Monitoring Campaigns
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Abstract

This document describes the activities planned and carried out in activity 3.3 (2020 Monitoring Campaigns), reporting the field monitoring results, including baseline survey methodologies, all data collected, a comparison with preliminary survey data (WP 3.1) and an update on transplant state and progress (WP 4.2).

The analysis of the collected data showed no anomalies at the Panzano Bay. At the Kornati NP and RNP Coastal Dunes sites, changes in the mean values of the main parameters were found.

Regarding the seagrass transplantations, at the Panzano Bay, monitoring highlighted that approximatively 95% of the plugs transplanted in September 2020 were still in place. At the Kornati NP site, the increase of length of the leaves which does not show great fluctuations, showed a good vitality of the shoots that survived the transplanting phase from donor to transplant area. At the RNP Coastal Dunes site, the transplant, originally planned in October 2020, was postponed, and carried out in February 2021.

1. Introduction

1.1. Aim and objectives

SASPAS (Safe Anchoring and Seagrass Protection in the Adriatic Sea) is an INTERREG project that aims to provide a proposal to develop and share actions and advanced policies for the conservation and sustainable use of the territory.

The common challenge of Project SASPAS is to preserve and get a better status of conservation of biodiversity of the Adriatic Sea ecosystem in order to decrease its vulnerability.

The overall objective is to improve the conservation and restoration of seagrasses by installing safe anchoring systems, performing pilot transplants, carrying out monitoring activities and establishing an integrated management system for seagrasses in the Adriatic area. The change will result in an increase in the level of conservation of habitat types and species in the Natura 2000 sites involved in the Project areas. To achieve the envisaged change the project will adopt a scientific-applicative approach, following the DPSIR (Driving force – Pressure – State – Impact - Response) causal framework, analyzing the interactions between society and the environment - the cause-effect relationships between interacting components of complex social, economic, and environmental systems. By doing so, it is possible to measure the effectiveness of responses put in place.

Since marine seagrasses and especially *Posidonia oceanica* beds (1120*) are widespread along the coastal areas of Interreg Programme and their conservation status is similar in the two Member States, significant results can only be achieved by establishing a good cross-border cooperation between the Italian and Croatian key partners. The cross-border approach ensures coordinated and cooperative actions in planning and performing the protection and restoration activities, as well as in the development of the envisaged Marine Seagrass Safeguard Integrated Management Program (i.e., the proposed guidelines for the management and proper behavior in protected areas). The innovative aspect, which goes beyond the existing common practices, consists in the joint protection and restoration of biodiversity at transboundary level through the development of specifically- tailored innovative solutions, harmonized for the Adriatic area and applicable to other similar realities facing with the same biodiversity protection and restoration issues.

The project activities have been carried out within the three project study sites (Figure 1):

- Monfalcone (Bay of Panzano),
- Kornati National Park – (Nacionalni Park Kornati),
- Regional Natural Park of Coastal Dunes from Torre Canne to Torre San Leonardo.

This proposal is well suited to the Adriatic, in particular to the Apulia (Regional Natural Park of Costal Dunes from Torre Canne to Torre San Leonardo) and Kornati National Park, characterized by widespread coverage of *P. oceanica*. In both sites, in the summer, there is a significant flow of pleasure boat, and the development of the industry tourism cannot fail to reckon with the need to preserve the quality of the

territory, understood as a whole between land, coast and sea. In Monfalcone (Bay of Panzano), there is an important coverage of marine seagrasses (i.e., *Cymodocea nodosa*) too.

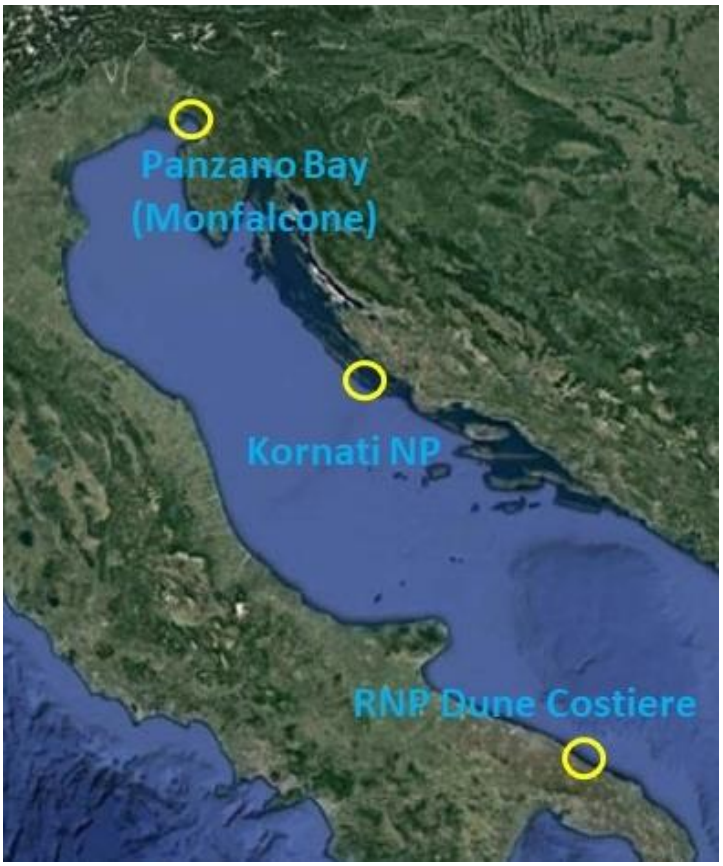

Figure 1. Location of the three project sites.

Both *P. oceanica* and *C. nodosa* play a crucial role in the consolidation of coastal sediments, slowing erosive phenomena, thanks to their radical apparatus with which they anchor to the bottom; with the leaf they promote the capture of suspended sediments, helping to limit turbidity, not to mention a number of benefits for marine and lagoon organisms.

The main project outputs related to the planned activities are:

- monitoring system with 3 data collections/monitoring campaigns (1 in 2020 and 2 in 2021),
- placement of environmentally friendly anchoring systems (anchorages and simple signaling buoys),
- pilot seagrasses transplants,
- Integrated Management System for seagrasses in the Adriatic area, made by a GIS Digital Information Platform (DIP) and a Marine Seagrass Safeguard Integrated Management Program (MSSIMP).

Protected areas managers, local, regional, and national public bodies, environmental associations, and NGOs, as well as the public will mainly benefit from the project activities.

1.2. Structure of Work Package 3

The objective of the Work Package 3 - *Integrate real-time monitoring system of marine seagrasses (phanerogamae) - in the involved Natura 2000 sites* – is to monitor and gather data on marine seagrasses in the three project sites, in order to improve the protection and to restore the biodiversity in the cross-border area.

The WP3 package consists of three activities:

- activity 3.1 - Preliminary Environmental Survey,
- activity 3.2 - Drivers and Pressures Identification and Assessment,
- activity 3.3 - Monitoring campaigns.

The preliminary survey (activity 3.1) aims to characterize the biodiversity of the project sites and gathering up-to-date information on the distribution and quality of seagrasses and their associated biota. The information collected, provided a starting point for the analysis of existing drivers and pressures, following the DPSIR (Drivers-Pressure-State-Impact-Response) procedures (activity 3.2). Monitoring campaigns will be carried out to control the plants phenological life cycle and the spatial dynamics of marine seagrasses as a response to the concrete actions (activity 3.3). Moreover, they will help to identify the potential impacts that the project could have on seagrasses meadows and other valuable habitat and species.

The analyses will include all monitoring data, especially those concerning the retreat or surface increase dynamics that will be related to the behavior of biodiversity at eco-friendly buoys.

Thus, the goal is to characterize and quantify, in time and space, the measured impacts and assess trends in biodiversity, as far as possible over the Project time frame. The results are critical to activate or strengthen different types of protection policies, to act with additional conservation measures or to manage recreational boat areas differently.

This document describes the activities planned and carried out in activity 3.3 (Monitoring Campaigns), reporting the field monitoring results.

All the activities were conducted adopting up-to-date safety protocols, to reduce risks during underwater operations. Expert marine and transitional waters biologists, according to standard operating procedures for the macrophytobenthos, performed laboratory analyses of collected samples.

Specifically, this Monitoring Campaigns Report includes baseline survey methodologies and all data collected, a comparison with preliminary survey data (WP 3.1) and an update on transplant state and progress (WP 4.2).

2. The three project areas and the Natura 2000 sites.

2.1. Monfalcone (Bay of Panzano)

The Bay of Panzano is a small bay of the Adriatic Sea (Friuli-Venezia Giulia), located in the northern part of the Gulf of Trieste, limited to the south-west by the Punta Sdobba, at the mouth of the Isonzo River. Inside the Panzano Bay are located two Natura 2000 sites: a Special Areas of Conservation (SAC) “Cavana di Monfalcone” and a Special Areas of Conservation (SAC) and Special Protection Area (SPA) “Foce dell’Isonzo - Isola della Cona” (Mouth of the Isonzo River and Cona Island) (Figure 2).

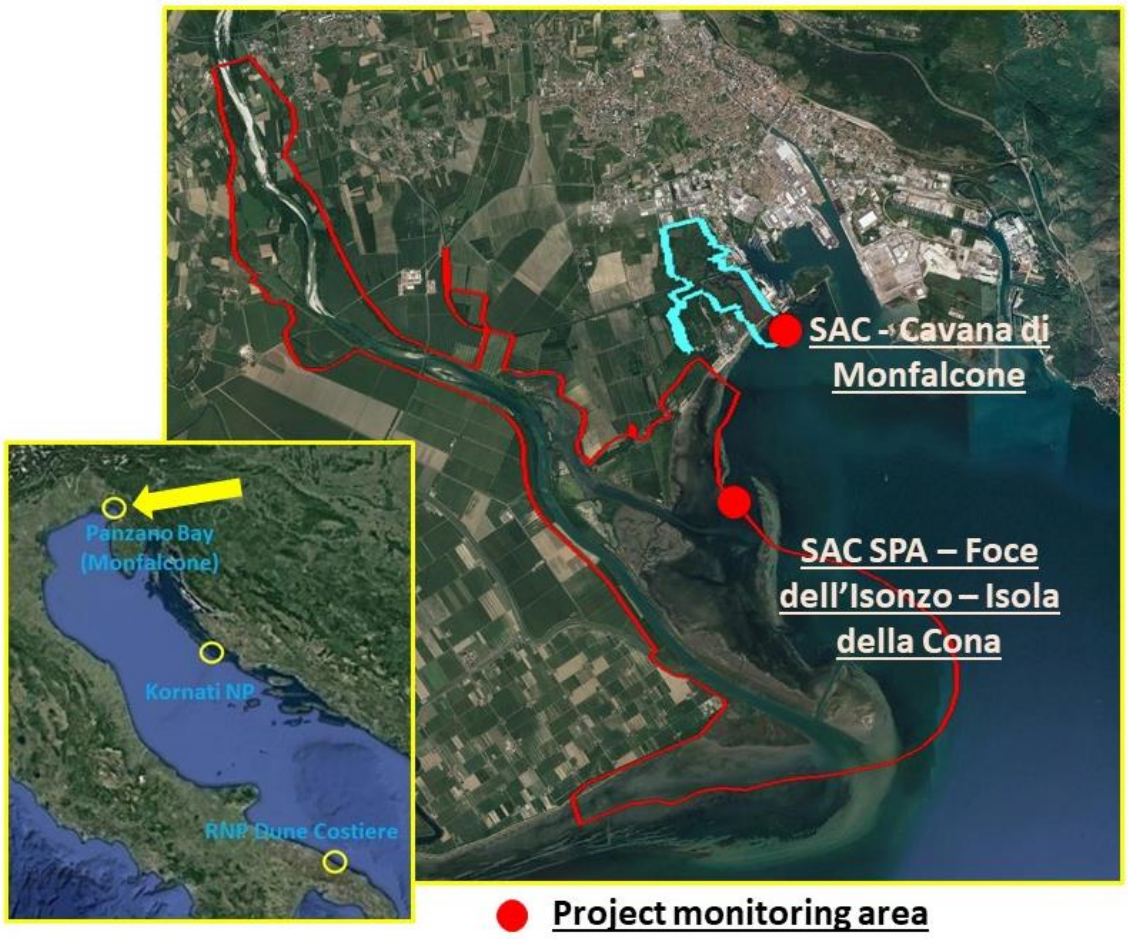

Figure 2. Location of the study areas in the Panzano Bay, positioned in two Natura 2000 sites.

Natura 2000 site: SAC IT3330007 - Cavana di Monfalcone

The "Cavana di Monfalcone" SAC extends over a surface of 133 ha, of which 12% is marine, in the transition area between the flat land and the Adriatic Sea and it is important because it includes a set of ecological systems characterized by rare habitats in a good state of conservation. A complex system of spring canals is still present, not modified by land reclamation. It is a site that includes the spring ecological system closest to the coastline and therefore in direct contact with salt and marine waters. Aquatic surfaces with different trophic state, water speed, depth and salinity preserve rich and well-diversified aquatic vegetation. The site covers an area of 133 ha, approximately 12 of which are in marine areas.

Habitat 1110 ("*Sandbanks which are slightly covered by sea water all the time*") is present in the marine zone of the site. It consists mainly of sandy sediments (larger grain sizes, including boulders and cobbles, or smaller grain sizes including mud may also be present). These habitats are permanently submerged and predominantly surrounded by deeper water. Above the sand-bank the water depth is rarely greater than 20 m. In these sub-littoral sandbanks, seagrass meadows can be present: *Zostera marina* (in brackish-salt waters), *Cymodocea nodosa* (in salt waters) and *Zostera noltei* in shallower salty waters.

The other Habitat identified is the 1140 ("*Mudflats and sandflats not covered by sea water at low tide*") and is characterized by sands and mud emerging during the low tides, partially covered by *Zostera noltii* and partly coated by green, blue, brown algae, and diatoms.

