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**Common strategies and best practices to IMprove the
transnational PProtection of ECOsystem integrity and
services**

DELIVERABLE T1.2.2

SIMPLIFIED JOINT MONITORING PROTOCOLS

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1 INTRODUCTION

The Activity T1.2 of the Project analyzes the quality of ES, using some target species or habitats (identified on the basis of the lists implemented in Activity T1.1), identified as quality level indicators. To do this, a transnational monitoring campaign on such species or habitats is launching, to improve the assessment on ES and ESS.

A Joint Monitoring Protocol for species, habitats, ES functions and ESS was developed by PP2, giving international standards to implement methods and tools in order to obtain a common transnational tool. In the Deliverable T1.2.1. is reported the Joint Monitoring Protocol for species and habitats, referred to the target species and target habitats of each PP.

In addition to this protocol (which is intended for expert technicians) is foreseen a second level of implementation, represented by a Simplified Joint Monitoring Protocol, which involves volunteers (often without professional skills) to enlarge the quantity of data while reducing costs. The Simplified Joint Monitoring Protocol contains methods to obtain useful and reliable information on target species/habitats (or some of them). PPs identified also the target groups of volunteers: in some case they are the visitors of the pilot areas while, in other cases, they are students or persons with scientific skills or people carrying out their professional activities within the Protected Areas (i.e. fishermen).

The sharing of the Simplified Joint Monitoring Protocol and the technical training of the volunteers for its application is implemented by means of different National trainings (Deliverable T1.2.4): each PP identified the best methodology and tools for its implementation. In some cases, the training addresses directly the volunteers who work in the field to obtain the data on the target species or habitats, in other cases the National training is directed to the guides or other persons who give materials (such as forms) to the pilot areas visitors.

In the present Deliverable are reported the information on the protocols identified by the different PPs, regarding different species and habitats present in their pilot areas. The target groups are also reported, and the materials to be used within the National trainings are included in different attachments, developed as single deliverables (one for each PP).



2 SIMPLIFIED MONITORING PROTOCOLS

2.1 ISONZO RIVERMOUTH NATURE RESERVE (LP)

OBJECTIVE OF THE SIMPLIFIED MONITORING PROTOCOL: The main goal of the simplified monitoring protocol of the Isonzo Rivermouth Nature Reserve is twofold:

1. on one hand, it aims to involve some categories of stakeholders in the monitoring activities that take place within the Reserve making them active subjects in the management of the same according to the community based management system prompted by the project
2. on the other hand, it aims to acquire new distribution information relating to some habitats and some species exploiting the significant number of people who for various reasons annually attends the protected area.

MONITORED SPECIES: Thanks to IMPREGO project, with this simplified monitoring protocol two animal species, *Pinna nobilis* and *Aphanius fasciatus*, and one habitat, the Mediterranean prairies at *Cymodocea* and *Zoostera*, are monitored.

METHODOLOGY ADOPTED: Given the spread of smartphones that easily allows the shooting of georeferenced images, LP chose to involve stakeholders inviting them to take geotagged images of species and target habitats and, then, sharing such images with the Reserve's technical personnel through e-mail or freeware cross-platform messaging applications such Whatsapp. The advantages of this method are the following:

1. It is not very demanding for the detectors;
2. The image allows the technical personnel of the protected area to evaluate the quality of the data and the attribution to the species;
3. A large number of georeferenced presence data can potentially be obtained.

SIMPLIFIED MONITORING PROTOCOL FOR *PINNA NOBILIS*



Figure 1: *Pinna nobilis*.

The aim of this protocol is to get reliable and useful data about this species in addition to those obtained by the technicians of the Reserve using standard monitoring protocol. The specific protocol for *P. nobilis* is aimed at providing, in particular:

- information on the presence of *Pinna nobilis* in the Reserve;
- presence of beached shells of dead specimens.

The simplified monitoring of *P. nobilis* can be conducted by the people visiting the marine area of the Reserve by taking geotagged pictures of the specimens. The geotagged pictures are sent by the visitors to the Protected area mobile or email's contacts.

SIMPLIFIED MONITORING PROTOCOL FOR MEDITERRANEO-PONTIC *CYMODOCEA* AND *ZOSTERA BED HABITAT*



Figure 2: Mediterraneo-Pontic *Cymodocea* and *Zostera* bed habitat in Isonzo Rivermouth Nature Reserve.

The aim of this protocol is to get reliable and useful data about this kind of habitat, in addition to those obtained by the technicians of the Reserve using standard monitoring protocols. The specific protocol for **Mediterraneo-Pontic *Cymodocea* and *Zostera bed habitat*** is aimed at providing, in particular:

- information on the seagrass coverage;

The simplified monitoring of **Mediterraneo-Pontic *Cymodocea* and *Zostera bed habitat*** can be conducted by the people visiting the marine area of the Reserve by boats in order to take geotagged pictures of the anchorage point. The geotagged pictures are sent by visitors to the Protected area mobile or email's contacts.



SIMPLIFIED MONITORING PROTOCOL FOR *APHANIUS FASCIATUS*



Figure 3: *Aphanius fasciatus* male.

The aim of this protocol is to get reliable and useful data about this species, in addition to those obtained by the technicians of the Reserve using standard monitoring protocols. The specific protocol for *Aphanius fasciatus* is aimed at providing, in particular:

- information on the presence of *Aphanius fasciatus* in the Reserve;

The simplified monitoring of *Aphanius fasciatus* can be conducted by professional fishermen angling in the marine area of the Reserve by taking geotagged pictures of the specimens caught in the nets. The geotagged pictures are sent by fishermen to the Protected area mobile or email's contacts.

TARGET GROUPS INVOLVED:

- Visitors of the marine area of the Reserve
- People visiting the marine area of the Reserve by boats in order to take geotagged pictures of the anchorage point



- Professional fishermen angling in the marine area of the Reserve

TRAINING OF THE TARGET GROUPS: The main stakeholders are involved in these activities through a training meeting organized for this purpose and through simple tutorials (PDF and Video), available on the Nature Reserve website and social channels, explaining how to get involved and apply the simplified monitoring protocol (see ANNEX 1 - SIMPLIFIED MONITORING PROTOCOL OF THE ISONZO RIVERMOUTH NATURE RESERVE).



2.2 BOSCO NORDIO NATURE RESERVE (PP2)

OBJECTIVE OF THE SIMPLIFIED MONITORING PROTOCOL: The aim of this protocol is to obtain information, in addition to those obtained by the technicians of the Reserve using standard monitoring protocol (as suggested by Angelini et al., 2016). The specific protocol for *Testudo Hermannii* is aimed at providing, in particular:

- data on the distribution of terrestrial turtles in the Reserve;
- presence of newborns and juveniles on paths used from visitors;
- date of breeding and egg-laying seasons.

Moreover, thanks to their involvement in the monitoring activity, an additional result foreseen is enriching the visit to the Bosco Nordio Reserve with this kind of participative experience.

MONITORED SPECIES: The simplified protocol applied in the Bosco Nordio Reserve concerns the Hermann's turtle, a species easily reachable by the visitors to whom the protocol is mainly directed.

METHODOLOGY ADOPTED:

SIMPLIFIED MONITORING PROTOCOL FOR *TESTUDO HERMANNI*



Figure 4: A *Testudo hermanni* male in Bosco Nordio.

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The monitoring of *T. hermanni* can be conducted by the visitors of the Reserve which are informed thanks to a poster located at the entrance of the Reserve, near the ticket office. They are encouraged to fill in a specific sheet, given to them at the start of the visit, with the number of the turtles contacted, pointing out mating couples, female during egg-laying, newborns or juveniles (classified by a scale printed on the sheet itself). Moreover, visitors are encouraged to take pictures of each specimen, possibly georeferenced. They could sign the position of each turtle on a map present on the sheet. At the end of the visit, the sheet is returned to the ticket office (see ANNEX 2 - SIMPLIFIED MONITORING PROTOCOL OF THE BOSCO NORDIO NATURE RESERVE).

