** in order to implement a program of interventions, which aim to guarantee the conservation and enhancement of our environmental and landscape heritage as part of the regeneration and enhancement strategies for the settlements and socio-economic structures of the areas involved.

**4** the “*Gap Agreement*” model wishes to guarantee the potential ecological functionality and maintain the connections between its constituent elements, by applying precautionary criteria in all those cases in which there is a lack of scientific knowledge on the subject. The use of this model (**by the Region and local Authorities**) provides a protocol to integrate it with regional legislation and produces specific guidelines.

**5** The “*Communities in the earthquake crater*” model aims to start a participatory process between **the local communities and stakeholders in the areas hit by the earthquake in Umbria** for the socio-economic recovery of the territory by means of a process of comparison and sharing on topics regarding reconstruction processes and the need to introduce solutions that show increasing care and attention to [biodiversity and the sustainable use of resources](#).

# Paths and Itineraries for Tourism and Green Jobs



Promote ecotourism in support of nature in the Region of Umbria and increase “green” jobs.



read the updated project results



4



# The Life Imagine Project for Tourism and Green Jobs

## what

training on green jobs and identifying tourist itineraries (food & wine, connected with recreational and cultural activities) to promote awareness of Natura 2000 sites.

## who with

stakeholders connected with the tourism industry and interested in green jobs.

## for you

if you are interested in ecotourism that supports nature, if you are interested in training modules on green jobs, follow us!



Ecotourism in support of nature can be defined as the segment of the tourist market in which people travel with the main purpose of visiting areas where the main attraction is nature (the sites of attraction par excellence are the Natura 2000 network sites).

The identifying of itineraries for this tourist segment that include food and wine, recreational and cultural elements can be a driving force for the socioeconomic development of the area and requires specific professional skills.

### Actions in this topic include:

- identification of 5 **training modules to fill the gaps in skills and professionalism** that are necessary for increasing the attractiveness of ecotourism in support of nature at the regional level;
- identification of **tourist itineraries to promote knowledge of Natura 2000 network sites connected with food and wine**, recreational activities, and the cultural heritage that an area offers, as well as the network of relationships among the different actors working in the area.

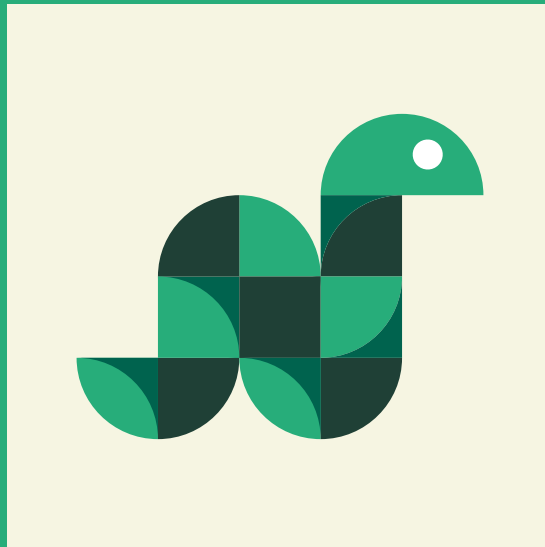
### The types of itineraries that could be developed are:

- **Natura 2000 and Food & Wine:** itineraries for lovers of nature and local foods and wines, and especially those that use products obtained with eco-sustainable;
- **Natura 2000 and Recreation:** itineraries for lovers of nature and outdoor recreational activities;
- **Natura 2000 and Culture:** itineraries for lovers of nature and of the cultural, spiritual, architectural and archaeological heritage.

A specific map and a pocket guide will be created for each itinerary, the safety and maintenance of the paths will be guaranteed and signage will be created.

Tourism is a fundamental instrument for encouraging the sustainable development of the Region and raising awareness on the importance and value of the Natura 2000 network.

# Actions for Habitats and Fauna



improvement of the state  
of knowledge and conservation  
of regional animal and plant  
species and habitats  
and especially those  
of European conservation  
interest.




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project results





15

Southern Damselfly  
(*Coenagrion mercuriale*)



# The Life Imagine Project for Biodiversity

Common Thatching Grass  
(*Himantoglossum adriaticum*)

## what

planning  
of interventions  
for the maintenance  
and restoration  
of protected habitats  
and plant species  
and for the  
conservation of fauna.

## who with

public bodies,  
associations,  
hunters and  
freelance experts  
in fauna and flora.