Natura 2000 site: SAC SPA IT3330005 - Foce dell'Isonzo - Isola della Cona

The "Foce dell'Isonzo – Isola della Cona" SAC SPA covers an area of 2.668 ha, 40% of which is marine. It is situated in the eastern part of the Friuli Venezia Giulia region along the last stretch of the Isonzo River and coincides in large part with the "Foce dell'Isonzo Regional Nature Reserve".

The marine part of the site covers about 1.100 ha of shallow waters with relevant extensions of seagrass meadows; in the marine part of the site the Habitat 1110 ("*Sandbanks which are slightly covered by sea water all the time*") and the Habitat 1140 ("*Mudflats and sandflats not covered by sea water at low tide*") are present.

2.2. Regional Natural Park of Coastal Dunes from Torre Canne to Torre San Leonardo

The "Regional Nature Park Dune Costiere from Torre Canne to Torre San Leonado" extends for 1.100 ha, along 8 km of coastline, and includes the inland agricultural areas occupied by centuries-old olive groves and ancient "masserie" (typical Apulian farms) (Figure 3). The perimeter follows the long course of the "lame" (55 km of erosion), which characterizes the Park's territorial morphology; they are linear clefts of the land perpendicular to the coastline, with flat bottom and slightly sloping sides originated by the erosive action of surface waters.

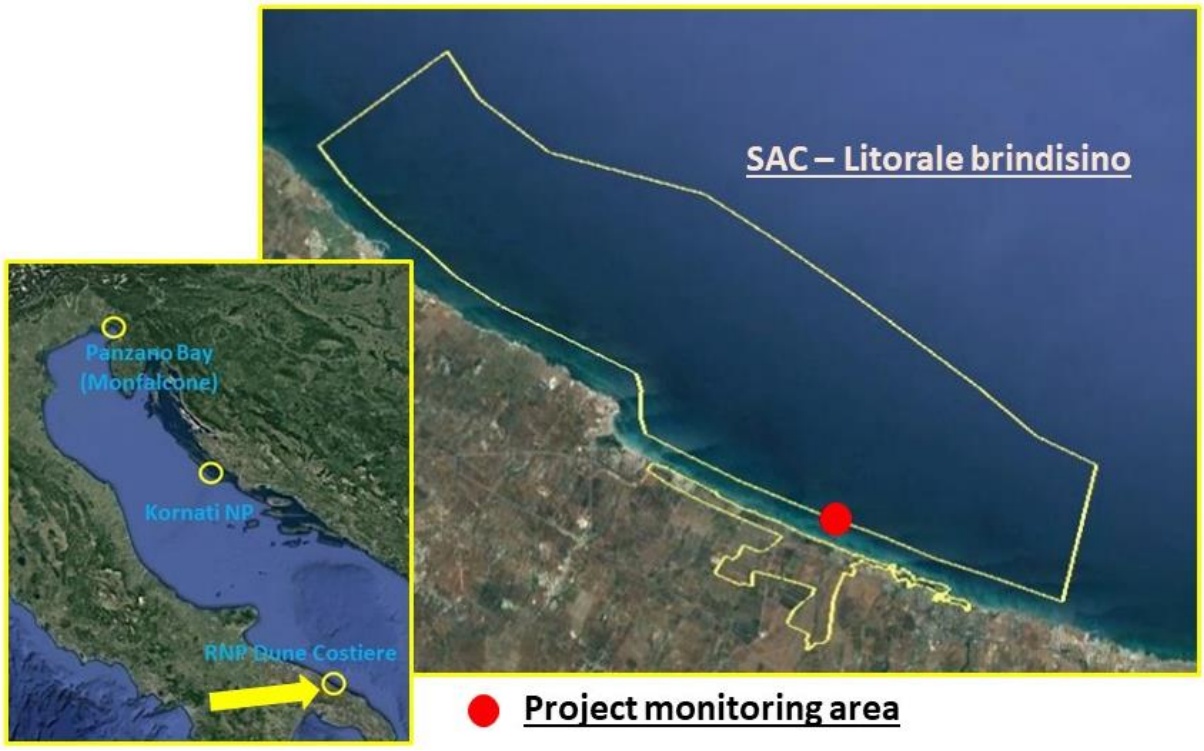

Figure 3. Location of the study area in the RNP Dune Costiere, positioned in a Natura 2000 site.

In the protected area, there are many habitats. Each habitat is a result of the geological, morphological and climatic features of the site that determine the presence of plant and animal species preferring those features. Some of those habitats are considered priority, such the *Posidonia oceanica*. Starting at a depth of 10-12 m, *P. oceanica* meadows are present on sandy bottoms.

The park includes the Special Areas of Conservation (SAC) "Litorale brindisino".

Natura 2000 site: SAC IT9140002 - Litorale brindisino

The SAC "Litorale brindisino" covers an area of 7.256 ha, 95% of which is marine. The priority habitat 1120* (P. *oceanica*) covers 50% of its total area. It is also characterized by the presence of coastal wetlands, where rare or endangered species of migratory bird stop or reproduce.

2.3. Kornati NP

Kornati National Park is designated as Site of Community Importance SCI HR4000001 - Nacionalni park Kornati (Figure 4). The park[1] was established in 1980 and its management began in 1982. It currently includes 89 islands and reefs, a total area of 217 km², of which almost 80% is marine territory (land 50 km² / sea 167 km²) and a total coastline of 238 km. Karst features dominate its geomorphology. It is estimated that at least 2.500 to 3.000 families of benthic and pelagic fauna live in the Kornati archipelago such as 353 species of algae, 3 species of underwater flower plants as well as about 850 animal species – 61 species of corals, 177 species of mollusks, 127 species of polychaetes, 61 species of decapod crabs, 64 species of echinoderms and 185 species of fishes. Meadows of *P. oceanica* are also present in the Park, up to depths of 25-30 meters. The presence of alien species is included among the anthropogenic threats. *P. oceanica* is particularly threatened by some algal species: *Caulerpa cylindracea*[2] (that has been observed in the last years and is spreading in the entire Park) and the turf-forming red algae *Womersleyella setacea* and *Acrothamnion preissii* (two species that grow over *Posidonia* rhizomes).

Public Institution, under the competence of the Ministry of Economy and Sustainable Development, manages the Kornati National Park. The land part of the park is entirely privately owned (around 620 owners).

There are four no-take zones where only scientific research is allowed. Sailing is allowed in the entire Kornati National Park except in the areas of strict protection. Anchoring and overnight stay are allowed only in 19 locations (bays and coves). Autonomous diving is allowed only in organized groups, with a license for autonomous diving in the Kornati NP obtained in advance.

Since 2013, traditional fishing in Kornati National Park is forbidden and only recreational fishing is allowed.

[1] The data cited in the following paragraphs are reported in the articles: Casier, 2011; Mihelcic and Ramov, 2018; Ivković N., 2015.

[2] *Caulerpa cylindracea* Sonder [previously known as *Caulerpa racemosa* var. *cylindracea* (Sonder) Verlaque, Huisman *et* Boudouresque]

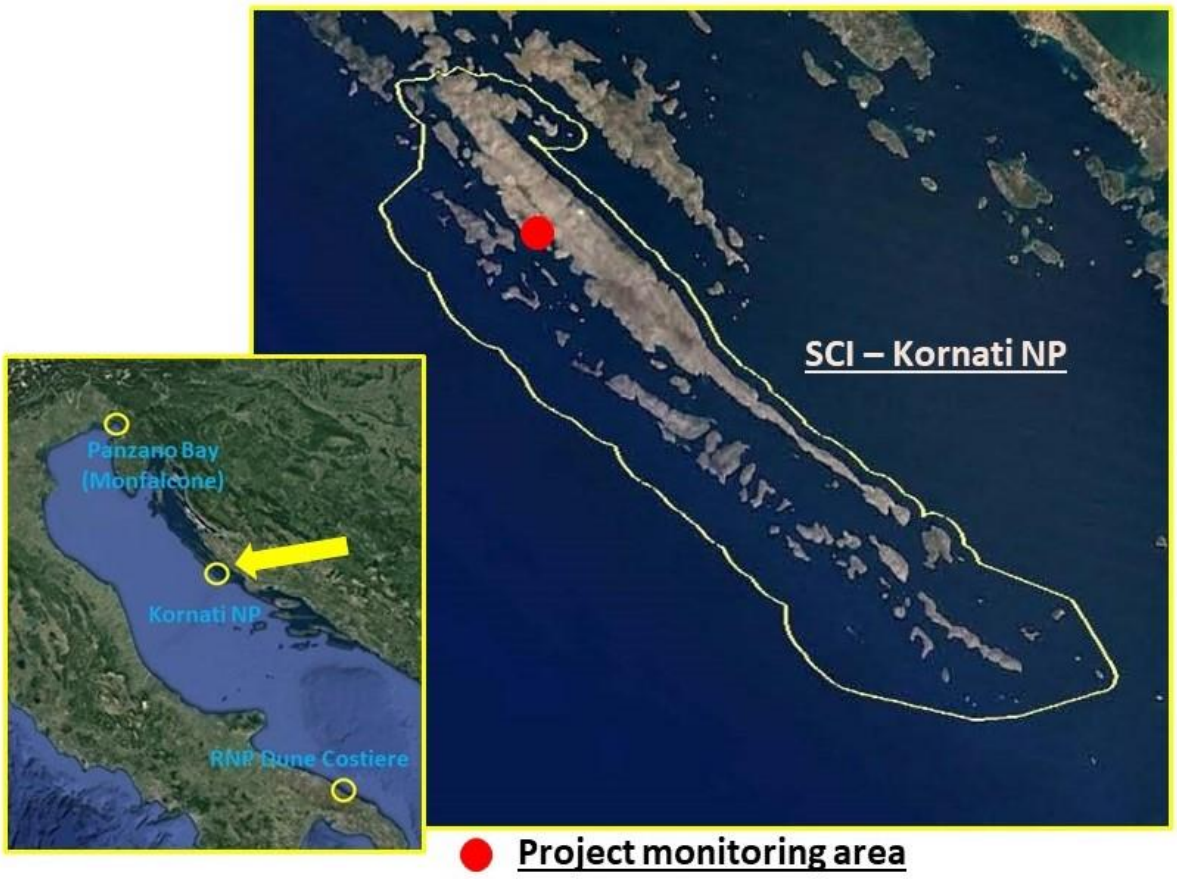

Figure 4. Location of the study area in the Natura 2000 site Kornati NP.

3. SASPAS MONITORING PROTOCOL

The SASPAS Monitoring Protocol aims to identify the best procedure to perform both field surveys and laboratory analyses in order to define a shared methodology to assess the status of seagrass meadows in Natura 2000 sites.

The protocol identifies useful indicators to monitor the status and possible changes of seagrass meadows and to assess the effects on the ecosystem of the concrete actions implemented in WP4: the pilot seagrass transplants (activity 4.2) and the placement of environmentally friendly anchoring systems (anchorages and simple signaling buoys) (activity 4.1). The monitoring protocol allows for the acquisition of necessary and univocal information related to the three project sites (Chapter 2).

The SASPAS Monitoring Protocol is a chapter in the "WP 3 Activity 1 - PRELIMINARY SURVEY REPORT" and specifies the methodologies for carrying out the activities as planned in activity 3.1 (Preliminary Environmental Survey) and activity 3.3 (Monitoring campaigns) and includes:

- a brief description of the seagrass species likely to be found at the three project sites - knowledge of these species is useful for selecting appropriate indicators because, although similar, the species have differences that may affect the applicability of the indicators;
- the best procedure to carry out field surveys and laboratory analyses;
- the description of indicators measured during the field and laboratory activities, in order to assess seagrass meadows status, in different stations to be appropriately placed nearby the areas where concrete actions will be carried out.

In this document, only the description of indicators measured during the field and laboratory activities is reported.

3.1. Monitoring activities

The SASPAS Monitoring Protocol has been applied to field activities planned in activity 3.1 (Preliminary survey) and, more extensively, in activity 3.3 (Monitoring campaigns).

In activity 3.1, the protocol was applied to broader areas to update knowledge of the status of biodiversity at the project sites (e.g., species, bathymetry, seagrass presence/absence, meadows extension, coverage) and to identify specific areas where concrete actions will be implemented (as planned in activity 4.1 and activity 4.2) to protect the habitat of *P. oceanica* and/or other marine seagrasses. Information on operational limits, general criticalities, prohibitions, local ordinances, etc. was also gathered.

The same methodologies of sampling and laboratory analyses on the collected samples, used during the preliminary survey activities (activity 3.1), have been adopted during the 2020 annual monitoring

campaigns (activity 3.3), to check the efficiency and success of the protection measure activities (activity 4.2 - pilot seagrass transplants).

In addition to the use of specific indicators, described in detail below, the monitoring protocol includes underwater photo and video surveys to document activities.

During the boat-supported field activities, direct observations were carried out through scuba diving, video-photographic recordings, and seagrass sampling; all these activities were carried out by Scientific Scuba Operators, and if necessary, in the case of special operations, also considering possible requests from local Maritime Authorities.

All activities have been implemented in accordance with national laws, regulations, and permissions. Diving permits to carry out the monitoring activities were obtained from the Ministry of Environmental and Nature Protection. For monitoring at sites within protected areas, permission from the management board of MPA or Park is required.

All the activities have been conducted by adopting updated safety protocols, to reduce risks during diving operations. A safety plan was set up for all field activities to profile and manage surface and underwater operations according to criteria to maintain a high safety standard (such as the use of a stand-by operator, underwater communicators, floating indicators, etc.).

Because of their wide national and European distribution and similar morphological structure (leaves, roots, rhizomes), the monitoring protocols for *Zostera marina*, *Zostera noltei* and *Cymodocea nodosa* appear to be relatively similar.

Monitoring sites should be examined at approximately the same time of year, each year: late spring-summer for *C. nodosa* and *Zostera* spp. and late summer-early autumn for *P. oceanica*.

Sampling planned in activity 3.3 (and in activity 3.1) according to the monitoring protocol has been conducted on selected stations. In each study site, three Zones were selected where three monitoring stations were placed at different depths, for a total of nine stations (Figure 5).