TARGET GROUPS INVOLVED:

- Naturalistic guides and the staff of the ticket office of Bosco Nordio
- Visitors of Bosco Nordio Nature Reserve

At the beginning of the turtles season, an event is organized on terrestrial tortoises, during which the monitoring activities are presented. This event is publicized by Veneto Agricoltura and by the cooperative of the guides.

TRAINING OF THE TARGET GROUPS: since it is not possible to reach all the potential visitors, the training for the application of the Simplified Monitoring Protocol mainly addresses the naturalistic guides and the staff of the ticket office of Bosco Nordio which are the main operators for the implementation of the simplified monitoring activities. Visitors are informed about the monitoring activities and their potential involvement when they enter into the Reserve, giving them a survey form which is filled in and returned at the exit, to the ticket office staff or in a box ready to collect the completed forms. The materials used for the training includes a power point presentation, which is introduced to the guides, the survey form and an information poster displayed at the ticket office

REFERENCES: Angelini P., Casella L., Grignetti A., Genovesi P., (ed.) 2016. Manuali per il monitoraggio di specie ed habitat d'interesse comunitario (Direttiva 92/43/CEE) in Italia: specie animali. Ispra, Serie Manuali e linee guida, 141/2016.



2.3 AQUATINA DI FRIGOLE (PP3)

OBJECTIVE OF THE SIMPLIFIED MONITORING PROTOCOL: the simplified monitoring protocol for the target species selected for the Aquatina di Frigole protected area is aimed at involving volunteers and students in the scientific data collection in order to increase the amount of biodiversity information available while reducing time and costs of the monitoring. The simplified monitoring protocol could also allow obtaining new information about the species involved (e.g., presence of new alien species, new nursery areas for *Pinna nobilis*, spatial distribution of guilds of benthic macroinvertebrates etc.). Before starting the monitoring, PP3 organizes a training session for the volunteers and students involved in the sampling activities in the field, in order to transfer the protocol criteria of the simplified monitoring of the target species.

MONITORED SPECIES: the selected target species/guilds and the related monitoring methods for the Aquatina di Frigole protected area are listed in the table below:

Species/Guild	Sampling methods	Monitoring reason
Benthic macroinvertebrates	Grab/Box corer (Sangiorgio et al., 2009)	Benthic macroinvertebrates are affected by environmental pollution and anthropogenic pressures responding with changes in abundance, taxonomic richness and composition, biomass, body size and biological traits (Pinna et al., 2013). Therefore, they are considered suitable bioindicators widely used in biomonitoring and in the assessment of the ecological quality of the water bodies. AMBI, M-AMBI, BENTIX, BITS, BO2A, STAR-ICMI, are just a few of the ecological indicators based on benthic macroinvertebrates largely used in biomonitoring plans of aquatic ecosystems (Borja et al., 2000; Muxika et al., 2007) in accordance to the Water Framework Directive (WFD, 2000/60 EC).
<i>Pinna nobilis</i>	Line transect (ISPRA 2006) and biometry (Marocco et al., 2018)	It is an endangered and protected species under the European Union, listed in the Annex IV of the Habitats Directive 92/43/EEC and subsequent amendments, and in the Annex II of Barcelona Convention. Nevertheless, it is harvested for ornamental and food purposes, and it is exposed to numerous threats of degradation due to illegal fishing, climate change, anchorage of tourist boats and to the action of a parasite protozoan, called Haplosporidium pinnae, which gradually reduces the feeding of the individuals and finally kills them. <i>P. nobilis</i> is an



important filter feeder providing many ecosystem services: by filtering organic and inorganic particles in impacted areas contributing to the water clarity; by hosting many species contributing to the increase of the local biodiversity, it attracts snorkelers and divers, with a consequent development of recreational activities and environmental education. There is scientific evidence that this benthic filter feeder is a good indicator of changes in marine and coastal ecosystems providing information of biotic response to anthropogenic pressures. Consequently, *P. nobilis* is used as an indicator in the Marine Strategy Monitoring Programs (MSFD Directive 2008/56/EC) in order to obtain suitable knowledge on the presence, distribution, abundance and demographic structure of *P. nobilis* in sites representative for the species.

Alien species

Presence/Absence criteria

The knowledge and the potential distribution of the alien species in the protected area of Aquatina di Frigole still remain rather critical. Alien species recorded in the Aquatina di Frigole protected area are: *Acanthophora nayadiformis*, *Caulerpa cylindracea*, *Beroe ovate*, *Callinectes sapidus*, *Ficopomatus enigmaticus*, *Terebella lapidaria*, *Hydroides dianthus*, *Hydroides elegans*, *Mnemiopsis leidy*.

METHODOLOGY ADOPTED:

SIMPLIFIED MONITORING PROTOCOL FOR BENTHIC MACROINVERTEBRATES

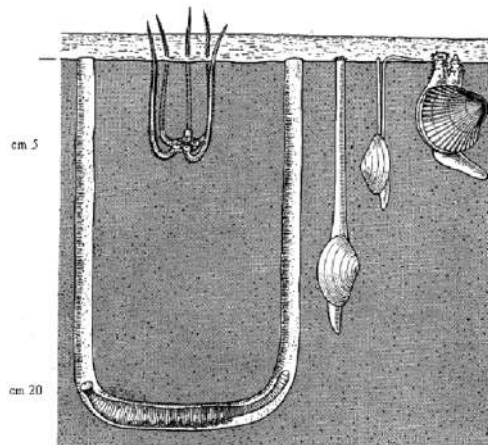


Figure 5: Representation of a soft bottom macroinvertebrate guild (Castelli et al., 2013).



1.1 Simplified sampling of benthic macroinvertebrates

The sampling of the benthic macroinvertebrates community is linked to the structural characteristics of the ecosystems and the choice of the samplers to be used is linked above all to the substrate to be sampled. Soft bottoms like Aquatina di Frigole, can be bare or covered with vegetation, both submerged and emerging, and constitute a wide variety of habitats for the benthic macroinvertebrate guild. On these substrates, macroinvertebrates have the ability to penetrate the sediment and, depending on the composition/granulometry of the substrate and specific adaptations, can reach a depth of 15-20 cm by constructing a network of canals and tunnels that promote oxygenation of the sediment itself.

1.2 Sediment sampling method with box corer/grab and sample processing: sampling technique and field measurement

The sediment containing the macroinvertebrates is taken using an Ekman Birge grab or a box corer instruments particularly suitable to quantitative studies; they withdraw in fact, well-defined quantities of sediment more or less easily and, therefore, to obtain a remarkable reproducibility of the sample. Moreover, these instruments allow obtaining more precise information on the distribution of organisms and a more accurate evaluation of the individual biomass sampling not damaged specimens. The use of the box corer (figure 2-PP3) also has some advantages compared to the grab, as it does not cause a significant disturbance of the substrate and the leaching of the material is relatively limited; this instrument is also able to maintain unaltered the stratification in the sample, differently than what occurs with grabs.



Figure 6: Phases with which a manual box corer is used (Sangiorgio et al., 2009).



1.3 Sediment sampling method with box corer/grab and sample processing: sampling effort

Sampling in the protected area of Aquatina di Frigole is carried out in six sites selected according to the criteria of the proximity to the open sea and the gradient of salinity (figure 3-PP3). For each sampling site, three replicas are performed using the box corer. The sediment samples is sieved with a 2 mm mesh size sieve. The monitoring activity is carried out in the period between May and July.



Figure 7: Map and sampling sites. In the table are reported the geographic coordinates (Lat. and Long.).

1.4 Sediment sampling method with box corer/grab and sample processing: sample treatment methods

The sediment samples is sieved through a sieve with square openings and 1 mm mesh size (Retsch® gmbh, Germany, 40 cm Ø, DIN ISO 3310/1) to separate the benthic macroinvertebrates from the rest of the sampled material and avoid loss of significant organisms (figure 4-PP3). The 2 mm mesh sieve should be used instead of 1 mm mesh



sieve, so as to make the subsequent sampling phases easier for the volunteers. In fact, the 2 mm sieve retains larger organisms that are faster to sort and easier to identify, reducing time, costs and efforts.