## for you

if you want to help  
collect data on the  
fauna and flora of your  
area, whether you are  
a professional or an  
ordinary citizen, follow  
our social pages, where  
you will find instructions  
for working with us!

# Actions for the conservation and restoration of the typical habitats of aquatic ecosystems

Planning and implementation of actions for the conservation and restoration of rare habitats connected with wetlands, found in very few areas in the region.

Starting with the defining of the conservation status of the habitats through the verification of structural and functional parameters, as well as the identification of any pressures and threats, the conservation or restoration needs of the habitats are defined for which appropriate plans or projects are prepared.

## Habitat 7210\*

Calcareous fens with *Cladium mariscus* and species of *Paludi calcaree*

found in the region exclusively along the shores of Lake Piediluco (TR) (SAC IT5220018 and SPA IT5220026). The activities provide for the mapping of all the stations where the habitat is present, with defining of the conservation status and any pressure factors. Subsequently, actions are taken in the areas deemed suitable to expand the habitat over an area of at least 1000 m<sup>2</sup>. The actions are carried out by the propagation via seeding and planting of individuals of the *Cladium mariscus* species, which are planted within the artificial islands (AFI) designed for LIFE;

## Habitat 7220\*

Petrifying springs with tufa formation (*Cratoneurion*)

despite being extremely localized, as it is reported in only 3 sites (SAC IT5210049, SAC IT5220017 and SPA IT5220025), the habitat is in a good conservation status.

The project provides for the mapping of all stations where the habitat is present, also outside the Natura 2000 network, with the defining of the conservation status and any pressure factors;

## Habitat 7230

Alkaline fens

of great environmental value in Umbria, it is found only in the Colfiorito area and in the Sibillini Mountains National Park (SAC/SPA IT5210072 and IT5210071). It is a habitat of great environmental value, subject to natural dynamism in the absence of certain water conditions or lacking active management. In many cases, traditional uses such as the cutting of woody species have played a fundamental role in countering habitat transformation phenomena, which in recent years, due to reduced amounts of rainfall, have led to the shrinking of the habitat. Once the current size and conservation status of the habitat have been precisely defined, actions are planned to contain the species typical of the stages of replacement and propagation by the seeding and planting of individuals typical of the habitat's floristic cortège. At the same time, a re-functionalization and rearrangement of the channels that carry the water towards the fen is planned, so as to maintain high levels of soil humidity in the habitat distribution area;



### Habitat 7140

#### Transition mires and quaking bogs

was recently found in Umbria in the Sibillini Mountains National Park within the Natura 2000 site SAC/SPA IT5210071. The habitat is of considerable biogeographic importance in the Apennines, as it represents the southernmost limit of these types of plants, typical of continental and alpine biogeographic regions.

The project provides for investigations to determine the conservation status and in particular the structure and function parameters, together with the identification of any pressures and threats.

In relation to the results of the informational surveys, the management guidelines for maintaining the habitat in a satisfactory conservation status are defined;

**Habitat 3130** - Standing waters, from oligotrophic to mesotrophic, with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*

### Habitat 3170\* - Mediterranean temporary ponds

have a high conservation value and have a very limited distribution, found in temporary ponds that fill up following winter and spring rains. The Project provides for the drawing up of an Action Plan starting from an update on the actual distribution and floristic-vegetational composition of the two habitats, with special attention given to the SAC IT5210020 (**Ferretto - Bagnolo Woods**) and IT5210013 (**Woods of the Gubbio Basin**), which are home to the most significant examples in the region. Starting from the creating of detailed 1:1000 scale maps, the Action Plans take into account the need to combat the main pressures encountered, such as the excessive expansion of shrub species, the accumulation of leaves on the bottom of the pools, and the invasion of the invasive alien moss *Campylopus introflexus*, recently found in Umbria.

# Actions for meadows and pastures

are aimed at improving the conservation status of the target habitats of the annex.

**H6110\*** - Rupicolous calcareous or basophilic grasslands of the *Alyso-Sedion albi*.

**H6210 (\*)** - Semi-natural dry grasslands and scrubland facies on calcareous substrates

**H6220\*** - Pseudo-steppe with grasses and annuals (Thero-Brachypodietea).

**H6230\*** - Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas

**H6510** - Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

and of the biological habitats of the target plant species of Annexes II-IV linked to grazing systems in Umbria [*Serratula lycopifolia\**, *Jonopsidium savianum*, *Iris marsica*, *Himantoglossum adriaticum*].