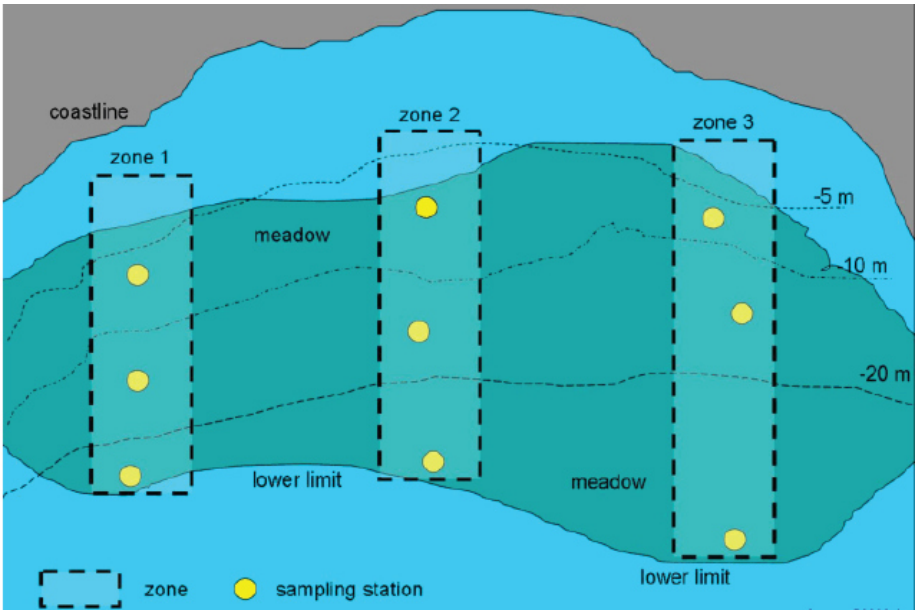

Figure 5. Example of distribution of sampling stations in the three zones and at three different bathymetric ranges (UNEP/MAP - RAC/SPA, 2014).

3.2. Sampling methodology scheme and indicators

The proposed sampling methodology and indicators are shown in Figure 6. The scheme, taken from the ISPRA monitoring protocol for *P. oceanica* (ISPRA, 2012) for the WFD monitoring, has been simplified to be adapted to the objectives and timing of the SASPAS project; the indications reported in the UNEP/MAP - RAC/SPA (2014) monitoring protocol for *P. oceanica* have also been considered to achieve the integration of the two protocols.

Considering that:

- the activities scheduled by the SASPAS project (39 months) allow only two vegetative monitoring seasons,
- some status indicators have an ecological significance only if collected for several years,
- the structure and phenology of P. *oceanica*, partially differ from those of the other seagrasses,
- species require different transplanting and monitoring periods,
- seagrass meadows are characterized by great variation among years,

only status indicators were selected for the monitoring protocol that could meaningful and useful answers over the timeframe of the project.

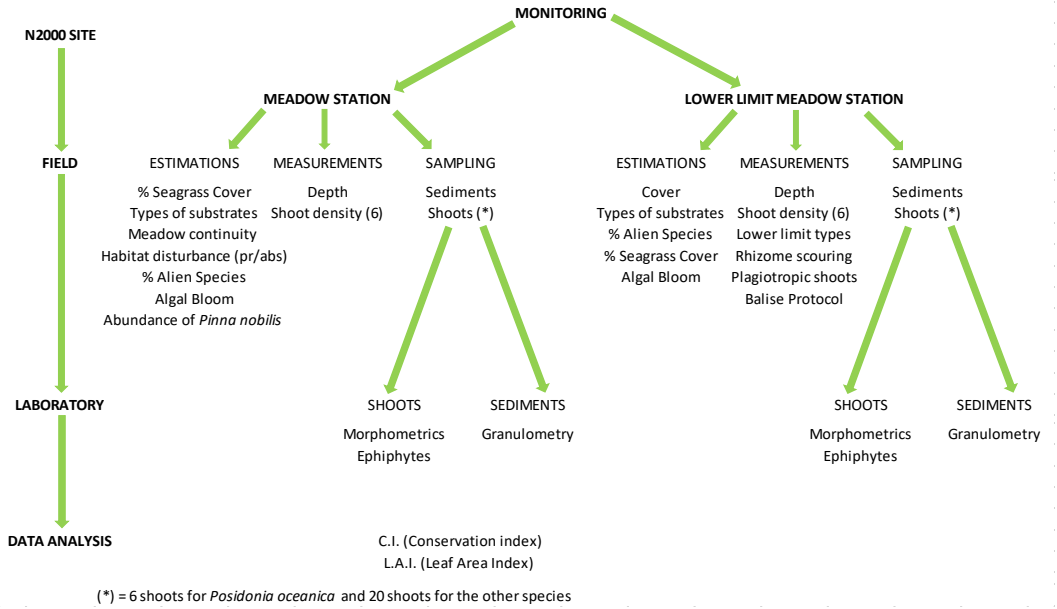

Figure 6. Sampling methodology scheme (ISPRA, 2012, modified).

The following table (Table 1) shows the indicators selected for the protocol.

Table 1. List of indicators selected for the monitoring protocol.

Indicators	Seagrass Meadows		
	Posidonia oceanica	*Zostera* spp.	*Cymodocea nodosa*
Meadow Cover (%)	x	x	x
Continuos/discontinuos meadow	x	x	x
Dead matte (%)	x		
Depth limit (m)	x		
Substrate type	x	x	x
Shoot density (shoots/m^2)	x	x	x
Shoot morphometric measurement	x	x	x
Balisage protocol	x		
Blooms and filamentous algae	x	x	x
Epiphytes (phyto-zoobenthos)	x	x	x
Pinna nobilis Abundance	x	x	x
Alien species (e.g. *Caulerpa* spp.)	x	x	x
Presence/absence of habitat disturbance	x	x	x

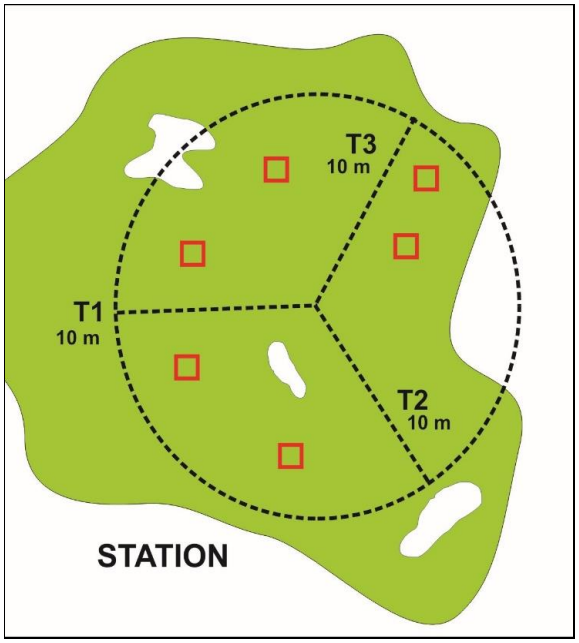

Figure 7. Sampling methodology scheme (Gerakaris et al., 2017, modified).

Figure 7 is an example of a possible sampling design to test the spatial variability within each sampling site in different circular zones (Gerakaris *et al*., 2017, modified). At each station, shoot density is measured in random quadrats and meadow cover is estimated along 10 m linear transects (T1, T2 and T3). The green polygon is a portion of a hypothetical meadow.

3.2.1. General data

Several types of data were collected at each station. General information has been recorded at the meadow scale and the following data have been recorded at each site: monitoring date; site name/code; coordinator and of the operators' name; exposure.

3.2.2. Percentage Cover and meadow continuity

Seagrass cover and its continuity/discontinuity describe the seafloor fraction covered by seagrasses on a 0-100% scales and provides a measure of seagrass abundance. As cover is depth-dependent, any measure of cover must be related to water depth. Both density and length of shoot affect the estimation of the seagrass cover (e.g., short shoots may have the same cover as meadows of sparser but longer shoots). Seagrass cover may reflect the patchiness of seagrass stands or seagrass cover of within patches, or both.

Percent seagrass cover is usually visually estimated by a diver as the fraction of the bottom covered by seagrass. Cover can be estimated directly as percentage or according to a cover scale. For *P. oceanica* the cover of the dead matte is also evaluated.

SASPAS protocol: all percent cover values have been assessed using the Line Intercept Transect (LIT) technique (Bianchi *et al*., 2004) (Figure 8). Three transects, each of 10 m length, have been placed for each station (transects extend radially from a fixed central point). Key elements (Lx) cover measurements, along the transects (live seagrass; unvegetated muddy/sandy patches; unvegetated rocky patches; dead matte), have been collected and reported for each transect, at the nine stations.

Along the transects, any changes in key elements have been noted and recorded. Thus, seagrass presence has been referred as a percentage of transect length. As an approximation, this linear pattern can also be reported to m^2 and averaged.

The percent key element cover (R%) along a 10 m transect length is calculated from the following formula:

$R\% = \sum(Lx/10*100)$

where Lx is the length of the key element 10 is the length of transect (Figure 9).

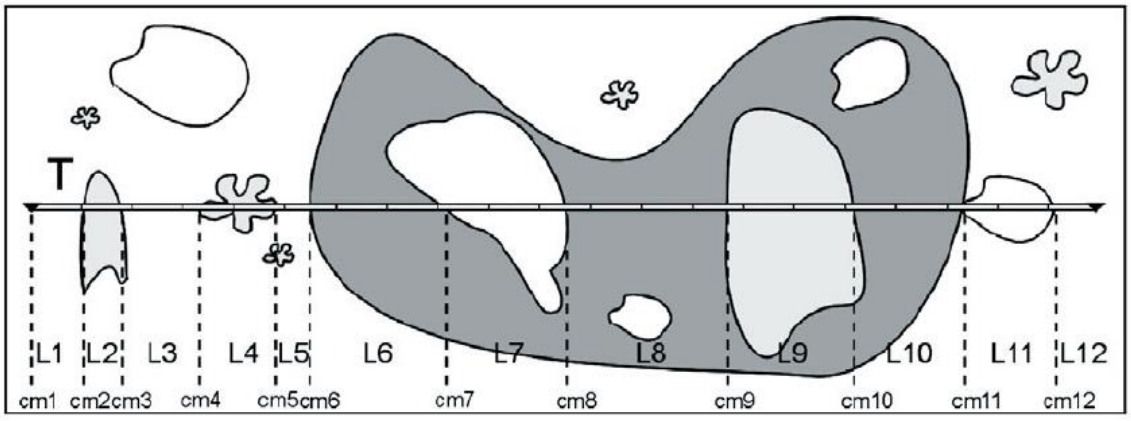

Figure 8. Line Intercept Transect (LIT) technique (Bianchi et al., 2004).

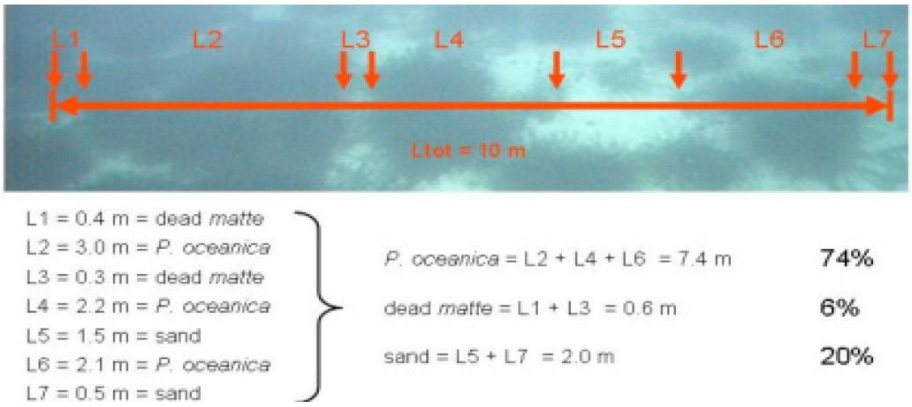

Figure 9. Example of LIT technique for the assessment of percentage cover (UNEP/MAP - RAC/SPA, 2014).

3.2.3. Shoot density

Shoot density is the number of seagrass shoots/m^2 and thus provides a measure of seagrass abundance along depth gradients. The decline in density with depth suggests that shoot density responds faster than other indicators (e.g., biomass and cover) to environmental changes and may be an early indicator of change or negative trends that are occurring in the habitat type (Borum *et al*. 2004).

SASPAS protocol: shoot density has been measured non-destructively by counting the number of shoots within sampling unit (six replicated quadrats) launched randomly at least one meter apart at each sampling station. As shoot density is depth-dependent, any measure of shoot density has been related to water depth.

When shoot density is high (i.e., 2500 shoots/m^2) counting of dense stands is only feasible using small sub-areas. Duarte and Kirkman (2001) suggest different frames size depending on the expected shoot density: 0,5 m x 0,5 m for less than 300 shoots/m^2, 0,25 m x 0,25 m for 300-3000 shoots/m^2 and 0,1 m x 0,1 m for more than 3000 shoots/m^2.

For *P. oceanica*, the number of shoots per m^2 is one of the most widely used descriptors to assess ecosystem health (Pergent-Martini *et al*., 2005; UNEP/MAP-RAC/SPA, 2011) because it provides information on the viability and dynamic of meadows, while also revealing changes due to human influence when measured on a multi-year time scale. Since the meadow density is strongly affected by the depth, Pergent *et al*. (1995) identifies four classes, which are a function of the theoretical mean densities for each depth, and which reflect the ecological conditions of the meadow (Buia *et al*., 2004). Recently this classification has been updated for the interpretation of monitoring data (UNEP/MAP-RAC/SPA, 2011) (Table 2).

Along the lower limit of *P. oceanica* meadows, rhizome scouring (laying bare of the rhizomes) and plagiotropic shoots (plagiotropic to orthotropic rhizome ratio) have also been considered.

Table 2. Meaning of shoot density (shoots/m²) for P. oceanica (UNEP/MAP-RAC/SPA, 2011 modified).