At the end of the phase of sieving and cleaning of the sample from the finest particulate material, the collected material is transferred into bottles or plastic bags and taken back to the laboratory in a refrigerated portable cooler at 4-6 °C. For example, semi-transparent plastic bottles or bags with a volume of 1000 ml can be used, so that the material can be observed. The containers must be labelled before being transferred to the storage location. The label shall indicate the site and date of sampling, the name of the station, the number of replication and the name of the operators who carried out the sampling.



Figure 8: Field sieving operation (Castelli et al., 2013).

1.5 Measurement of the parameters

The parameters to be determined are:

- Taxonomic identification until the species level is reached for the crustacean, mollusc, bivalves and echinoderms;
- Abundance (ind/m²) and taxonomic richness for the application of the ecological indicators, AMBI (Borja et al., 2000), M-AMBI (Muxika et al., 2007) and BITS (Mistri



- and Munari, 2008), which are indicators for the classification of the ecological status of the lagoons, and other indices for the description of the community (e.g., Shannon diversity index, Margalef index, Pielou's equitability index and Simpson's dominance index).
- Optional parameters: Body size; Biomass.

1.6 Method of analysis

In the laboratory, samples of benthic macroinvertebrates are subjected to sorting, that is, separation of the dead fraction (thanatocoenosis) from the living fraction, and the latter divided into the main taxonomic groups (molluscs, crustaceans, polychaetes, etc.). The identified organisms are stored in 70% ethyl alcohol or other low toxicity preservative solution until the identification of the species by means of the stereomicroscope/optical microscope and dichotomous keys available in literature. Subsequently, the body size of the benthic macroinvertebrate is defined with the use of an image analysis system applied to the stereomicroscope (figure 5-PP3).



Figure 9: Taxonomic identification and image analysis system.

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Table 1 - List of the benthic macroinvertebrates sampled in the Aquatina di Frigole lagoon.

<i>Abra alba</i>	<i>Heteromastus filiformis</i>	<i>Rimostrombidium sphaericum</i>
<i>Acanthocardia tuberculata</i>	<i>Homalopoma sanguineum</i>	<i>Rissoa variabilis</i>
<i>Amphorella amphora</i>	<i>Laboea strobila</i>	<i>Rissoa ventricosa</i>
<i>Armandia cirrhosa</i>	<i>Loripes orbiculatus</i>	<i>Ruditapes decussatus</i>
<i>Bittium reticulatum</i>	<i>Lumbrineris latreilli</i>	<i>Spio decorata</i>
<i>Brania arminii</i>	<i>Lumbrineris sp.</i>	<i>Stenosemella nivalis</i>
<i>Carcinus aestuarii</i>	<i>Monocorophium acherusicum</i>	<i>Stenosemella ventricosa</i>
<i>Cerastoderma edule</i>	<i>Murex sp.</i>	<i>Strombidium acutum</i>
<i>Ceriagrion tenellum</i>	<i>Myosotella myosotis</i>	<i>Strombidium capitatum</i>
<i>Cerithium vulgatum</i>	<i>Mytilus galloprovincialis</i>	<i>Strombidium conicum</i>
<i>Chamelea gallina</i>	<i>Naineris laevigata</i>	<i>Syllides japonicus</i>
<i>Chiton olivaceus</i>	<i>Nassarius sp.</i>	<i>Terebella lapidaria</i>
<i>Cirriformia tentaculata</i>	<i>Neanthes acuminata</i>	<i>Tintinnopsis baltica</i>
<i>Cirrophorus furcata</i>	<i>Noctiluca scintillans</i>	<i>Tintinnopsis beroidea</i>
<i>Clanculus jussieui</i>	<i>Notomastus latericeus</i>	<i>Tintinnopsis cylindrica</i>
<i>Clanculus cruciatus</i>	<i>Oligochaeta</i>	<i>Tintinnopsis karajacensis</i>
<i>Codonellopsis schabi</i>	<i>Paracartia latisetosa</i>	<i>Tintinnopsis levigata</i>
<i>Coenagrion mercuriale</i>	<i>Pelagostrobilidium spirale</i>	<i>Tintinnopsis lobiancoi</i>
<i>Dorvillea rubrovittata</i>	<i>Perkinsyllis anophthalma</i>	<i>Tintinnopsis minuta</i>
<i>Ecrobia ventrosa</i>	<i>Peronidia albicans</i>	<i>Tintinnopsis nana</i>
<i>Eutintinnus apertus</i>	<i>Petaloproctus terricolus</i>	<i>Tintinnopsis parvula</i>
<i>Eutintinnus fraknoii</i>	<i>Petalotricha ampulla</i>	<i>Tintinnopsis radix</i>
<i>Exogone meridionalis</i>	<i>Phoronida</i>	<i>Tritia neritea</i>
<i>Exogone naidina</i>	<i>Pinna nobilis</i>	<i>Tritia nitida</i>
<i>Ficopomatus enigmaticus</i>	<i>Podocorynoides minima</i>	<i>Tritia pellucida</i>
<i>Gammarus aequicauda</i>	<i>Podon polyphemoides</i>	<i>Truncatella subcylindrica</i>
<i>Gibbula albida</i>	<i>Protorhabdonella simplex</i>	<i>Venerupis corrugata</i>



SIMPLIFIED MONITORING PROTOCOL FOR *PINNA NOBILIS*



Figure 10: A specimen of *Pinna nobilis* in the Aquatina di Frigole (Marocco et al., 2018).



Figure 11: Inside view (above) and external view (below) of *Pinna nobilis* (photo by Matteo De Luca).



2.1 Sampling method and measurements of the individuals

Monitoring survey and the assessment of the abundance and size composition of the individuals are carried out through underwater visual census in apnea. In the protect area of Aquatina di Frigole, five monitoring sites are allocated. Within the sites, 3 linear transects (replicates) of 100 m each are performed to determine the density of the individuals (ind/m^2) and to monitor the individual vitality (dead/alive or damage) length size and orientation according to the protocol proposed by García-March and Vicente (2006) (figure 8-PP3).

In situ, within each transect all specimens are counted in order to determine the density and the individual vitality for each specimens.

Information on biometry is recorded with a measuring tape:

- unburied length (UL);
- maximum width (W);
- minimum width (w),

while gape orientation (Or) is measured by a compass (figure 8-PP3).

Maximum shell length (Ht) and length of the buried part (h) can be measured by removing the specimens from the bottom. Besides, Ht can be estimated by applying specific mathematical models (Garcia-March and Vicente 2006). The mentoring activities are carried out in the protected area in the period between May and July.

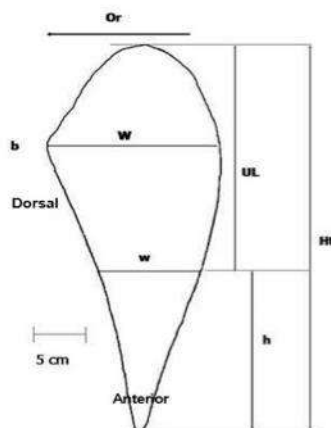


Figure 12: Measurements of interest to estimate the orientation and body size of *Pinna nobilis*.



SIMPLIFIED MONITORING PROTOCOL FOR ALIEN SPECIES

Sampling in relation to the presence of alien species in the perimeter area of the Aquatina lagoon will be carried out by means of presence/absence criteria. The presence of alien species can be reported by photcamera, drone or smartphones indicating the observed species, the date of sighting and geographical coordinates. The photos or reports are sent via *whatsapp* to the numbers of the project responsible to the University of Salento. The reports once validated will be published on the IMPREGO project website.