It has been demonstrated that semi-natural grasslands and pastures are the environments richest in plant species in Europe, essential habitats for various animal species, including numerous mammals, birds and precious pollinators.

Their conservation is one of the main objectives of the European Union, also in the light of the results of the fourth monitoring cycle for habitats of Annex I to Directive 92/43/EEC and of the framework provided by the European Red List of Habitats, which shows how grasslands are among the habitats most subject to degradation and reduction in Europe.

This action starts with the creation of an updated multidisciplinary overview of the target habitats and plant species, in order to develop dedicated grazing/mowing plans, action plans and management techniques,

with the aim of improving their conservation status, launching a process for enhancing biodiversity integrated with the economic process and with the typical social problems of the Apennine territory. **The project includes:**

- **Identification of “Graze Sites”** in Umbria where Grazing Plans can be put into practice that are developed on the basis of the specific biodiversity of each site, in terms of species, phytocoenosis and habitat;
- **quantification of the degree of shrub invasion**, in order to plan suitable shrubs operations and/or mowing of the edge grass species;
- **development of georeferenced spatial models for analyzing the productivity of meadows and pastures over time and space**, so as to obtain a projection of future trends of herbaceous vegetation;
- **analysis of animal production systems in Umbrian territories**, in order to identify suitable grazing and mowing management techniques, specific to each habitat;
- **estimation of the appropriate load of grazing animals** and its optimal localization in the target areas.

Great importance is given to the real protagonists of the active management of these grassy habitats: the farmers of the Umbrian Apennines. It is they who, through traditional extensive grazing and mowing activities, contribute to maintaining biodiversity and the wealth of species of these unique, precious environments, where one can enjoy the incredibly beautiful blossoming of flowers in the spring. The Project provides for a series of concrete actions that will enhance the nutritional qualities and flavors of mountain products, hoping to show people and consumers how the choice of supporting small, local, low-impact farms can also have a beneficial effect on nature conservation.

## Actions for priority plant species

are aimed at developing a protocol for the *ex situ* conservation of the 5 target plant species, as well as of some indicator species, defined as “H-key” species, which play a key role in the conservation of certain habitats.

The project aims to develop specific Action Plans for the 5 target species of Annex II-IV found in Umbria, i.e. *Adonis distorta*, *Himantoglossum adriaticum*, *Iris marsica*, *Jonopsidium savianum*, \**Serratula lycopifolia* (current name: *Klasea lycopifolia*).

The scheduled activities include

- field analysis of the distribution of the 5 target species, mapping and census, analysis of the demographic/reproductive aspects of Umbrian populations, identifying of pressures and threats;
- developing action plans for the 5 target species in Umbria, including the defining of intervention types and procedures for the species’ biological habitats, to improve growing conditions;
- development of a protocol for the collection, reproduction and preservation of the germplasm of the 5 target species of Annex II-IV and of the selected H-key species.

The preparing of the Action Plans for each species specifically provides for:

**a** for *Serratula* with sawgrass leaves (*Klasea lycopifolia*\*): planning of in situ conservation actions by strengthening the only 2 populations existing in Umbria (using seeds and seedlings of local origin);

**b** for Marsican iris (*Iris marsica*): planning of in situ conservation actions by strengthening two target populations in Umbria (using rhizomes and seeds, where available); the suitability of intervening by expanding the populations by

introducing them into similar habitats around the areas where they are currently present will also be taken into consideration;

**c** for *bivonea di Savi* (*Jonopsidium savianum*): planning of in situ conservation actions by strengthening three existing target populations in Umbria, selected by favoring those with a worse conservation status (using of seeds); the suitability of intervening by removing the perennial herbaceous and shrubby/woody component in the case of the abandoning of traditional uses and the onset of dynamic vegetation processes will also be taken into consideration;

**d** for Adriatic lizard orchid (*Himantoglossum adriaticum*): planning of in situ conservation actions by strengthening three existing target populations, selected by favoring those with a worse conservation status (using seeds and seedlings); the suitability of intervening by removing the shrubby/woody component in the case of the onset of dynamic vegetation processes will also be taken into consideration;

**e** for distorted pheasant’s eye (*Adonis distorta*): planning of *in situ* conservation actions by strengthening the only existing population in Umbria (SPA/SAC IT5210071) (using seeds and seedlings); the action plan for this species must include long-term monitoring of climatic conditions in order to investigate the consequences of climate change on the fertility and vitality of the Umbrian population. Given the isolation, meagerness and marginality of the population, the Action Plan will also take into consideration the suitability of intervening by expanding the existing population by introducing it into similar habitats around the areas where it is currently present

# Actions for Birds

improvement of the conservation status and of knowledge of the avifauna in the Region of Umbria and in particular of species of European conservation interest (Annex I of the Wild Birds Directive - 2009/147/EC) present in protected areas such as SPAs, SACs and Regional Parks.