Depth (m)	High	Good			Moderate			Poor			Bad
1	> 1133	1133	to	930	930	to	727	727	to	524	< 524
2	> 1067	1067	to	863	863	to	659	659	to	456	< 456
3	> 1005	1005	to	808	808	to	612	612	to	415	< 415
4	> 947	947	to	757	757	to	567	567	to	377	< 377
5	> 892	892	to	709	709	to	526	526	to	343	< 343
6	> 841	841	to	665	665	to	489	489	to	312	< 312
7	> 792	792	to	623	623	to	454	454	to	284	< 284
8	> 746	746	to	584	584	to	421	421	to	259	< 259
9	> 703	703	to	547	547	to	391	391	to	235	< 235
10	> 662	662	to	513	513	to	364	364	to	214	< 214
11	> 624	624	to	481	481	to	338	338	to	195	< 195
12	> 588	588	to	451	451	to	314	314	to	177	< 177
13	> 554	554	to	423	423	to	292	292	to	161	< 161
14	> 522	522	to	397	397	to	272	272	to	147	< 147
15	> 492	492	to	372	372	to	253	253	to	134	< 134
16	> 463	463	to	349	349	to	236	236	to	122	< 122
17	> 436	436	to	328	328	to	219	219	to	111	< 111
18	> 411	411	to	308	308	to	204	204	to	101	< 101
19	> 387	387	to	289	289	to	190	190	to	92	< 92
20	> 365	365	to	271	271	to	177	177	to	83	< 83
21	> 344	344	to	255	255	to	165	165	to	76	< 76
22	> 324	324	to	239	239	to	154	154	to	69	< 69
23	> 305	305	to	224	224	to	144	144	to	63	< 63
24	> 288	288	to	211	211	to	134	134	to	57	< 57
25	> 271	271	to	198	198	to	125	125	to	52	< 52
26	> 255	255	to	186	186	to	117	117	to	47	< 47
27	> 240	240	to	175	175	to	109	109	to	43	< 43
28	> 227	227	to	164	164	to	102	102	to	39	< 39
29	> 213	213	to	154	154	to	95	95	to	36	< 36
30	> 201	201	to	145	145	to	89	89	to	32	< 32
31	> 189	189	to	136	136	to	83	83	to	30	< 30
32	> 179	179	to	128	128	to	77	77	to	27	< 27
33	> 168	168	to	120	120	to	72	72	to	24	< 24
34	> 158	158	to	113	113	to	68	68	to	22	< 22
35	> 149	149	to	106	106	to	63	< 63			
36	> 141	141	to	100	100	to	59	< 59			
37	> 133	133	to	94	94	to	55	< 55			
38	> 125	125	to	88	88	to	52	< 52			
39	> 118	118	to	83	83	to	48	< 48			
40	> 111	111	to	78	78	to	45	< 45			

3.2.4. Shoot morphometric measurement

The study of the phenological characteristics of marine seagrasses allows to describe the state of vitality of plants through the analysis of vegetation turnover and cyclic phases that characterize the species and the meadow.

SASPAS protocol - The following parameters have been measured in the laboratory: shoot length (cm/shoot), shoot width (cm/shoot), average number of leaves (leaves/shoot), leaf necrosis (% leaves/shoot) of randomly collected shoots at each station (for *P. oceanica* only orthotropic shoots will be sampled). For each station, we collected 6 shoots for *P. oceanica* and 20 shoots for the other species (which have been also used for epiphyte analyses).

The limited number of *P. oceanica* shoots (6) collected compared to those provided by other monitoring protocols (6-18) (ISPRA, 2012) is justified by the fact that the monitoring operations aim to preserve the meadows as much as possible, considering how they are damaged by trawling or anchoring.

3.2.5. Leaf Area Index (LAI) and Conservation Index (CI)

To assess the conservation status of the *P. oceanica* meadows, the monitoring protocol foresees the application of two indices, the Leaf Area Index (LAI) and the Conservation Index (CI):

Leaf Area Index (LAI):
The photosynthetically active surface (m^2/m^2) is determined by multiplying the mean surface of one-shoot leaves (only one face) by meadow shoot density.

Conservation Index (CI): (only applicable to *P. oceanica*)

CI = P/(P+D)

where: P= % of alive *P. oceanica*; D= % of dead matte.

Based on the values of CI, meadows have been classified according to the criterion proposed by Montefalcone (2009) that follow the WFD requirements:

Bad	Poor	Moderate	Good	High
CI<0.3	0.3≤CI<0.5	0.5≤CI<0.7	0.7≤CI<0.9	CI≥0.9

3.2.6. Algal blooms and filamentous algae

Macroalgal blooms can vary greatly over time both because they grow fast and because they are regulated by wind exposure and can be decimated after a storm. The presence and quantity of filamentous algae (especially the genera *Ulva* and *Cladophora*) can be used as an indicator of nutrient richness in coastal waters.

SASPAS protocol: the presence/absence of macroalgal blooms has been measured by visual estimations from boat using the aqua scope.

3.2.7. Abundance of epiphytes

Epiphytes (phyto- and zoo-) can be a prominent component of seagrass ecosystems when ambient nutrient concentrations are high. Both composition and abundance are important. Samples with associated epiphytic assemblages will be collected in immersion and stored frozen or in a preservation liquid until laboratory analysis.

SASPAS protocol: for each station we collected 6 shoots for *P. oceanica* and 20 shoots for the other species (that will also be used for morphometric measurements).

Each shoot collected has been carefully examined under a microscope to determine the organisms present. They have been classified into three morpho-functional categories: *encrusting* (encrusting or prostrate algae), *turf* (algae less than 10 mm long) and *erect* (algae greater than 10 mm) (Airoldi and Cinelli, 1997; Irving and Connell, 2002a, 2002b). Zoobenthos has been reported, only when their presence was significant. Then, cover, i.e., the percentage of area occupied by organisms on the leaf surface, was calculated and divided among the three morpho-functional categories.

3.2.8. Associated communities

The abundance of bivalve *Pinna nobilis* (listed in the Annex IV of HD) is considered an indicator of meadow health (Borum *et al*., 2004; Díaz-Almela e Duarte, 2008). The presence of *P. nobilis* can be affected by physical impacts on the meadows (e.g., boat anchoring).

SASPAS protocol: *Pinna nobilis* density has been measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long (see “Belt Transect” technique in Bianchi *et al*., 2004; Figure 10) and evaluating their status (dead or alive).

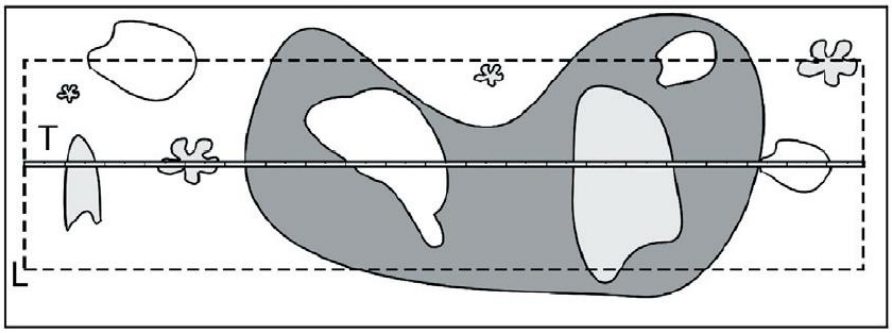

Figure 10. "Belt Transect" technique (Bianchi et al., 2004).

3.2.9. Lower limit of meadows and balise placement (only for *P. oceanica*)

The lower depth of the meadow extension is more fragile than the upper one and can be considered as an indicator of the dynamics of the entire meadows. In addition, its bathymetric identification will be performed by the technique called "balisage" which will allow to verify its evolution in the temporal scales envisaged by the project. It consists in the installation of marking points (balises), dead bodies to be placed on the bottom at the edge of the meadow and to control in time possible retreat or increase of the contour.

SASPAS protocol: considering the schedule of the project, the protocol adopted by the Reseau de Surveillance Posidonies (Charbonnel *et al*., 2000) was applied in a simplified form with the laying of three balises and a photographic survey.

During the Preliminary Survey (WP 3.1), divers tried to find three sections of the lower limit (characterized by degraded/risk of meadows conditions) to place the three balises (1 balise in every section). Only one section was identified and all three balises have been placed along it. Divers took photos: no. 3 frontal pictures (central, lateral right side and lateral left side) from 0,5 m off the seaflor, using a picket installed 1,5 m from the balise, downward to the *P. oceanica* meadow.

Because of the characteristics of the two study areas (NP Kornati and Litorale Brindisino), where the stations are located in an area characterized by the presence of discontinuous meadows, the balises were placed on the bottom by the edge of patches of *Posidonia* characterized by degraded/risk conditions. The selected limit did not correspond to the actual lower limit of the meadow (as represented in the example in the Figure 11), as only possible anchor-risk contours were considered, to monitor their retreat dynamics.

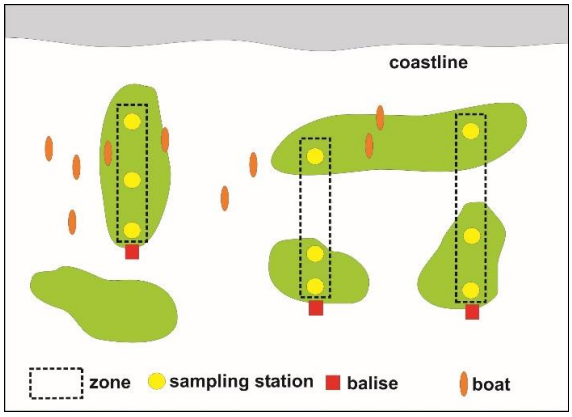

Figure 11. Example of balise placement in a discontinuous meadow.

The typology of lower limits is based on the description of Pergent *et al*. (1995) integrated by Montefalcone (2009) and UNEP/MAP-RAC/SPA (2009):

- progressive limit: with plagiotropic (horizontal) rhizomes beyond the limit oriented toward the bottom, the absence of matte, regularly decreasing cover (indicates colonization of the meadow in the depth);
- sharp limit: the meadow stops abruptly with the presence of vertical rhizomes but in the absence of matte; it is characterized by high (>25 %) or low (<25 %) cover (these limits usually indicate a state of equilibrium, but low percent cover may indicate environmental deterioration and an early imbalance);
- erosive limit: the meadow stops abruptly with the presence of a pronounced step of matte and cover > 50 %;
- sparse limit: density is less than 100 shoots per m^2 and cover less than 15 % (in general it reflects degraded conditions);
- regressive limit: the presence of dead matte beyond the limit, within the dead matte a few isolated shoots or residual patches of *P. oceanica* alive may persist, with or without step of matte, isolated or connected to the meadow (it testifies a decline of the meadow).

Recent classifications of the status of the meadow in function of lower limit depth, typology and % cover are reported in Table 3,

Table 4 and Table 5 (UNEP/MAP-RAC/SPA, 2009, 2011).

Table 3. Status of the meadow in function of the lower limit depth (UNEP/MAP-RAC/SPA, 2011, modified).

	High	Good	Moderate	Poor	Bad
Depth (m)	> 34.2	34.2 to 30.4	30.4 to 26.6	26.6 to 22.8	< 22.8

Table 4. Status of the meadow in function of the lower limit tipology (UNEP/MAP-RAC/SPA, 2011, modified).

	High	Good	Moderate	Poor	Bad
Lower limit	progressive	sharp (cover > 25 %)	sharp (cover < 25 %)	sparse	regressive

Table 5. Status of the meadow in function of the lower limit cover (UNEP/MAP-RAC/SPA, 2011, modified).

	High	Good	Moderate	Poor	Bad
% cover at lower limit	> 35 %	35 % to 25 %	25 % to 15 %	15 % to 5 %	< 5 %

3.2.10. Type of substrate

The type of substrate, by means of visual observation, has been evaluated. Sediment samples have been collected for laboratory grain-size analyses.

3.2.11. Alien species

The presence of *alien species* is included among anthropogenic threats. *P. oceanica* is particularly threatened by some algal species: three species of the genus *Caulerpa* (*C. taxifolia*, *C. prolifera* and *C. cylindracea*) and the turf-forming red alga *Womersleyella setacea*. For this reason, their reporting and coverage estimation are required by the WFD protocols applied in the Mediterranean.
SASPAS protocol: the abundance of *alien species* has been evaluated as cover using the same methods described for seagrass cover (along three transects at each station).

3.2.12. Presence/absence of habitat disturbance

Evidence of mechanical pressures (e.g., mooring systems, concrete blocks, piers, chains, ropes, trash) and signs of impacts (e.g., detached shoots, detached plates of matte, damages due to trawling or anchoring) has been identified through visual observation.

4. MONITORING RESULTS

The results of the annual monitoring campaigns carried out at the three project sites are reported in the following paragraphs. In the project sites, at each station, general information, such as monitoring date, site name/code, coordinator and operators' names, exposure, and coordinates have been recorded in the field sheets (see annexes). Also, laboratory data have been reported in special sheets that are collected in the annexes.

The coordinates of the monitoring stations at the three study sites are reported in Table 6:

Table 6. Coordinates of the monitoring stations in the three study sites.