For the information of the alien species volunteers should be concern to the following major information services providers or consult the photo in this document:

- European Alien Species Information Network (EASIN): <https://easin.jrc.ec.europa.eu/>
- Invasive species compendium (ISC), CABI: <http://www.cabi.org>
- Delivering Alien invasive species Inventory for Europe, Daisy: <http://www.europe-alien.org>



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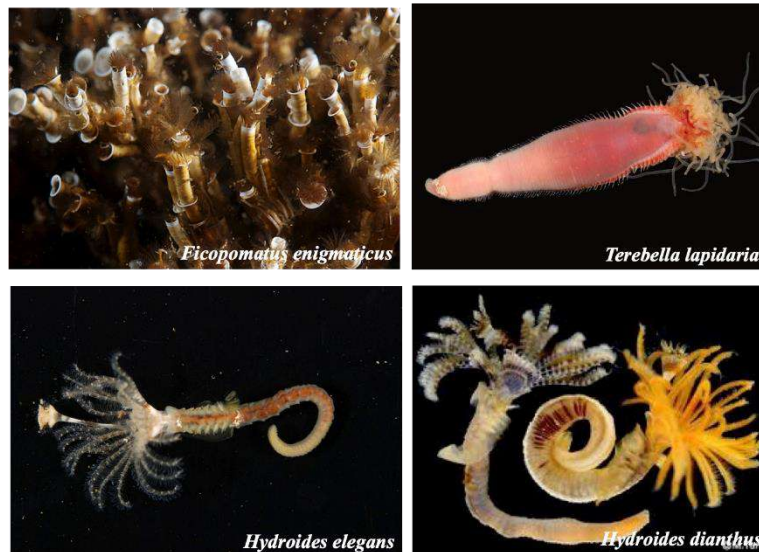


Figure 13: Alien species monitored in the Aquatina di Frigole.

TARGET GROUPS INVOLVED: The target groups involved in simplified monitoring activity will be organized groups of volunteers, associations and students. Just trained persons will be introduced to simplified monitoring activities.

Foreign target groups will be welcome.

TRAINING OF THE TARGET GROUPS: The training is managed by the researchers involved in the project, who master the sampling techniques for the targeted species. All volunteers and students are properly trained in the use of the equipment and the measurement techniques set out in the sampling protocol, in the identification of benthic macroinvertebrates, biometry of *Pinna nobilis* and identification of alien species. More complex methods should include practical training related to: 1. field sampling, which includes samples collection and processing; 2. species identification in the laboratory. The sampling in Aquatina di Frigole protected area is carried out in the spring-summer season between May and July. In this period, the presence of alien species and the abundance and richness of benthic macroinvertebrates reach the maximum level.



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Alien species

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2.4 SKOCIANSKI ZATOK NATURE RESERVE (PP4)

OBJECTIVE OF THE SIMPLIFIED MONITORING PROTOCOL: The simplified monitoring protocol of Skocianski Zatok Nature Reserve aims at involving volunteers in the monitoring activities in order to obtain reliable and useful data in addition to those obtained by the experts thanks to the application of the IMPREGO Joint Monitoring Protocol. In particular, the additional data foreseen are:

- data about distribution of selected target species in the Nature Reserve area;
- presence of certain species on/near the visitor nature trail used from visitors;
- data about the number of individuals, their oldness (ad/ juv) and behavior.

MONITORED SPECIES: The species targeted by the simplified monitoring protocol of Skocianski Zatok Nature Reserve, together with their specific monitoring methodologies, are:

Species	Methodology
<i>Sterna hirundo</i>	Active search (visual census), filling in a form in order to report the number of observed individuals, their location, oldness and behavior (searching food, individuals on nest, individuals feeding offspring etc.) and geotagged pictures
<i>Himantopus himantopus</i>	Active search (visual census), filling in a form in order to report the number of observed individuals, their location, oldness and behavior (searching food, individuals on nest, individuals feeding offspring etc.) and geotagged pictures
<i>Emys orbicularis</i>	Active search (visual census), filling in a form in order to report the number of observed individuals, their location, oldness and behavior (searching food, reproduction, feeding, sun-basking, etc.) with additional data about the presence (number, location, oldness and behavior, egg-laying) of the invasive alien subspecies

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	<i>Trachemys scripta scripta</i> and <i>T. s. elegans</i> and geotagged pictures of both species
<i>Podarcis sicula</i>	Active search (visual census), filling in a form in order to report the number of observed individuals, their location, oldness and behavior (searching food, etc.) and geotagged pictures.
<i>Hyla arborea</i>	Active search (visual census), filling in a form in order to report the number of observed individuals, their location, oldness and behavior (searching food, etc.) and geotagged pictures.
<i>Lissotriton vulgaris</i>	Active search (visual census), filling in a form in order to report the number of observed individuals (alive or dead on the trail), their location, oldness and behavior (searching food, etc.) and geotagged pictures.
<i>Tyria jacobaea</i>	Active search (visual census), filling in a form in order to report the number of observed individuals, their location, the stadium (caterpillar, imago, feeding plant) and behavior (feeding, eggs-laying etc.) and geotagged pictures.

METHODOLOGY ADOPTED: The volunteers are encouraged to fill in a form which provides the protected area manager with the data about the number of observed individuals, pointing out behavior, oldness etc. They are also encouraged to take pictures of each specimen, possibly georeferenced and sign the position of each individual on the area's map, which is provided by the protected area manager. At the end of the visit, the form is returned to the protected area manager through the reception desk in the Visitor Centre (see ANNEX 4 - SIMPLIFIED MONITORING PROTOCOL OF THE SKOCIANSKI ZATOK NATURE RESERVE).



SIMPLIFIED MONITORING PROTOCOL FOR *STERNA HIRUNDO* AND *HIMANTOPUS HIMANTOPUS*



Figure 14: *Sterna hirundo* (photo by Igor Brajnik).



Figure 15: *Himantopus himantopus* (photo by Igor Brajnik).

The Simplified monitoring activities for *Sterna hirundo* include the reporting of observation of individuals: their number and behavior (searching food etc.), individuals on nest, individuals feeding offspring etc. The species could be observed from observatories No. 7, 8 and 9 (brackish/coastal lagoon where the species nest) and from observatories No. 5, 6, 10 and 11 (freshwater area where the species feed). The data about observation of individuals with uniquely coded color rings on their legs are collected too.

The simplified monitoring activities for *Himantopus himantopus* include the reporting of geotagged pictures or marking of the position of the individuals on the map of the NR area accessible to the visitors and the reporting of observation of individual's behavior like searching food, individuals on nest, individuals feeding offspring, oldness (number of adults/juveniles). The species could be observed from observatories No. 7, 8 and 9 (brackish/coastal lagoon where the species nest) and from observatories No. 5, 6, 10 and 11 (freshwater area where the species feed). A particular focus is dedicated to the visitor trail between observatories 8 and 9, where the adults move the juveniles to feed from brackish to the freshwater part of the NR. The data about observation of individuals with uniquely coded color rings on their legs will be collected too.



SIMPLIFIED MONITORING PROTOCOL FOR *HYLA ARBOREA* AND *LISSOTRITON VULGARIS*



Figure 16: *Hyla arborea* (photo by Mirko Kastelic).

The simplified method involves the active search (visual census) of the species in a sample area - the visitor trail with special attention to the part of the trail between the Visitor Centre and the observatories no. 5 and 7 where this two Amphibian species were often observed in the last few years. Simplified monitoring activities include the reporting of geotagged pictures, observations of alive and dead (important for *Lissotriton vulgaris* larvae/subad.) individuals filling in a form (number of individuals, their oldness: ad/juv if can be defined and the observed behavior) and marking the position on the map of the NR area, both provided by the NR manager and accessible for the volunteers in the reception of the Visitor Centre. The monitoring activities for the census of this Amphibian species will be conducted from March till September.



Figure 17: *Lissotriton vulgaris* (Photo by Aleš Marsič)



SIMPLIFIED MONITORING PROTOCOL FOR *PODARCIS SICULA*



Figure 18: *Podarcis siculus* (Photo by Mirko Kastelic).

The simplified method involves the active search (visual census) of the specie in a sample area - the visitor trail. Simplified monitoring activities include the reporting of geotagged pictures; the observation of alive and dead individuals filling in a form (to provide information about the number and oldness - ad/juv; if can be defined - of individuals and their behavior) and marking the position on the map of the NR area, both provided by the NR manager and accessible for the volunteers in the reception desk of the Visitor Centre.