The activities include:

**1** identification of regional areas at high risk of electrocution due to the presence of power lines and creating 10 km safety zones in particularly important areas;

**2** calculation of the Farmland Bird Index (33 species), the Grassland Bird Index (6 species) and the Woodland Bird Index (22 species) on a regional scale, which are used to monitor the impact of the actions on bird communities;

**3** identification of person/organizations interested in the management of agricultural areas and mountain meadows in order to promote practices that foster the permanence or increase the wealth of species in bird communities;

**4** detailed study on the use of pesticides in the Region of Umbria, aimed at evaluating their potential effects on bird communities and promoting the adopting of good practices to improve their conservation status through the distribution of brochures and the organizing of informational meetings;

**5** mapping of areas with a greater illegal use of poisoned bait in order to reduce the impact on sensitive species such as the golden eagle and many birds that feed on carrion;

**6** identification of areas of great importance in the Region of Umbria for the Montagu's harrier and the promoting of good practices to preserve the species's nesting sites.



European Robin  
(*Erithacus rubecula*)

# Actions for the Italian Wolf and Marsican Brown Bear

improvement of wolf and bear monitoring activities, in order to acquire the knowledge necessary for promoting conservation measures for the two species.

The activities include:

- 1 definition of monitoring models calibrated for the territory of the Region of Umbria.
  - for the wolf, **techniques are used to obtain data on the distribution and size of the packs in the region with non-invasive techniques such as camera trapping, genetic analyses on organic samples found in the area and wolf howling.** The regional territory was divided into 7 macro-areas in which the packs are gradually monitored to arrive at a complete mapping over 5 years. All of this is in order to provide a permanent and sustainable wolf monitoring model for the Region of Umbria;
  - as regards the bear, their great mobility, lower density in peripheral and marginal areas, and the size of the area make it impossible to use intensive monitoring strategies over the entire potential area. In general, opportunistic sampling is carried out at the regional level, that is, not done according to a real monitoring sampling strategy, but rather concentrated on **the search for signs of bear presence in the areas and in the periods in which the need arises.** In areas frequented sporadically, genetic confirmation is one of the most important pieces of information, since it allows us to understand whether they are young individuals

in dispersal or individuals who frequent the area with a certain regularity. In this sense, the finding of organic samples can be done with inspections in search of excrement/hair, the setting up of hair traps using scented lure and barbed wire on scratching posts or at feeding sites;

- 2 creation of a network of collaborators to ensure effective monitoring throughout the region, consisting of technicians and professionals working in this field, regional employees, associations active in the area and stakeholders (e.g. hunters and breeders);
- 3 creation of a risk map for attacks on livestock for the prevention and management of conflicts and, therefore, for the better conservation of the species;
- 4 identification of the dispersion corridors used by the brown bear to colonize new territories. This action is the first step towards the identification of areas suitable for the future recolonization of the territory by this large carnivore, in which to best direct the actions for preparing the social setting and the areas of new presence;
- 6 creation of a database containing all reports regarding wolves with bold behavior or who frequent urbanized areas or their outskirts. In the medium term, this action will make it possible to better manage situations of potential conflict, ensuring targeted and timely interventions.





Italian Wolf  
(*Canis lupus italicus*)

# Actions for Invertebrates

definition of good practices and carrying out of concrete interventions in order to improve the conservation status of the invertebrate species of Annexes II and IV of the Habitats Directive and their biological habitats.

The activities include:

1

Defining of actions for the maintenance and restoration of the structure and specific composition of wetlands, in particular the lake environment (reedbed and Habitats 3270, 3290, 6420, 6430) and the agricultural landscape (Habitat 6420), aimed at increasing the suitability of habitats for the following dragonfly species:

## Per bladetail (*Lindenia tetraphylla*)

- demographic analysis and distribution map;
- commercial survey on machines for cutting vegetation;
- creating of prototypes of artificial islands with the planting of *Phragmites australis* and other plant species typical of Phragmites and experimentation along the shores of the Lake Trasimeno Natura 2000 Site (code IT5210018, IT5210070) for restoring the species's biological habitat.