	Monfalcone (Bay of Panzano)			**Kornati NP (NEW)**			**RNP Dune Costiere**	
	Latitude (N)	Longitude (E)		Latitude (N)	Longitude (E)		Latitude (N)	Longitude (E)
Z1 A	45 46' 45,81''	13 32' 12,51''	Z1 A	43 49' 28,88''	15 16' 30,19''	Z1 A	40 48' 59,81''	17 31' 25,11''
Z1 B	45 46' 45,47''	13 32' 19,19''	Z1 B	43 49' 29,53''	15 16' 31,23''	Z1 B	40 48' 59,83''	17 31' 24,42''
Z1 C	45 46' 37,97''	13 32' 27,58''	Z1 C	43 49' 30,85''	15 16' 31,98''	Z1 C	40 48' 59,81''	17 31' 23,78''
Z2 A	45 45' 34,13''	13 31' 36,79''	Z2 A	43 49' 28,47''	15 16' 31,12''	Z2 A	40 49' 00,32''	17 31' 25,01''
Z2 B	45 45' 28,69''	13 31' 54,76''	Z2 B	43 49' 29,48''	15 16' 31,81''	Z2 B	40 49' 00,39''	17 31' 24,38''
Z2 C	45 45' 23,05''	13 32' 32,63''	Z2 C	43 49' 30,33''	15 16' 33,00''	Z2 C	40 49' 00,43''	17 31' 23,51''
Z3 A	45 45' 06,27''	13 31' 54,88''	Z3 A	43 48' 32,69''	15 15' 18,90''	Z3 A	40 49' 00,91''	17 31' 24,93''
Z3 B	45 45' 09,33''	13 32' 06,01''	Z3 B	43 48' 32,20''	15 15' 18,20''	Z3 B	40 49' 00,87''	17 31' 24,10''
Z3 C	45 45' 11,00''	13 32' 35,82''	Z3 C	43 48' 32,00''	15 15' 17,50''	Z3 C	40 49' 00,92''	17 31' 23,17''
			Balise	43 49' 31,10''	15 16' 32,59''	*Balise*	40 49' 00,08''	17 31' 23,99''

4.1. Monfalcone (Bay of Panzano)

4.1.1. Monitoring area

At Monfalcone, the annual monitoring campaign took place between mid-September and early October in the two Natura 2000 sites in the Panzano Bay: SAC - *Cavana di Monfalcone* and SPA-SAC - *Foce dell'Isonzo - Isola della Cona* (Figure 13).

In the area located in the northern part of the Panzano bay, in the site "Cavana di Monfalcone", Zone 1 (Z1) was located on a *Cymodocea nodosa* meadow, where anchoring pressures occur, due to the presence of medium-sized boats (sailboats). Within this Zone, three monitoring stations have been positioned at different depths (Stations Z1-A, Z1-B and Z1-C) (Figure 12).

The Zone 2 (Z2) and Zone 3 (Z3) were placed in the "Foce dell'Isonzo – Isola della Cona". These Zones are characterized by shallow depth and are located on *Cymodocea nodosa* meadows mixed with other species (i.e., *Zostera noltei* in Z2 and *Zostera marina* in Z3). In these areas anchoring pressures occur, due to the presence of small-size boats. As at Zone 1, three monitoring stations were located, within each Zone, at different depths, for a total of six stations (Z2-A, Z2-B, Z2-C, Z3-A, Z3-B and Z3-C) (Figure 12).

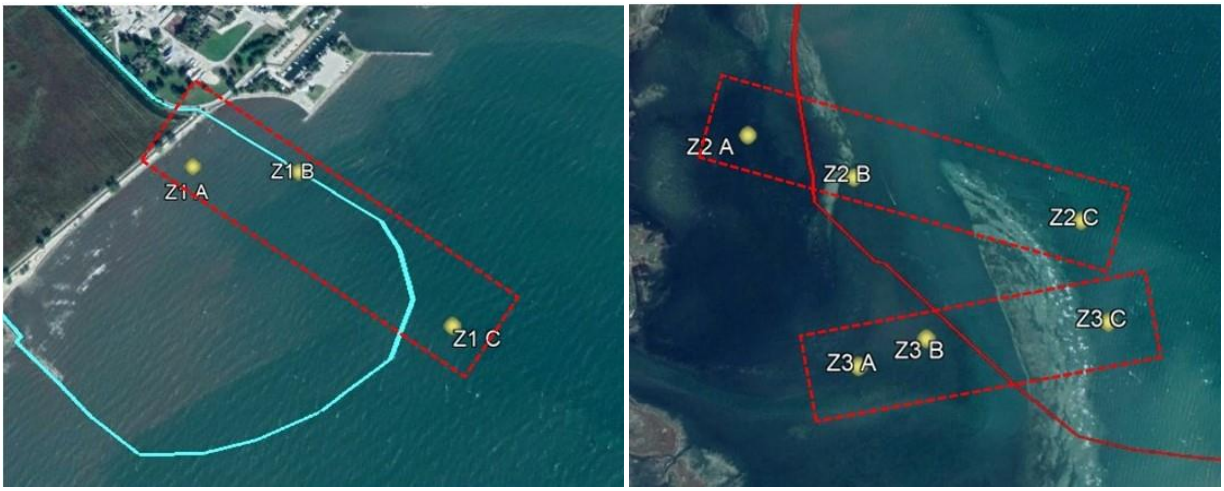

Figure 12. Sampling scheme applied to Zone 1 in the in the site "Cavana di Monfalcone" and to Zones 2 and 3 in the in the site "Foce dell'Isonzo, Isola della Cona".

Figure 13. September 2020, Bay of Panzano: first monitoring campaign.

4.1.2. Distribution of seagrass meadows

In the Bay of Panzano, *Cymodocea nodosa* is the most abundant seagrass species, which sometimes forms mixed meadows together with *Zostera marina* and / or *Zostera noltei*. Concerning the sampling areas, as previously mentioned, Zone 2 and Zone 3 were located on *Cymodocea nodosa* meadows, with reduced presence of other species (*Zostera noltei* in Z2 and *Zostera marina* in Z3) (Figure 14).

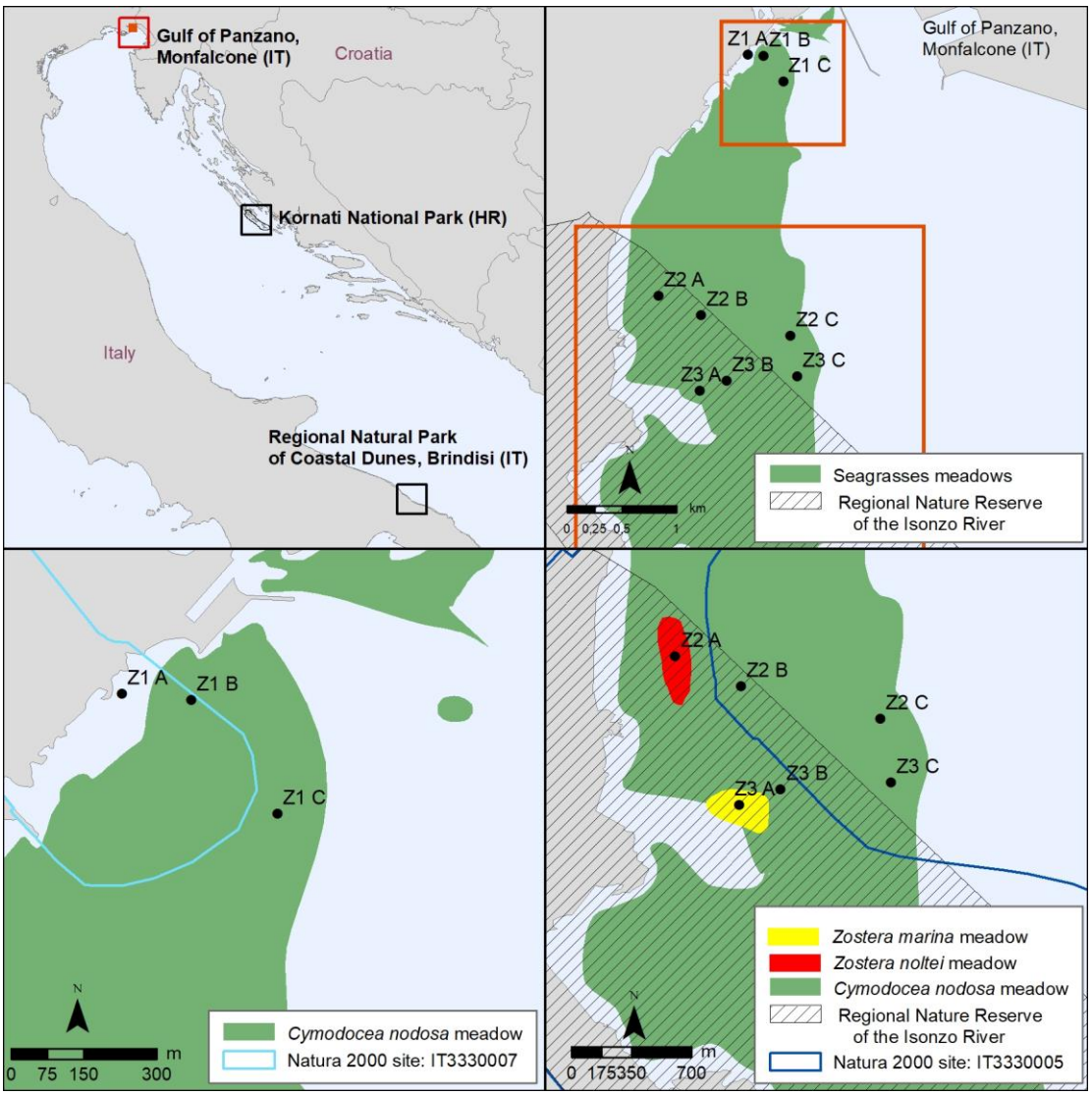

Figure 14. Seagrasses distribution and monitoring stations in the Panzano Bay.

At the time of measurements, a high continuity of meadows was observed in the monitoring stations and no particular signs of disturbance were recorded.

Other sites, coincident with the shallower areas are little or no colonized.

4.1.3. Percentage Cover and meadow continuity

In Zone 1 (stations Z1-A, Z1-B and Z1-C), the average cover of *Cymodocea nodosa* varied between 0% and 100%; in fact, in some areas (Station Z1-C) the seagrasses were absent (bare seabed). In Zone 2 (stations Z2-A, Z2-B and Z2-C), as mentioned before, the *Cymodocea nodosa* meadows were mixed with *Zostera noltei* and (as the graphs shows) the average cover of *C. nodosa* was close to 100% and the cover of *Z. noltei* was slightly less than 90% (discontinuity of the meadow). In Zone 3 (stations Z3-A, Z3-B and Z3-C), the cover of both the species (*C. nodosa* and *Zostera marina*) was close to 100%. Even considering the variability due to the presence of different species characterized by different seasonal cycles, data analysis suggests the existence of limited differences along stations and Zones for percent cover. A comparison with the data from 2019 campaign (preliminary survey - WP 3 activity 1) shows an increase in coverage of *Z. noltei* at station Z2-A and *C. nodosa* at station Z1-A. The results are summarized in Figure 15.

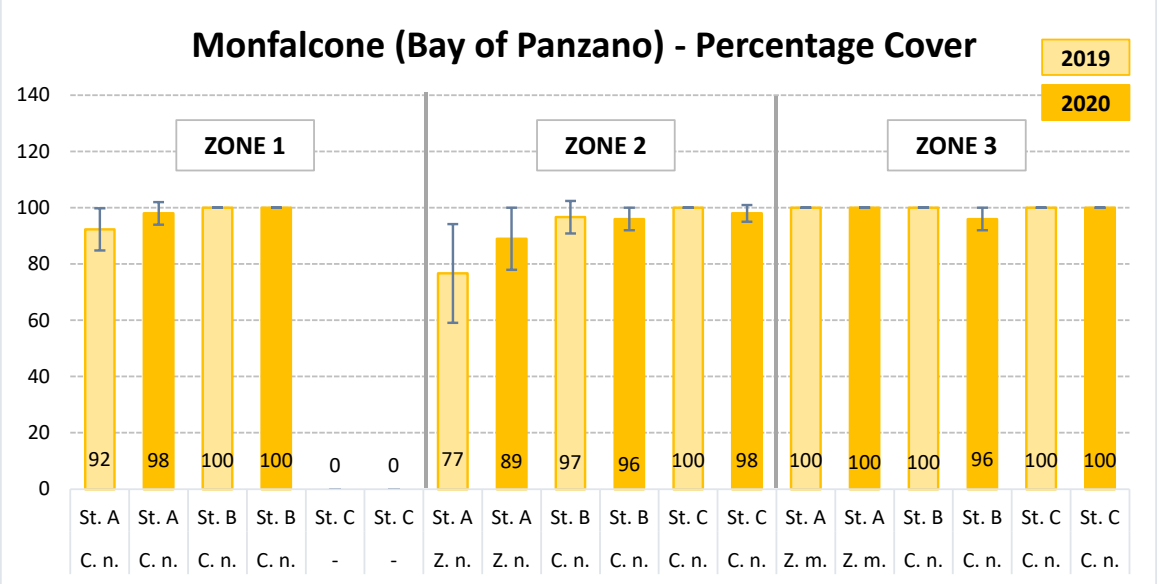

Figure 15. The average values of seagrasses percentage cover as measured at the sampling stations.

4.1.4. Shoot density

In Zone 1 (stations Z1-A, Z1-B and Z1-C), the average shoot density of *Cymodocea nodosa* varied between 602 and 613 shoots/m^2 (at Z1-C station the seagrasses were absent). In Zone 2 (stations Z2-A, Z2-B and Z2-C), the mean value of shoot density ranged between 602 and 639 shoots/m^2 for *Cymodocea nodosa* and is about 2304 shoots/m^2 for *Zostera noltei*. In the third Zone (stations Z3-A, Z3-B and Z3-C), the average shoot density of *Cymodocea nodosa* ranges from 681 to 813 shoots/m^2 and it was about 293 shoots/m^2 for *Zostera marina*. As for the percent cover, the data analysis suggests that there are limited differences along stations and Zones for shoot density. The differences are related to the presence of species (*C. nodosa* e *Zostera* spp.) characterized by different seasonal cycles (growth rate and spread, reproductive season, etc.). A comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) highlights an increase of *Zostera noltei* shoot density in the station Z2-A. The results are summarized in Figure 16.