SIMPLIFIED MONITORING PROTOCOL FOR *EMYS ORBICULARIS*

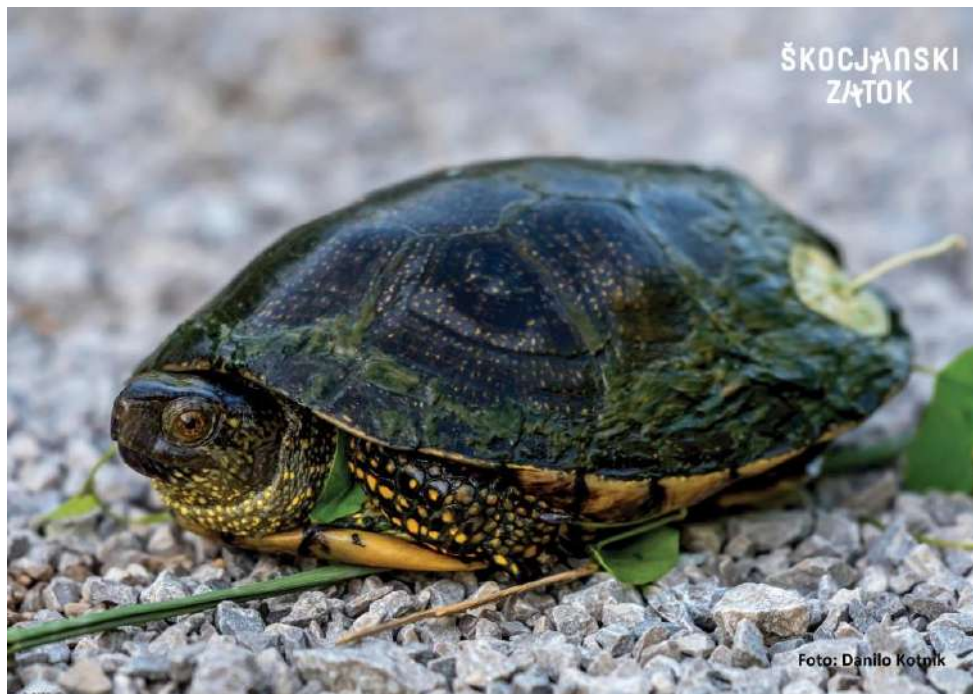


Figure 19: *Emys orbicularis* (Photo by Danilo Kotnik).

The simplified method involves the active search (visual census) of the species in a sample area that can be seen from the visitor trail and from the observatories. Simplified monitoring activities include the reporting of geotagged pictures of *Emys orbicularis* individuals and additional reporting of observation of invasive alien species *Trachemys scripta* (the subspecies *T. scripta scripta* and *T. scripta elegans* and their hybrids *T. scripta scripta x elegans*) filling in a form (to provide info about the number and oldness - ad/juv if it can be defined - of individuals and their behavior) and marking the position on the map of the NR area, both provided by the NR manager and accessible for the volunteers in the reception of the Visitor. The monitoring activities for the census of this reptile species will be conducted from March till September.



SIMPLIFIED MONITORING PROTOCOL FOR *TYRIA JACOBAEA*



Figure 20: *Tyria jacobaea* imago (Photo by Slavko Polak).



Figure 21: *Tyria jacobaea* caterpillars (Photo by Mirko Kastelic).

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The simplified method involves the active search (visual census) of the species in a sample area - the visitor trail. The simplified method includes the reporting of geotagged pictures (caterpillar, imago, feeding plant) and observations of individuals (different stadium; caterpillar, imago, eggs and the feeding plant) filling in a form (to provide info about the number and oldness - caterpillar, imago, pupa - of individuals and their behavior) and marking the position on the map of the NR area, both provided by the NR manager and accessible for the visitors/volunteers in the reception of the Visitor Centre. The monitoring activities for the census of this invertebrate species will be conducted from May till August/September.

TARGET GROUPS INVOLVED:

- Visitors of Skocianski Zatok Nature Reserve
- Naturalistic guides and the staff of the Skocianski Zatok Nature Reserve.

TRAINING OF THE TARGET GROUPS: The national training aims at informing the volunteers about the simplified monitoring protocol, presenting them the selected target species and monitoring methods for each specimen. Some visitors are personally invited to take part of the national training: the information and invitation to take part of the training is published on the Nature Reserve web site and FB page to reach more volunteers. The naturalistic guides takes part to the training too with the aim of involving the students and other visitors in the monitoring activities. The material used for the training includes a power point presentation (Deliverable T1.2.4.) which is presented to the volunteers, the survey form, the Nature Reserve map (plasticized Orto photo of the area). More copies of survey forms are available for volunteers in the reception of the Visitor Centre, where the full field is collected. At the beginning of target species “seasons”, before the monitoring activities start, the volunteers are contacted since an event to present monitoring activities is organized for them.



2.5 PAKLENI OTOCI ISLANDS (PP5)

OBJECTIVE OF THE SIMPLIFIED MONITORING PROTOCOL: Simplified monitoring in the marine area of Pakleni Islands is planned as citizen monitoring of specific target marine species in Natura 2000 marine area of Pakleni Islands (site code: HR3000095). The area is represented by following habitat types: Sandbanks which are slightly covered by sea water all the time (code: 1110), Posidonia beds (*Posidonium oceanicae*) (code: 1120), Reefs (code: 1170), Submerged or partially submerged sea caves (code: 8330), Mudflats and sandflats not covered by seawater at low tide (code: 1140)¹.



Figure 22: Map of the Pakleni Islands with Natura 2000 marine area indicated in green color.

Species	Monitoring reason/objectives
<i>Ophidiaster ophidianus</i> (Lamarck, 1816), seastar	easily to be spotted; thermophilic species - indicator of tropicalisation; protected species; public awareness; shallow bottom; indicator of good status of the Reef habitat
<i>Centrostephanus longispinus</i> (Philippi, 1845), seurchin	easily to be spotted; thermophilic species - indicator of tropicalisation; protected species; public awareness; shallow bottom; indicator of good status of the Reef habitat
<i>Luria lurida</i> (Linnaeus, 1758), sea snail	easily to be spotted; protected species; public awareness; shallow bottom; indicator of good status of the Reef habitat
<i>Charonia tritonis</i> (Linnaeus, 1758), sea snail	easily to be spotted; rare species still not observed in the Pakleni Islands; protected species; public

¹ This habitat type is in the process of being added to Natura 2000 Standard Data Form once the revision of the Regulation on ecological network will be adopted.



	awareness; shallow and deeper bottom; indicator of good status of the Reef habitat
<i>Pinna nobilis</i> Linnaeus, 1758, sea clam	easily to be spotted; common species in the Pakleni Islands; protected species; public awareness; shallow bottom; indicator of good status of different habitats.
<i>Hippocampus guttulatus</i> (= <i>Hippocampus ramulosus</i>)	easily to be spotted; rare species in the Pakleni Islands; protected species; public awareness; shallow bottom; indicator of good status of the different habitats
<i>Posidonia oceanica</i> L. - appearance of flowers and seeds	easily to be spotted; protected species; target and most endangered habitat in Pakleni islands; public awareness; infralittoral bottom; indicator of good status <i>Posidonia</i> habitat.
<i>Caulerpa cylindracea</i> Sonder, alien and invasive green algae	easily to be spotted, invasive alien species, different habitats.

MONITORED SPECIES: the simplified monitoring presents and focuses on the 7 native and 1 invasive species listed here above. The species, which are targeted by the simplified monitoring protocol, include different protected benthic species which are indicators of Natura 2000 habitats condition, as well as not native species such as *Caulerpa cylindracea*. It also includes a recording of appearance of seeds and flowers of *Posidonia oceanica* as a biological phenomenon important for estimation of status of *Posidonia* habitat as well as an important element for raising public awareness about the protection of *P. oceanica* meadows, which has been identified as a priority habitat type for conservation under the EU Habitats Directive.