## For southern damselfly (*Coenagrion mercuriale*)

- demographic and genetic analysis and distribution map;
- identification and delimiting of intervention areas;
- commercial survey on machines for cutting vegetation;
- establishing of guidelines for the conservation of the species and its biological habitat.

2

Defining and carrying out of actions for the maintenance and restoration of the structure and specific composition of hill and mountain forest habitats (Habitats: 91AA\*, 9210\*, 9340, riparian woods), identification and protection of senescent trees and improvement of biological habitats for the following species of saproxylic beetles:

- European stag beetle (*Lucanus cervus* – Pietralunga woods), great capricorn beetle (*Cerambyx cerdo* - Meana – Alleron forest) and Rosalia longicorn (Mt. Cucco and Sibillini mountains): creation of approximately 100 small artificial areas of oak and beech senescence..
- hermit beetle (*Osmoderma eremita* – Mt. Coscerno-Civitella-Aspra): making and installation of about 30 wood mould boxes full of woody detritus used as a substitute microhabitat for the larvae.

Overall, the projects concern the reconversion of the woods towards “mature” forms for the restoring of trees of different ages (young and mature trees and trunks decomposing on the ground) as well as the restoration of the native forest habitat through the partial removal of allochthonous pine forests (9 ha).

Hermit Beetle  
(*Osmoderma  
eremita*)



3

Definition and carrying out of actions for restoring the structure and specific composition of the habitats of the ecotonal environments between woods and grasslands, aimed at expanding the biological habitat of the moth *Eriogaster catax*. The shrub belt is the preferred environment of the species, whose larvae feed mainly on blackthorn (*Prunus spinosa*). The intervention area is Mt. Subasio, where the actions will be carried out by planting blackthorn hedges (extending a total of approx. 1000 m) in areas near roadsides, with the intention of stabilizing the soil thanks to the deep stoloniferous root system and creating a dense, animal-proof hedge.

4

Definition and carrying out of actions for restoring the structure and specific composition of grassland habitats (Habitats: H6110\*, H6210(\*), H6220\*, H6230\* and H6510), aimed at increasing their suitability for the Euphydryas butterflies of Provence (*Euphydryas provincialis* – Mt. Cucco, Mt. Subasio and Mt. Maggio and Nero) and the Italian marbled white butterfly (*Melanargia arge* - Monte Cucco, Vetorno stream and valley of the Nese stream– Mt. Acuto and Corona). The protection of the biological habitat (meadow/pasture) will be done by removing shrub species, tree plants and synanthropic and alien vegetation.

# Actions for aquatic animal species

in order to coordinate conservation actions for the most endangered fish species and decapod crustacean species among those found in Umbria and listed in Annexes II and IV (Habitat Directive): brook lamprey (*Lampetra planeri*), Lombardy lamprey (*Lampetra zanandreai*), chub (*Squalius lucumonis*), Mediterranean trout (*Salmo cetti*), horse barbel (*Barbus tyberinus*), Italian barbel (*Barbus plebejus*), loach (*Cobitis billineata*), vairone (*Telestes muticellus*), rovello (*Sarmarutilus rubilio*), Arno goby (*Padogobius nigricans*), European bullhead (*Cottus gobio*), European crayfish (*Austropotamobius pallipes*), the project provides for the defining of a regional Action Plan for each species containing the following elements:

- overview, biology and ecology of the species and their conservation status;
- distribution and abundance of populations;
- regional, national, European and international regulatory framework;
- population monitoring techniques and methods;
- identification of threats and limiting factors as concerns in particular the presence and spreading of Invasive Alien Species (IAS);
- identification of general and specific goals;
- identification of action priorities;
- identification of sites in which to carry out conservation actions;
- information and awareness strategies for the community and public administrations.

The Plan also provides for the following activities:

- *screening* of the genetic and demographic characteristics of the populations of *Salmo trutta* complex in the Umbria Natura 2000 network, using the same methods tested during LIFE12 NAT/IT/000940 (Life TROUT), so as to integrate it with the information collected in LIFE18 NAT/IT/ 000931 (Life Streams);
- *screening* of the demographic characteristics of the populations of *Padogobius nigricans* and *Padogobius bonelli* in the Umbrian Natura 2000 network in order to identify the areas where the two species coexist and the sites where the invasive species has replaced the native one;
- identification of river stretches in which to carry out concrete actions in support of *Salmo cetti* and *Padogobius nigricans*; provide fundamental instructions for the management of IAS and for identifying sites in which to carry out actions to restore river connectivity in order to restore otherwise isolated native fish populations and contain the spread of invasive species;
- producing of executive plans for the structural adaptation of the Regional Fish Breeding Centers in Borgo Cerreto and Sant’Arcangelo, to allow them to breed specimens of *Salmo cetti* and *Padogobius nigricans* for reintroduction and *supportive breeding* actions;
- implementation of the plan for the eradication of the signal crayfish *Pacifastacus leniusculus*, an IAS introduced in the Clitunno river.