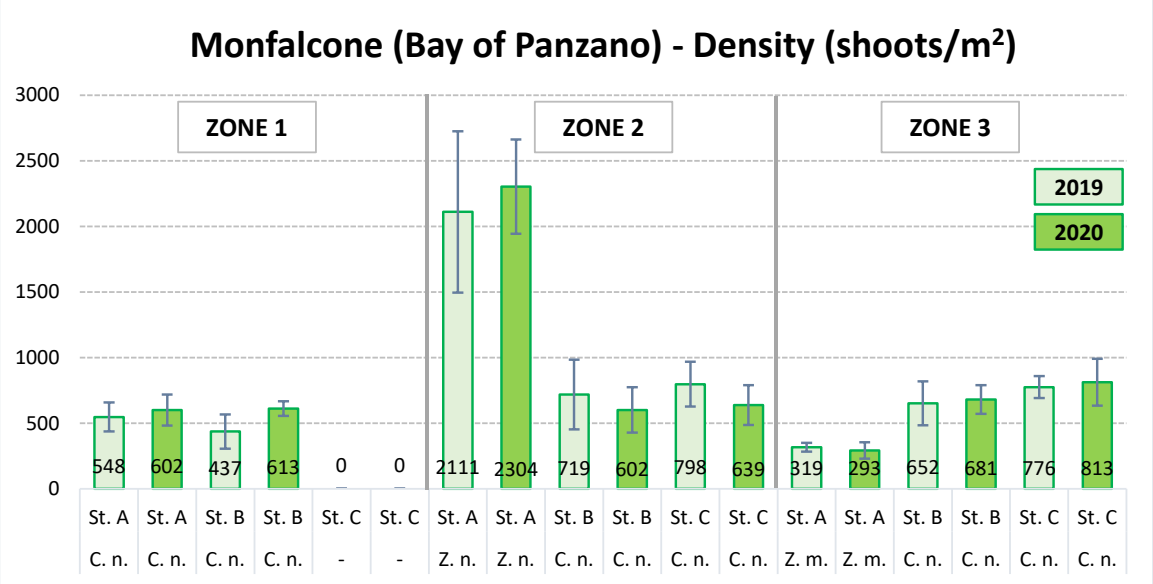

Figure 16. The average values of seagrasses shoot density as measured at the sampling stations.

4.1.5. Shoot morphometric measurement

In Zone 1 (stations Z1-A, Z1-B and Z1-C), the mean shoot length of *Cymodocea nodosa* ranged from 45 and 50,1 cm (at Z1-C station the seagrasses were absent). In Zone 2 (stations Z2-A, Z2-B and Z2-C), the mean shoot length ranged from 58,6 and 70,8 cm for *Cymodocea nodosa* and was 40,6 cm for *Zostera noltei*. In Zone 3 (stations Z3-A, Z3-B and Z3-C), the mean shoot length of *Cymodocea nodosa* ranged from 58,8 and 62,2 cm and was approximately 40,0 cm for *Zostera marina*. Analysis of the data suggests that there are limited differences along stations and Zones, for *C. nodosa* shoot density, and are mainly due to different water depths. Light attenuates with increasing depth and seagrasses prolong leaves and thin shoots density to capture more light to convert into photosynthetic production. Compared to the average shoot length of *C. nodosa*, the shorter length of *Z. noltei* and the longer lenght of *Z. marina* are expected and due to different phenological cycles. A comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows a general increase in *C. nodosa* shoot length. This increase is due to the different sampling seasons (end of May in 2019 and mid-September in 2020), at the beginning and at the end of the vegetative cycle, respectively. The results are summarized in Figure 17.

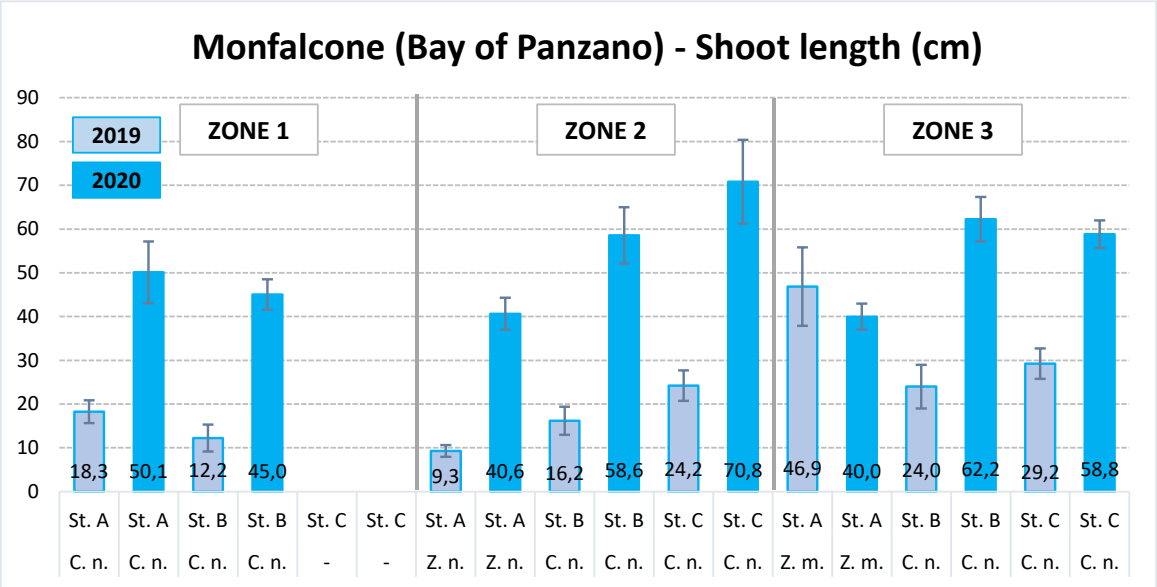

Figure 17. The average values of seagrasses shoot length as measured at the sampling stations.

The other parameters are summarized in Table 7 (average values and standard deviations).

Table 7. Shoot width (cm/shoot), n. of leaves/shoot and leaf necrosis (% leaves/shoot) (verage values and standard deviations).

Zone 1		**Z1-A (C.n.)**	**Z1-B (C.n.)**	**Z1-C**
Shoot width (cm/shoot)	**2020**	0,36±0,01	0,35±0,02	-
	2019	0,17±0,02	0,18±0,03	
N. of leaves/shoot - 2020	**2020**	2,7±0,5	2,8±0,6	-
	2019	3,1±0,5	3,0±0,7	-
Leaf necrosis (% leaves/shoot)	**2020**	0,6±0,2	0,6±0,2	-
	2019	0,1±0,2	0,4±0,8	-
Zone 2		**Z2-A (Z.n.)**	**Z2-B (C.n.)**	**Z2-C (C.n.)**
Shoot width (cm/shoot)	**2020**	0,11±0,01	0,34±0,01	0,38±0,02
	2019	0,10±0	0,18±0,02	0,28±0,02
N. of leaves/shoot	**2020**	2,8±0,4	2,7±0,5	2,5±0,5
	2019	2,8±0,4	2,7±0,6	2,7±0,6
Leaf necrosis (% leaves/shoot)	**2020**	0,2±0,2	0,7±0,5	1,1±0,5
	2019	0,2±0,2	0,3±0,5	1,4±0,9
Zone 3		**Z3-A (Z.m.)**	**Z3-B (C.n.)**	**Z3-C (C.n.)**
Shoot width (cm/shoot)	**2020**	0,49±0,01	0,33±0,02	0,39±0,02
	2019	0,44±0,05	0,19±0,03	0,25±0,04
N. of leaves/shoot	**2020**	4,8±0,7	2,8±0,4	3,0±0,7
	2019	4,8±0,7	2,8±0,5	2,8±0,5
Leaf necrosis (% leaves/shoot)	**2020**	1,5±0,5	0,7±0,3	0,5±0,3
	2019	1,1±0,5	0,8±0,3	1,4±0,9

The comparison with the 2019 campaign data (preliminary survey - WP 3 activity 1) shows no particular anomalies in the three parameters' values.

4.1.6. Leaf Area Index (LAI)

The index values are reported in Table 8. Leaf Area Index (LAI) averages values (the values in brackets refer to 2019 Preliminary survey campaign).

Table 8. Leaf Area Index (LAI) averages values (the values in brackets refer to 2019 Preliminary survey campaign).

Zone 1	Z1-A (C.n.)	Z1-B (C.n.)	Z1-C
LAI (station average value)	1,66 (0,28)	1,59 (0,14)	-
LAI (Zone average value)	1,62 (0,21)		-

Zone 2	Z2-A (Z.n.)	Z2-B (C.n.)	Z2-C (C.n.)
LAI (station average value)	1,37 (0,34)	2,07 (0,25)	2,62 (0,69)
LAI (Zone average value)	-	2,35 (0,47)	

Zone 3	Z3-A (Z.m.)	Z3-B (C.n.)	Z3-C (C.n.)
LAI (station average value)	1,35 (1,81)	2,31 (0,44)	3,37 (0,86)
LAI (Zone average value)	-	2,84 (0,65)	

Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows a general increase in LAI values due to the increased shoot length of *C. nodosa* and *Z. noltei* (see paragraph 4.1.5).

4.1.7. Algal blooms and filamentous algae

A general visual assessment by boat using aqua scope in the monitoring areas showed the absence of (filamentous) macroalgal blooms.

4.1.8. Abundance of epiphytes

The average cover of the three categories has been calculated (i.e., the percentage of surface area occupied by the organisms on the leaf surface) and reported in Table 9.

Table 9. Average cover of the three categories (Encrusting layer, Erect layer and Turf layer).

	Z1-A	Z1-B	Z1-C	Z2-A	Z2-B	Z2-C	Z3-A	Z3-B	Z3-C
Encrusting layer	15%	15%	/	15%	15%	15%	15%	20%	20%
Erect layer	<5%	<5%	/	<5%	<5%	<5%	<5%	<5%	<5%
Turf layer	<5%	<5%	/	<5%	<5%	<5%	<5%	<5%	<5%

The dominance of the *encrusting layer* (mainly represented by red calcareous algae) is reported in the literature as a positive condition of the quality status of seagrass meadows. In fact, in disturbed

environments (e.g., in the presence of increased nutrient or turbidity), there would be a reduction in the abundance of encrusting taxa and a simultaneous increase in the presence of filamentous algae (Ballesteros, 1987; Martínez-Crego *et al*., 2010).

4.1.9. Associated communities

Pinna nobilis was found at station Z2-C (4 live individuals and 1 dead individual) and at station Z3-C (1 live bivalve).

4.1.10. Type of substrate

Considering the close relationship between seagrasses and substrate, to identify the type of substrate, in addition to visual observation in field, sediment samples were collected for laboratory granulometric analyses, and the results are reported in Table 10:

Table 10. Results of the grain-size analyses.

	coarse sand %	medium sand %	fine sand %	silt %	clay %	Grain size classification
	Ø>64 mm	2<Ø<64 mm	0.063<Ø<2 mm	0.0039<Ø<0.063 mm	Ø<0.0039 mm	
Z1	0,00	0,00	83,99	15,54	0,47	Fine silty sand
Z2	0,00	0,00	74,18	22,47	3,35	Fine silty sand
Z3	0,00	0,00	84,16	15,24	0,61	Fine silty sand

4.1.11. Alien species

No alien algal species were found in the study area during the monitoring activities.

4.1.12. Presence/absence of habitat disturbance

Concerning human disturbance and evidence of mechanical pressures, some fishing-nets, fixed to the sea bottom by poles, were observed near Zone 2 and Zone 3.

4.1.13. Monitoring of seagrass transplantation

At the Monfalcone site (Figure 18), the area for pilot seagrass transplantation (planned in WP 4 activity 2) has been identified in the SPA SAC Foce dell'Isonzo – Isola della Cona (near Zone 2 and Zone 3). This area is characterized by shallow waters (some 1.2 meters above mean sea level), and by the presence of *Cymodocea nodosa* meadows mixed with other species (*Zostera noltei* and *Zostera marina*); anchoring pressures occur in this area, due to the presence of small boats. The meadows of the donor site have been selected in a nearby area (Figure 18). The donor meadow was continuous with no visible signs of disturbance.

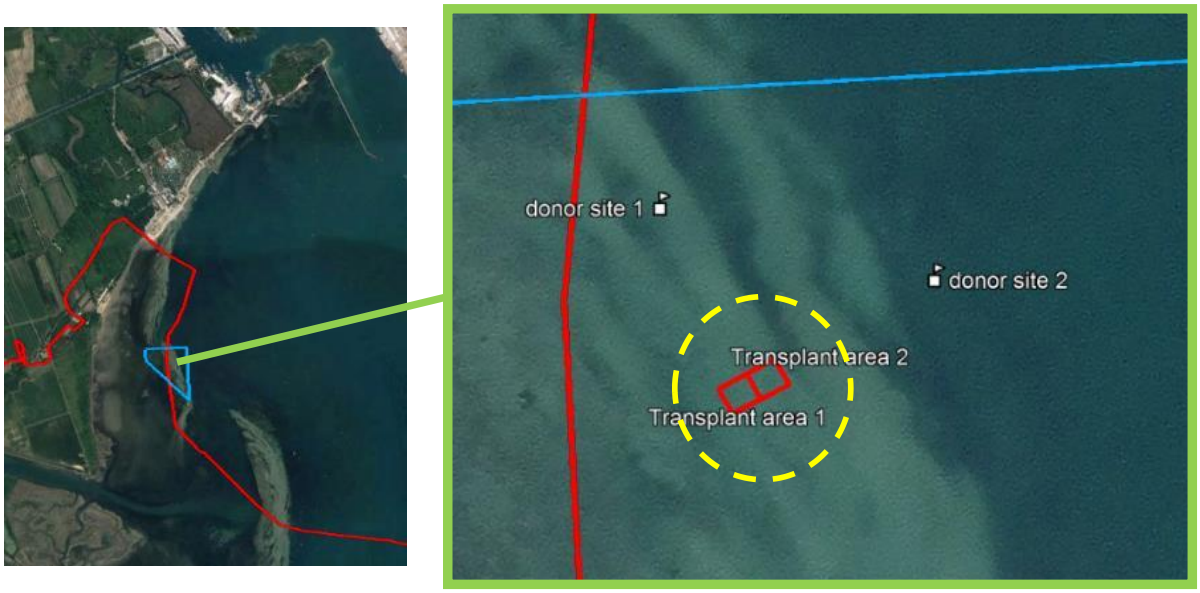

Figure 18. Seagrass transplantation: host and donor sites in Panzano Bay (Monfalcone)

Figure 19. Cymodocea nodosa *transplanting techniques: collection and planting of plugs (on the left) and collection of shoots and subsequent re-planting by staples (on the right).*

On 17th September 2020, *Cymodocea nodosa* shoots have been transplanted using two different techniques (Figure 19). The first one, which was prevalent, involved the collection and planting of plugs (vegetated units where the plant with leaves, roots and rhizomes will be taken with the native sediment surrounding it). The second one involved the collection of shoots (bare root planting units - cuttings) and subsequent replanting, using anchor staples.