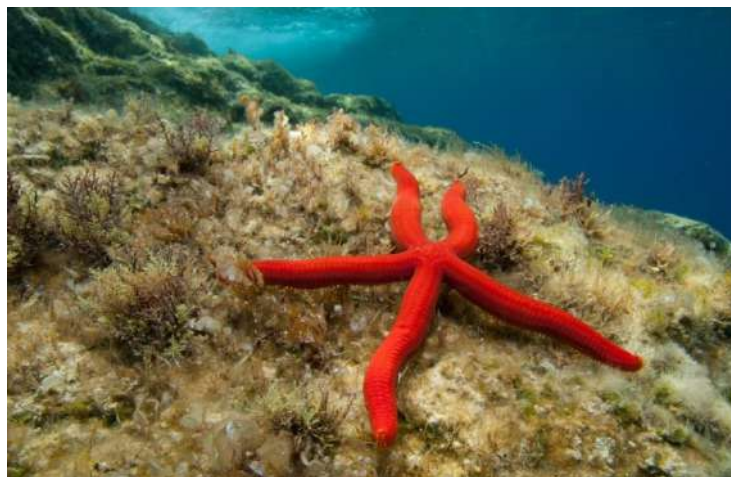


Figure 23: *Ophiodaster ophidianus*.



Description: The **Purple seastar** *Ophidiaster ophidianus*, thermophilic species of the reef habitat. It has a small central panel with 5 rounded arms, uniform in thickness from base to top. It is orange-red, often has orange or purple-red spots, and sometimes it may be entirely purple. Relatively soft structure and smooth surface. It can grow to a diameter of about 30 cm. Her appearance is similar to other starfish species such as *Echinaster sepositus* and *Hacelia attenuata*.

Frequent depth range: 1-150 m

Habitat type: Reefs (code: 1170)

Reasons for monitoring: Species is protected by national law and listed in Bern and Barcelona Convention. Species is threatened due to collection for souvenir and habitat degradation.

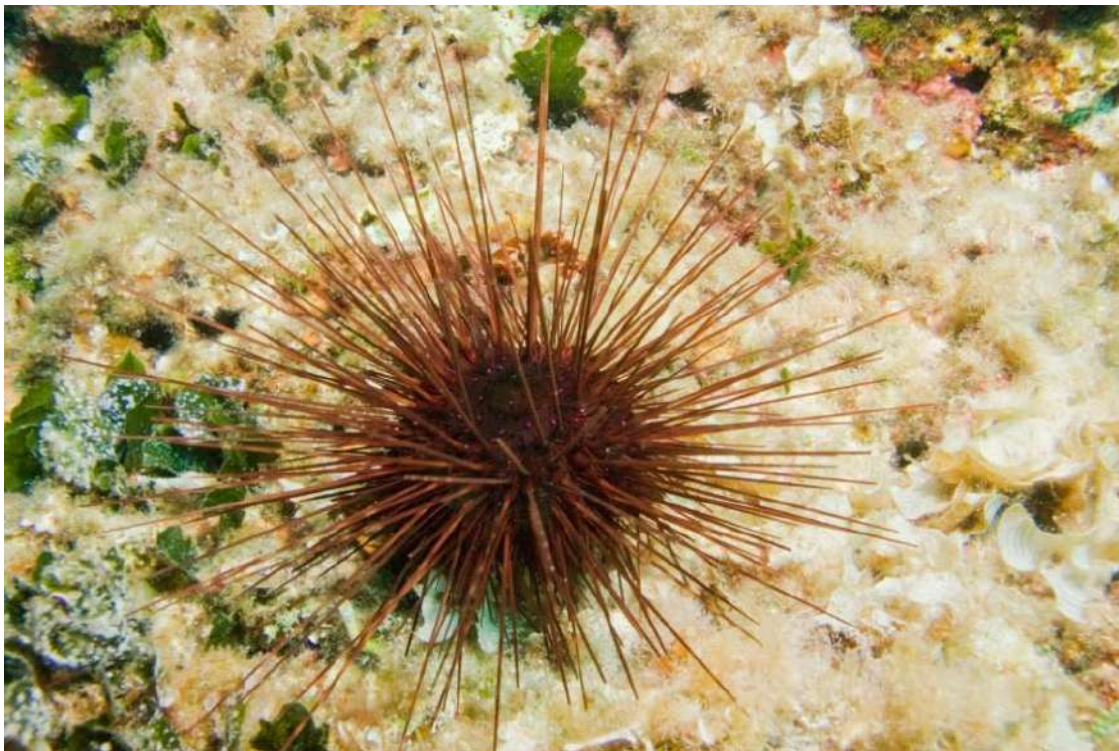


Figure 24: *Centrostephanus longispinus*.

Description: The **Hatpin urchin** *Centrostephanus longispinus*, thermophilic species of the reef habitat. It has long, thin, hollow and fragile spikes with tiny teeth. He is brownish with white, purple or black rings.



Frequent depth range: 3-200 m

Habitat type: Sandbanks which are slightly covered by sea water all the time (code: 1110), Reefs (code: 1170), partially submerged sea caves (code: 8330)

Reasons for monitoring: Species is protected by national law and listed in Bern and Barcelona Convention and Council *Directive* on the conservation of natural habitats and of wild fauna and flora. Species is threatened due to collection for souvenir and habitat degradation.



Figure 25: *Luria lurida*.

Description: The **Brown Cowry** *Luria lurida* is a nocturnal species of sea snail, common in the Adriatic Sea. The shell is of oval shape. The upper side is of gray-brown color with two transversal light stripes, and the lower side is beige. The ends of the shell are orange with two distinctive dark spots. The longest shaft of the snail is 60 mm. Can be active daily in submerged sea caves. Be careful, his appearance is similar to other sea snail species such as *Erosaria spurca*, *Zonaria pyrum*.

Frequent depth range: 1-50 m



Habitat type: Reefs (code: 1170), Submerged or partially submerged sea caves (code: 8330)

Reasons for monitoring: Species is protected by national law and listed in Bern and Barcelona Convention. Species is threatened due to collection for souvenir and habitat degradation.



Figure 26: *Charonia tritonis*.

Description: The **Triton's trumpet** or the **Giant triton**, *Charonia tritonis*, one of the largest sea snail in the Adriatic Sea. There are several similar species of this genus that differ in the details of the shell. All species have ejected spindle shape, large opening and oval lid. The outer structure of the shell consists of flattened or slight protrusions. Mostly beige with curly brownish spots. The longest axis of the snail is up to 450 mm and can grow to about 1 kg.

Frequent depth range: 1-200m

Habitat type: Reefs (code: 1170)



Reasons for monitoring: Species is protected by national law and listed in Bern and Barcelona Convention. Species is threatened due to collection for souvenir and habitat degradation. Specially because of the collection, it became rare species in the Adriatic. No data exist on the species presence in the Pakleni Islands.



Figure 27: *Pinna nobilis*.

Description: The **Noble pen shell or Fan mussel** *Pinna nobilis* is the largest clam in the Mediterranean Sea. It is probably commonly distributed in the Pakleni Island but its precise distribution is still unknown. It has the shape of a pointed triangle; the outer surface has a lustered lamella which is more pronounced in young individuals. It is very noticeable because it grows upright from the sediment in which it is engraved with a pointed part, to the sea bottom it is attached with the byssus threads. It can grow to a height of about 1 m. Be careful, her appearance is similar to other bivalve species such as *Pinna rudis* and *Atrina fragilis*.

Frequent depth range: 1-40 m

Habitat type: Sandbanks which are slightly covered by sea water all the time (code: 1110), Posidonia beds (*Posidonion oceanicae*) (code: 1120)



Reasons for monitoring: Species is protected by national law and listed in Bern and Barcelona Convention. It is threatened due to collection for souvenir and habitat degradation. Recently populations rapidly decreased in the West Mediterranean due to a parasitic disease.



Figure 28: *Hippocampus guttulatus*.

Description: The **Long-snouted seahorse** *Hippocampus guttulatus* is a seahorse, relatively rare species of marine fish. The body is elongated, the head does not continue in the direction of the body, but is bended to the chest, while the tail is bent toward the abdomen and serves for mooring especially to sea algae or seagrass. The body is high and flattened laterally. Grows up to about 15 cm in length. Can be observed at shallow well developed algae biocenosis. Two species exist in the Adriatic, the long-



snouted seahorse is differentiated from short-snouted seahorse *Hippocampus hippocampus* by the longer snout and well-developed body extensions.