Greater Horseshoe Bat  
(*Rhinolophus  
ferrumequinum*)



## Actions for Bats

in consideration of the wide distribution of bats and the ecological setting in which they are found, a Regional Action Plan for Bats is defined in order to synergistically coordinate conservation interventions, and it contains the following elements:

- general information on bats (evolution, biogeography, general description, etc.);
- international, national and regional regulatory framework;
- bats in Umbria (monographs, the conservation status and the main factors of pressure and threats to the Umbrian populations);
- the Action Plan (general purpose of the plan, general goals, specific objectives and individual actions);
- guidelines and best practices for the management of bat habitats (woods and forests, agroecosystems, riparian strips, wetlands, underground caves, urban environments and buildings).

The plan also provides for the carrying out of experimental actions for the conservation of bats:

- free use of currently disused cabins/booths to be adapted so that they can be used by bats as *roosts*;
- planning measures for limiting access to at least 15 natural or artificial caves. The systems for closing off the entrances to the caves serve to limit man's disturbance of these colonies;
- planning and implementation of a course for speleologists aimed at establishing and forming of a team of expert speleologists that can provide information on the presence and size of bat populations in Umbrian caves of speleological interest;
- creation of a portal for entering data collected by speleologists;
- design and construction of 10 *roosts* for bats, wooden structures for sheltering bats to be installed in publicly owned areas identified by the Action Plan.

Apennine Yellow-Bellied Toad  
(*Bombina pachypus*)



# Azioni per Anfibi e Rettili

on the basis of current knowledge on the presence, distribution and ecology of species of conservation interest found in Umbria, active conservation actions are identified and a priority action plan is defined for some species of amphibians and reptiles: Apennine yellow-bellied toad (*Bombina variegata pachypus*), Italian crested newt (*Triturus carnifex*), European pond turtle (*Emys orbicularis*) and meadow viper (*Vipera ursinii*).

More specifically, the project provides for:

- the carrying out of improvement actions in at least 10 sites for *T. carnifex*;
- the creation of a breeding center for *B. v. pachypus* and *E. orbicularis*, at the Sant’Arcangelo fish breeding center managed by AFOR and the Region of Umbria with the construction of outdoor tanks for the housing and reproduction of the species and the growth of the young; and the creation of an indoor space at the center for indoor breeding.

for *B. v. pachypus*, it also provides for

- repopulation in at least 10 sites;
- the new construction or improvement of at least 15 watering troughs to increase their suitability as breeding sites;

for *E. orbicularis*:

- repopulation and/or reintroduction in at least 5 sites;
- the new construction or improvement of at least 5 ponds;

for *V. ursinii* awareness-raising actions are planned within the Sibillini Mountains National Park through the creation of information panels and brochures for making park visitors aware of the presence of this important species.

The producing of a technical manual and a training course for technicians working with the design and improvement of wet biotopes, including for zootechnical purposes, is also envisaged.

# Actions for Invasive Alien Species (IAS)

in-depth studies relating to the presence and abundance of IAS (Invasive Alien Species) found in the Region of Umbria.

The project involves the carrying out of a strategy aimed at their prevention and control through the following activities:

- the creation of a list of species that can spread in the regional territory and are most dangerous for native biodiversity (priority IAS), based on the information available in the literature and with the involvement of leading experts;
- forecast analysis of the species most likely to appear in Umbria in the near future, taking into account the current distribution of alien species in the surrounding regions;
- defining of actions for improving the 92°0 and 91E0\* habitats through the containment of *Robinia pseudacacia* and reestablishing connections between habitat patches.

A regional strategy is defined for each IAS identified as priority and is aimed at:

- formulating the operations most effective in detecting their arrival in advance (early warning systems), developing tools for the involvement of non-expert citizens;
- preventing its further spread, also by assessing the invasibility of the habitats;
- limiting or removing their presence through eradication (when possible);
- controlling or mitigating the harmful effects on native species and habitats listed in the Habitats Directive.







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