Special inspection of the restored site was carried out in January 2021 and showed that approximately 95% of the plugs transplanted in September were still present (Figure 20). Regarding the transplanted cuttings, the small leaf size of *Cymodocea*, due to the slow growth during the winter months, made it more difficult to identify them, so it will be possible to confirm their presence or absence only during the next spring monitoring campaign.

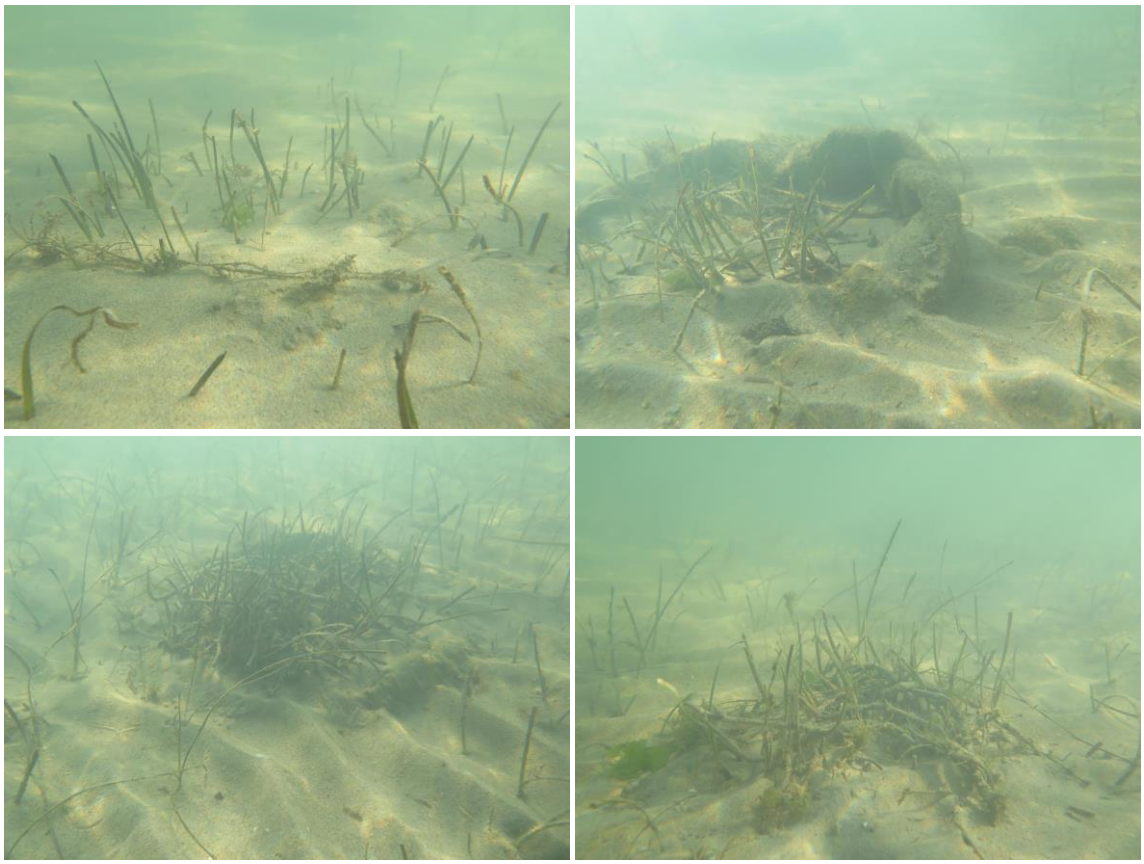

Figure 20. January 2021: plugs of Cymodocea nodosa *tranplanted in September 2020.*

4.2. KORNATI NP

4.2.1. Monitoring area

At the Kornati NP site, the annual monitoring campaign was carried out in mid-June (Figure 23). In this case, two types of sites were considered, located on *P. oceanica* meadows, the first one is the "Anchoring site" where anchoring pressures occur and the second one is the "Diving site" where diving boats frequently anchor for authorized diving activities.

In the "Anchoring site" (in Kravljačica Bay), two Zones have been selected (Zone 1 and Zone 2) on the *P. oceanica* meadows, where three monitoring stations have been placed at different depths (St. A, B and C) for a total of six stations. In addition, three marking points (balises) have been placed (Figure 21).

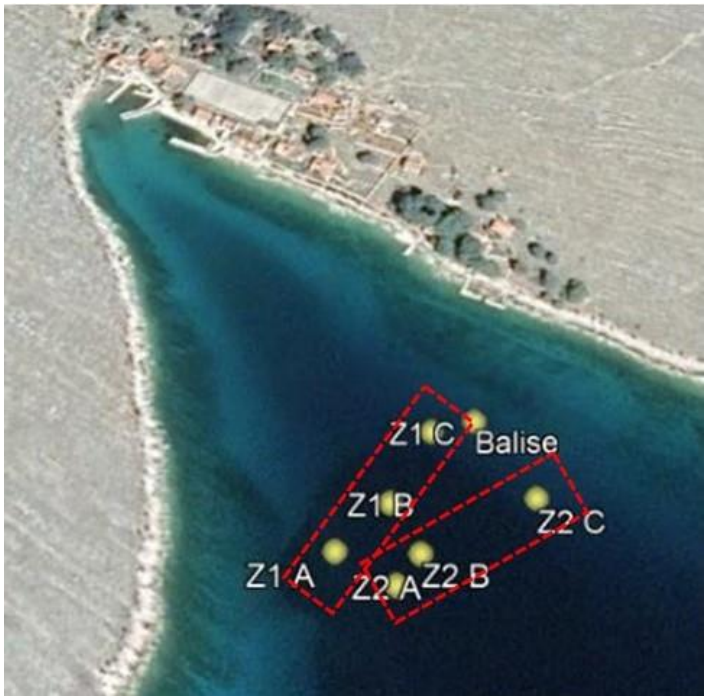

Figure 21. Sampling scheme applied to the Zone 1 and Zone 2 in the in the "Anchoring site "in Kravljačica Bay.

At the "Diving site", located between the Borovnik island and the Balun one, dive boats anchor for authorized diving activities a Zone (Zone 3), three monitoring stations (St. A, B and C) have been placed (Figure 22).

Figure 22. Sampling scheme applied to the Zone 3 in the in the "Diving site" positioned between Borovnik island and Balun Island.

Figure 23. June 2020, Kornati NP: partners staff and a monitoring zone delimited by inflatable signaling buoys.

4.2.2. Distribution of seagrass meadows

In an overall view, P. *oceanica* meadows are widespread in the park, down to depths of 25-30 meters and with an irregular distribution that mainly follows the bathymetric pattern of the archipelago (Figure 24).

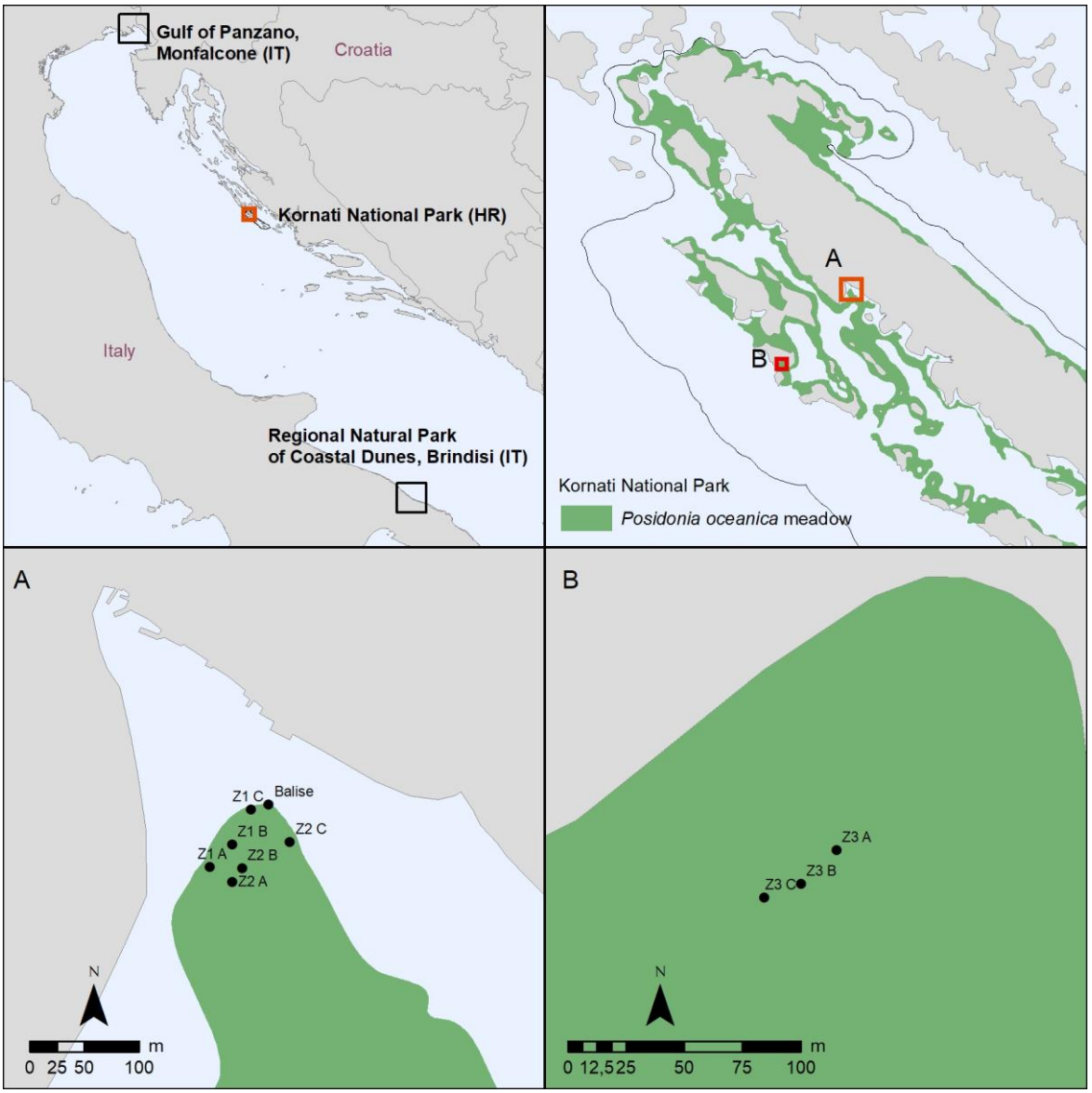

Figure 24. Seagrasses distribution and monitoring stations in the Kornati NP.

The existing distribution map was produced on the basis of the first available information and through orthophoto observations and bathymetric maps. This map represents a potential distribution range, as there is a need for more detailed seagrass distribution maps based on actual data collected in the field.

At the “Anchoring site” (Zone 1 and Zone 2) signs of disturbance on the meadows were reported and, in some areas, the cover is fragmented and patchy and damage to seagrasses appears to be caused by anchor dragging and scraping of anchor chains along the seabed. The “Anchoring site”, due to its morphology, bathymetric trend, and wind exposure, behaves as a sedimentation basin. At present, it is reasonable to assume that the numerous anchorages of pleasure boats in the summer period are also responsible for sediment re-suspension.

In the “Diving site” (Zone 3) the meadow was continuous, with no visible signs of disturbance and low sedimentation; only a few points were devoid of meadows, but this is believed to be due to natural distribution dynamics and not to the impact of human activities.

4.2.3. Percentage Cover and meadow continuity

In the “Anchoring site”, where two zones (Zone 1 with stations Z1-A, Z1-B, Z1-C and Zone 2 with stations Z2-A, Z2-B and Z2-C) were located, the mean *P. oceanica* coverage renged between 27% and 49%, showing strong discontinuity of the meadow, with a very patchy distribution, attributable to different pressures, as below suggested.

In the “Diving site” (where Zone 3, with stations Z3-A, Z3-B and Z3-C was located), the mean coverage of *P. oceanica* renged between 51% and 85%. The distribution resulted homogeneous, with sandy lenses to interrupt meadows and a few signs interpreted as anchorage disturbances.

The data analysis suggests the existence of differences in the *P. oceanica* coverage percentage of along stations in the “Anchoring site” and in the “Diving site”. In particular, the stations placed in the “Diving site” were characterized by coverage values higher than the ones in the “Anchoring site”. This is an expected result because, as mentioned before, in the “Anchoring site” *P. oceanica* meadows suffer from mechanical damage caused by boats anchoring and correlated disturbances (physical impacts, sediment burial, over-sedimentation on the canopy, light attenuation…) resulting in a very irregular residual distribution.

A comparison with the data from 2019 campaign (preliminary survey - WP 3 activity 1) highlights some local increase and decrease in the “Anchoring site”; however, statistically significant differences ($p<0,05$) between the two coverage values (2019 and 2020) have been found only in one out of six stations (Z2-B station). In the “Diving site”, a coverage decrease has been recorded in Z3-A and Z3-C stations and these differences are statistically significant differences ($p<0,05$). The presence of sandy lenses that cause variations in the overall values of coverage in this site is probably responsible for these differences. The results are summarized Figure 25.