Frequent depth range: 5-20 m

Habitat type: Reefs (code: 1170), Posidonia beds (*Posidonia oceanica*) (code: 1120)

Reasons for monitoring: Species is protected by national law and listed in Bern Convention. It is threatened due to collection for souvenir, habitat degradation and as a bycatch.



Figure 29: *Posidonia oceanica*. From left to right: Plants, flowers and seeds.

Description: *Posidonia oceanica*, flowers and seeds. Flowers appear during autumn while seeds are fully developed in spring. **Flowering** intensity and frequency are recently correlated with warming events and can be also correlated with the health status of the plant. *Posidonia oceanica* is a flowering plant having dark green leaves 30-140 cm long and up to 1 cm wide. The leaves are narrow, slightly rounded, with 13-17 parallel veins. Leaves are assembled by 5-8 in one shoot. Be careful, her appearance is similar to other seagrass species such as *Cymodocea nodosa*, *Zostera marina*, *Zostera noltei*.

Depth range: Flowers are observed *in situ* from 1-40 m, seeds on shore

Habitat type: Posidonia beds (*Posidonia oceanica*) (code: 1120)



Figure 30: *Caulerpa cylindracea*.

Description: *Caulerpa cylindracea* is an invasive alien green algae. Dark green algae, built from a creeping stolon and fronds of 2 to 10 cm long, on which small spheroid ramules grow.

Depth range: 0m-60m

Habitat type: Sandbanks which are slightly covered by sea water all the time (code: 1110), Posidonia beds (*Posidonium oceanicae*) (code: 1120), Reefs (code: 1170)

Reasons for monitoring: It is one of the most invasive marine species in the Mediterranean Sea, widely distributed in the Croatia and Pakleni Islands.

METHODOLOGY ADOPTED: The simplified joint monitoring protocol of Pakleni Islands consists of monitoring by non-technicians using the user-friendly application “*Did you see it?*”, available through Pakleni Islands web site, which will be developed as IMPRECO project pilot action. If the species is spotted, through the developed application, sea user are able to report the observation with supporting information such as photos, depth, location, etc. All data are collected by Sea and Karst and used for the different

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purpose depending on the observed species (see ANNEX 5 - SIMPLIFIED MONITORING PROTOCOL OF THE PAKLENI OTOCI ISLANDS).

TARGET GROUPS INVOLVED:

- visitors of Pakleni Islands;
- local community both practicing apnea or scuba diving in Pakleni Islands marine area.

TRAINING OF THE TARGET GROUPS: At the beginning of the touristic season 2019, PP5 is planning to develop the application “Did you see it?”, a mobile phone friendly application that provides basic information on the target species (description, frequent depth range, habitat type etc.) and the reasons for getting information about their distribution in the Pakleni Islands marine area (protected species, rare species, indicator species, invasive species, etc). “Did you see it?” application will be broadly promoted through IMPRECO project communication channels to reach a large public and presented during a dedicated training session for explaining to local stakeholders, both practicing apnea or scuba diving in Pakleni Islands marine area, how to use the application.



2.6 SHKODRA LAKE (PP6)

OBJECTIVE OF THE SIMPLIFIED MONITORING PROTOCOL: The main objective for developing the simplified monitoring protocol in Shkodra Lake for five target species is to assess the status of conservation of local ecosystems using them as quality level indicators for the health of that ecosystem. Data collected on biodiversity and target species can provide valuable information on the functionality of the ecosystem, the level of its protection and its ecological health. On other hand, monitoring of target species will be a good base for improving the assessment on ecosystems and ecosystems services.

MONITORED SPECIES: There are five target species to be monitored in Shkodra Lake. From them two species are plants, two species are birds and one is mammal. Selected species are the national and international importance, since all of them have protection status. Those species are:

1. Water Caltrop (*Trapa natans* L.). Status of the species referring IUCN Red list - Last concern (Lc).
2. European White Water lily (*Nymphaea alba* L.). Status of the species referring IUCN Red list - Last concern (Lc).
3. Eurasian Otter (*Lutra lutra* L.) - Status of the species referring IUCN Red list - Near threatened (Nt).
4. Dalmatian Pelican (*Pelecanus crispus* B.). - Status of the species referring IUCN Red list - Near threatened (Nt).
5. Pygmy Cormorant (*Phalacrocorax pygmeus* P.) Status of the species referring IUCN Red list - Last concern (Lc).

Implementation of the simplified monitoring protocol will provide data on each of those species giving us opportunity to judge the health of the ecosystem and its level of protection.

METHODOLOGY ADOPTED: For each species will be adopted a different methodology since each of those species have its specific habitat and distribution in the Shkodra lake.

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SIMPLIFIED MONITORING PROTOCOL FOR WATER CHESTNUT, EUROPEAN WATER CHESTNUT (PLANT) (*TRAPA NATANS* L.), PLANT

The ways for monitoring the *Trapa natans*: The habitat is best to visit in late May to mid-September, when regeneration and associated vegetation can be assessed. The methods for monitoring of this species are:

- i) Identification of species from the Regional Agency of Protected Areas (staff), fisherman, students of the University, fisherman, volunteers, community representative and Shkodra Lake Rangers. Localization of the species and setting the coordinates by GPS.
- ii) Number of populations in site. Some habitat areas can be assessed visually; others will require point sampling using a grapnel. Evidencing by fisherman, volunteers, hunters and local RAPA staff providing pictures, GPS coordinates/locations etc.
- iii) Comparison with previous data will be provided by Shkodra university students, RAPA project running in Shkodra Lake area, local SCOs, RAPA staff and rangers;
- iv) Visual assessment - Plants of differing sizes present or >50 % plants producing flowers or fruits can be monitored by fisherman, students of Shkodra University, fisherman, volunteers, CSOs and Shkodra lake Rangers;
- v) This specie produces barbed nuts (Swearingen et al., 2002) that pose a significant hazard to swimmers, boaters, and fishermen (Kaufman and Kaufman, 2007) and these nuts can be collected along lake shores by volunteers involved with the hand removal.

Indirect attributes - Method of assessment:

- i) Visual assessment or use of secchi disk;
- ii) Mapping (area of Lake Margin)
- iii) Assessment of relative height of other species within vegetation sample.

SIMPLIFIED MONITORING PROTOCOL FOR EUROPEAN WHITE WATER LILY (*NYMPHAEA ALBA* L.)

The best time to monitoring it is in late May to mid-September, when regeneration and associated vegetation can be assessed. The methods for monitoring are:

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- i) Identification of species from the Regional Agency of Protected Areas (staff), fisherman, students of the University, fisherman, volunteers, community representative and Shkodra Lake Rangers;
- ii) Assessing the population of the species in the site. Some habitat areas can be assessed visually; others will require point sampling using a grapnel. Evidencing by fisherman, volunteers, and hunters and local RAPA staff providing pictures, GPS coordinates/locations etc.;
- iii) Comparison with previous data can be provided by Shkodra university students, RAPA project running in Shkodra Lake area, local SCOs, RAPA staff and rangers;
- iv) Visual assessment - Plants of differing sizes present or >50 % plants producing flowers or fruits can be monitored by fisherman, students of Shkodra University, fisherman, volunteers, CSOs and Shkodra lake Rangers;

Indirect attributes - Method of assessment:

- i) Visual assessment or use of secchi disk;
- ii) Mapping (area of lake margin);
- iii) Assessment of relative height of other species within vegetation sample.

SIMPLIFIED MONITORING PROTOCOL FOR EURASIAN OTTER (*LUTRA LUTRA L.*)

Three ways will be followed for monitoring protocol:

- i) The method will be based on camera-trapping used by Regional Agency of Protected Areas (RAPA) in Shkodra region. The cameras will be installed in suitable places; sandy banks along the Shkodra Lake and Buna streams/rivers and in slopes near deep pools in flowing streams were selected for placing the camera traps. The camera traps will stay for 25-30 days for logistical reasons; minimizing the effort of camera removal. GPS locations of the camera traps and sightings will be plotted on a map.
- ii) Evidencing the otter footprints along rivers/streams by fisherman, volunteers, and hunters and other local RAPA staff.
- iii) Visual identification by fisherman, volunteers, and hunters and other local RAPA staff providing pictures, GPS coordinates/locations etc.



SIMPLIFIED MONITORING PROTOCOL
FOR DALMATIAN PELICAN (*PELECANUS CRISPUS BRUCH.*)

Dalmatian pelican located in Shkodra Lake will be monitored at different times of the year:

Monitoring of wintering individuals-will be carried out in the second half of January each year as part of the International Winter Awakening Census (IWC). Based on this methodology requires the count of each individual present in the area of Shkodra Lake. This process will be coordinated with similar process to be done at the national level and in cooperation with the Ornithological Association of Albania (AOS), bird watching organizations, individuals/volunteers, the Albanian Association of Water Resources Protection (APAWA) and the Regional Protected Areas Administration - Shkodra (RAPA). The first census was performed in 1992 and is repeated almost every year.

- i) Monitoring of nesting pairs-will be carried out in April in the form of control over the entire water surface of Lake Shkodra (Albanian part), and it will be carried in cooperation with local RAPA staff and other organizations there. The process will be coordinated with AOS (Albanian ornithological society).
- ii) General Census of the Dalmatian Pelican - consists of counting each individual present in the Lake Shkodra area during May. It will be carried in cooperation with local RAPA staff and other organizations there).

SIMPLIFIED MONITORING PROTOCOL FOR
PYGMY CORMORANT (*PHALACROCORAX PYGMEUS PALLAS*)

- i) Monitoring of wintering individuals-will be carried out in the second half of January. The methodology consists in count of each individual present in the area of Lake Skadar. That will be coordinated with local organizations and RAPA.
- ii) Monitoring of nesting pairs - will carried during June, in the form of control over the entire water surface of Lake Shkodra (the Albanian part). As such process it will be carried in cooperation with local RAPA staff and other organizations there. The process will be coordinated with AOS (Albanian ornithological society).

TARGET GROUPS INVOLVED:

- Staff of the Regional Administration of Protected Areas (RAPA), Shkoder
- Birdwatchers
- Fishermen organization in Shkodra lake

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- Fishermens
- Hunters
- University of Shkodra
- Volunteers
- Local NGOs
- People dealing with nature conservation
- Visitors

TRAINING OF THE TARGET GROUPS: Training on the monitoring protocol will be held at the Visitor Center in Velipoja.

After the training, visitor Center staff and RAPA Shkoder will be able to distribute the monitoring protocol to visitors and other local actors (fishermen, hunters, volunteers, NGOs, flora and fauna inventors etc.).

RAPA Shkoder and Visitor Center Staff will prepare questionnaires and formulas for each of the ferry species and distribute them to fishermen, hunters, volunteers, NGOs, flora and fauna inventors etc.

Also media (including the social media) will be used to inform and disseminate the information on the activity of monitoring the target species in Shkodra Lake and will invite different persons to cooperate in this monitoring process (see ANNEX 6 - SIMPLIFIED MONITORING PROTOCOL OF THE SHKODRA LAKE).



2.7 NORTH EAST OF CRETE (PP7)

OBJECTIVES OF THE SIMPLIFIED MONITORING PROTOCOL:

1. To involve groups of people in the observance of biodiversity, endemic species, ecological relationships, importance of habitats and biotopes, and ecosystemic functions in the protected area.
2. To gather information and data from the people involved in the monitoring on the presence, distribution, population size and status of the target habitat type and target species. These information and data will be evaluated together with the data which will be gathered by the scientific / technical monitoring.

The three NATURA 2000 areas of the Northeastern Edge of Crete have no Management Body. That means there is no permanent scientific and technical monitoring for species and habitats. The presence / absence in possible habitats, the exact distribution of the target species, the size and the status of their populations are therefore unknown and thus will be an objective of the technical and the simplified monitoring.

MONITORED SPECIES: 9370* Palm groves of *Phoenix*, Plant species: *Centaurea aegialophila*, *Anacamptis pyramidalis*, *Campanula pelviformis*. Amphibian: *Pelophylax cretensis*, Reptile: *Caretta caretta*. Bird species: *Anthus campestris*, *Falco eleonora*, *Sylvia rueppelli*.

METHODOLOGY ADOPTED:

1. **For the Habitat type 9370* Palm groves of *Phoenix*:**
 - 1.1. Visual inspection for presence of *Rhynchophorus ferrugineus* (red palm weevil).
 - 1.2. Visual inspection for presence of affected *Phoenix* individuals.
 - 1.3. Recording any type of human-caused disturbance to the habitat.
 - 1.4. Photos in each case.
2. **For the target plant species: *Centaurea aegialophila*, *Anacamptis pyramidalis*, *Campanula pelviformis*:**
 - 2.1. Species' identification and detection in habitats (location's spot or description).
 - 2.2. Brief habitat description (outline).
 - 2.3. Estimation of population's size (number of individuals or surface covered).

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- 2.4. Record of possible threats and disturbances.
- 2.5. Photos.
- 3. For the Amphibian *Pelophylax cretensis*:**
 - 3.1. Species' identification and detection in habitats (location's spot or description).
 - 3.2. Brief habitat description (outline).
 - 3.3. Number of individuals or estimation of population's size.
 - 3.4. Record of possible threats and disturbances.
 - 3.5. Photos.
- 4. For the Reptile *Caretta caretta*:**
 - 4.1. Location of nests.
 - 4.2. Records of possible threats and disturbances.
 - 4.3. Nests observation.
 - 4.4. Observations of the hatchlings along their route to the sea.
 - 4.5. Photos.
- 5. For the Bird species *Anthus campestris*, *Falco eleonora*, *Sylvia rueppelli*:**
 - 5.1. Species' identification.
 - 5.2. Observation of individuals (locality, habitat type, behaviour, time of the day) during spring and summer time.
 - 5.3. Records of possible threats and disturbances.
 - 5.4. Photos, if possible.

The materials and tools for the dissemination and application of the SMP (see ANNEX 7 - SIMPLIFIED MONITORING PROTOCOL OF NORTH EAST OF CRETE) are:

- A power point presentation and a leaflet will give basic information on the PAs, explaining the scope of the SMP and presenting briefly the target habitat and target species.
- A poster informing the visitors on the SMP that's is located at the entrance of the Vai parking lot. The Municipality of Sitia and the Geopark of Sitia are also asked to locate such a poster in their premises and info points.
- A survey form to fill-in is prepared for the target habitat and for each target species. It contains photos and a brief description of the respective species, possible habitats and asks people to fill in the date of the observance, to name

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- the habitat and the location, if known, to estimate the size and the status of the populations. Visitors are encouraged to take picture of each specimen, possibly georeferenced. They could sign the position of species population on a map attached to the survey form. Guidelines should be included against taking specimens or disturbing target species.
- Survey forms are distributed at the entrance of the Vai palm forest beach and at the above-mentioned public bodies' info point. At the end of the visit, the filled-in survey forms are returned to their source.
 - The invitation for the people to participate, the SMP informative power point and the survey forms should also be available online, e.g. on the website of the Region of Crete and on the social media pages.
 - People participating in the monitoring should be given the chance to upload or send their observance data and photos of the target species online, in case they are not able to return the filled-in survey form.

TARGET GROUPS INVOLVED:

- Visitors and tourists.
- Inhabitants and people working in the protected area.
- Students visiting the area for educational purposes.

TRAINING OF THE TARGET GROUPS: Since it is impossible to reach all groups of people and all visitors, the National Training is firstly addressed to the public bodies which are currently involved in the management of the area, considering the lack of a Management Body, namely:

- The Directorate of Protection and Management of Forests (Decentralized Administration of Crete).
- The Directorate of Agriculture Economy and Fisheries (Region of Crete).
- The Municipality of Sitia.
- The UNESCO Geopark of Sitia.

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