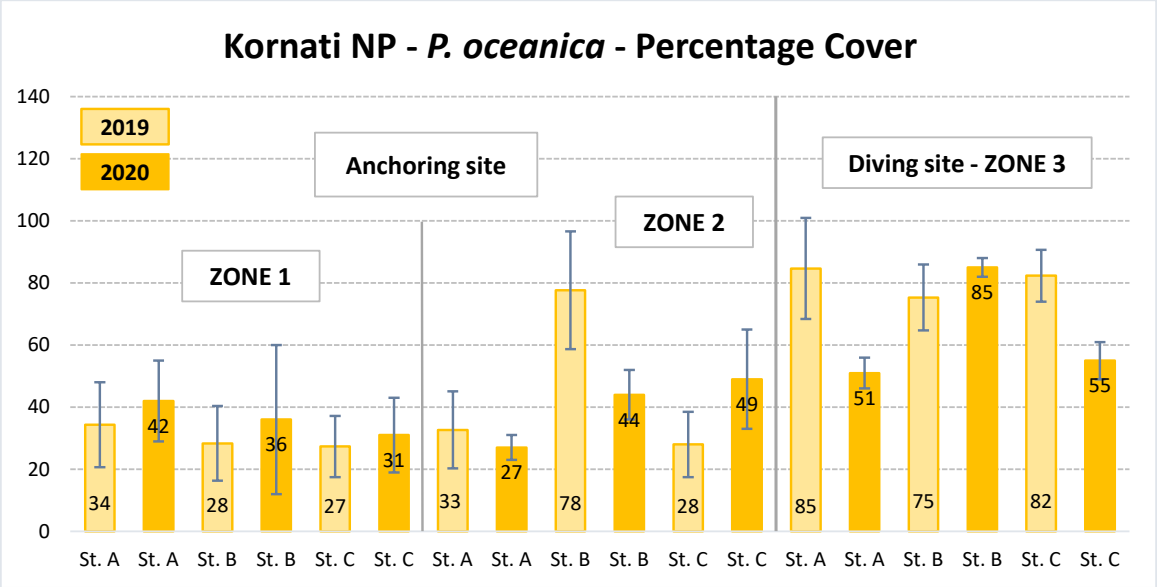

Figure 25. The average values of P. oceanica *percentage cover as measured at the sampling stations.*

4.2.4. Shoot density

At the "Anchoring site", the mean density of *P.oceanica* shoots ranged between 82 and 191 shoots/m^2 (Zone 1 and Zone 2). In the "Diving site" (Zone 3), the average shoot density of *P. oceanica* ranged between 294 and 390 shoots/m^2. As for the percentage cover, the existence of marked differences along stations at the "Anchoring site" for shoot density of *P. oceanica* are mainly related to the presence of anchoring pressure, being this impact not the result of an instantaneous disturbance, but a signal of suffocation and degradation of the leaf canopy caused by continuous mooring at anchor in the bays and by the presence of numerous pleasure boats throughout the long summer season (arrival and departure, sewage discharge, bathing activities, restaurants on the shore, etc.).

In particular, physical damage to seagrasses seems caused by dragging anchors and scraping anchor chains along the seabed. A comparison with the data of the 2019 campaign (preliminary survey - WP 3 activity 1) shows, as for the percentage cover, contradictory signs of decrease and increase of density for the different stations of the anchoring site, which correspond to such an irregular disturbance to the meadow. However, statistically significant differences ($p<0,05$) between the two density values (2019 and 2020) have been found only in one out of six stations (Z2-A station).

In the "Diving site", a completely different level of shoot density has been recorded in the stations Z3-A and Z3-C, showing statistically significant differences ($p<0,05$) between the two density values (2019 and 2020). The results are summarized in Figure 26.

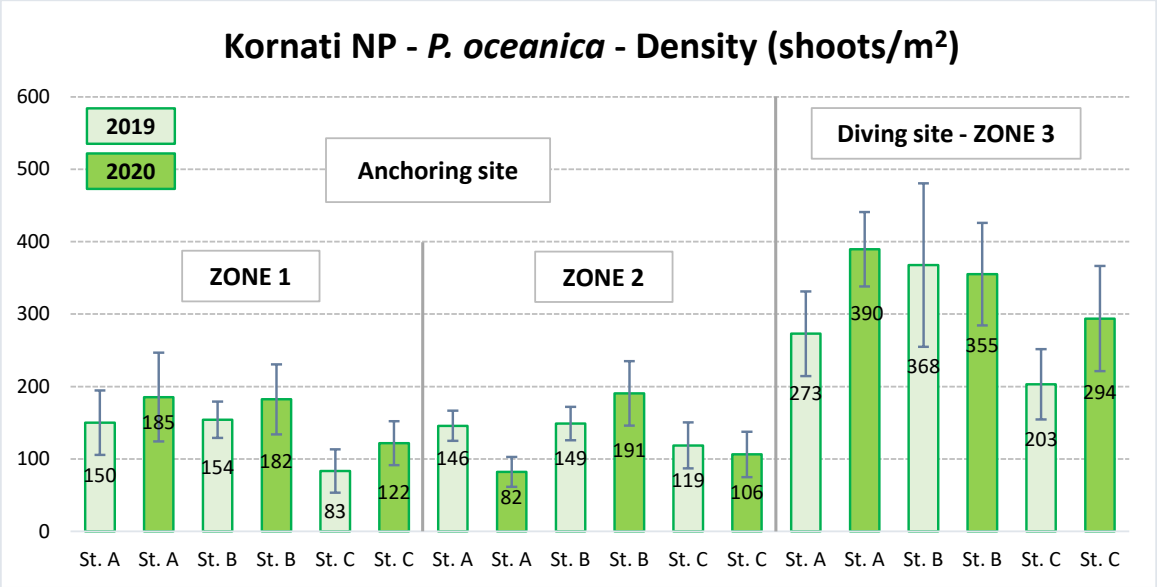

Figure 26. The average values of P. oceanica *shoot density as measured at the sampling stations.*

In Table 11, the values of shoot density and depth are related to the five classes for the final ecological classification (*sensu* WFD) (UNEP/MAP-RAC/SPA, 2011) (see par. 3.2.3).

Table 11. Shoot density and depth values in relation to the five classes for the final ecological classification (sensu WFD) (UNEP/MAP-RAC/SPA, 2011).

Zones	Z1	Z2	Z3
Density (shoots/m²) (average value)	163	126	346
Depth (m) (average value)	13	14	10
Ecological classification (sensu WFD)	POOR	BAD	POOR

At the "Anchoring site" in Zone 1, the increase recorded (compared to 2019) in shoot density allowed the ecological conditions of the meadow to improve from BAD to POOR.

4.2.5. Shoot morphometric measurement

At the "Anchoring site", in Zone 1 (stations Z1-A, Z1-B and Z1-C), the average length of *P. oceanica* shoots ranged between 42,9 and 56,5 cm, and, in Zone 2 (stations Z2-A, Z2-B and Z2-C), between 37,2 and 45,4 cm. In the "Diving site", in Zone 3 (stations Z3-A, Z3-B and Z3-C), the average length of *P. oceanica* shoots ranged between 42,3 and 74,3 cm.

Unlike the previous parameters, as far for shoot length is concerned, the existence of differences along the stations in the "Anchoring site" and in the "Diving site" was less evident (with the exception of station

Z3-A, where the highest density value was recorded). However, even in this case, they seemed to be related, at least in part, to the presence or reduced presence of anchoring pressure.

A comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows, in the "Anchoring site, a slight increase in the length of the shoots at the stations Z1-A and Z1-C in Zone 1 and, in Zone 2, a general reduction in the length of the shoots at the three stations (statistically significant differences ($p<0,05$) in Z1-A, Z2-A e Z2-C stations). At the "Diving site", a decrease in the shoot length was recorded at stations Z3-B and Z3-C and an increase at station Z3-A.

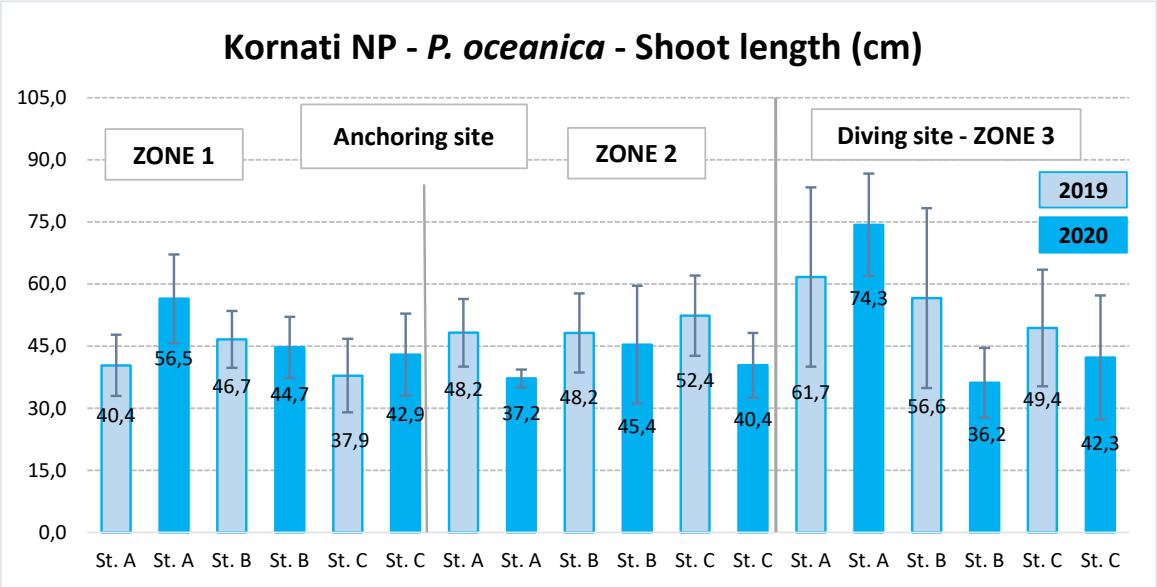

Figure 27. The average values of P. oceanica *shoot length as measured at the sampling stations.*

The other parameters are summarized in Table 12 (average values and standard deviations).

Table 12. Shoot width (cm/shoot), n. of leaves/shoot and leaf necrosis (% leaves/shoot) (verage values and standard deviations).

Zone 1		Z1-A	Z1-B	Z1-C
Shoot width (cm/shoot)	**2020**	0,93±0,04	0,91±0,06	0,93±0,08
	2019	1,06±0,51	0,84±0,03	0,79±0,01
N. of leaves/shoot - 2020	**2020**	4,5±0,5	6,0±2,4	5,0±1,4
	2019	6,2±2,4	6,2±1,6	5,8±0,8
Leaf necrosis (% leaves/shoot)	**2020**	1,4±0,6	1,2±0,8	0,2±0,4
	2019	15,9±7,7	12,4±6,6	3,2±2,6

Zone 2		Z2-A	Z2-B	Z2-C
Shoot width (cm/shoot)	**2020**	0,82±0,02	0,92±0,09	0,91±0,05
	2019	0,79±0,05	0,81±0,03	0,89±0,01
N. of leaves/shoot	**2020**	5,2±0,8	5,7±1,0	5,7±2,2
	2019	6,8±1,8	6,7±1,2	6,7±3,7
Leaf necrosis (% leaves/shoot)	**2020**	5,8±6,0	1,9±1,9	10,1±10,9
	2019	17,7±9,9	9,1±5,4	9,3±3,7
Zone 3		**Z3-A**	**Z3-B**	**Z3-C**
Shoot width (cm/shoot)	**2020**	0,81±0,04	0,76±0,04	0,71±0,02
	2019	0,69±0,03	0,70±0,03	0,70±0,03
N. of leaves/shoot	**2020**	5,7±1,0	4,8±0,8	6,0±0
	2019	6,8±2,0	5,3±0,5	6,0±1,3
Leaf necrosis (% leaves/shoot)	**2020**	8,5±8,5	5,5±5,1	3,9±2,1
	2019	22,2±10,0	30,7±6,4	36,3±10,6

Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows a general decrease in leaf necrosis of *Posidonia* leaves at the Anchoring site (Zone 1 and 2) and at the Diving site (Zone 3).

4.2.6. Leaf Area Index (LAI) and Conservation Index (CI)

To assess the conservation status of *P. oceanica* meadows, two indices were applied: the Leaf Area Index (LAI) and the Conservation Index (CI).

Leaf Area Index (LAI)

The values of the indices are shown in Table 13 (average values):

Table 13. Leaf Area Index (LAI) average (the values in brackets refer to 2019 Preliminary survey campaign).

Zone 1	Z1-A	Z1-B	Z1-C
LAI (station average value)	3,06 (2,31)	2,57 (2,09)	1,69 (0,90)
LAI (Zone average value)	2,44 (1,77)		

Zone 2	Z2-A	Z2-B	Z2-C
LAI (station average value)	0,78 (1,92)	2,91 (2,07)	1,27 (2,23)
LAI (Zone average value)	1,66 (2,07)		

Zone 3	Z3-A	Z3-B	Z3-C
LAI (station average value)	6,25 (4,77)	3,04 (4,13)	2,72 (2,69)
LAI (Zone average value)	4,00 (3,87)		

Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows an increase in the average LAI values in Zone 1 and Zone 3 and a slight decrease in Zone 2.

Conservation Index (CI)

The CI values range from 0 (maximum alteration or minimum conservation status, only presence of dead matte) to 1 (high conservation status) (Table 14).

Table 14. Conservation Index (CI) average values.

Zone 1	Z1-A	Z1-B	Z1-C
CI (station average value)	0,42	0,36	0,31
CI (Zone average value)	0,37 (poor conservation status)		

Zone 2	Z2-A	Z2-B	Z2-C
CI (station average value)	0,27	0,44	0,49
CI (Zone average value)	0,40 (poor conservation status)		
Zone 3	**Z3-A**	**Z3-B**	**Z3-C**
CI (station average value)	0,51	0,85	0,55
CI (Zone average value)	0,64 (moderate conservation status)		

In the "Diving site", the decrease recorded (compared to 2019) in the percentage of cover in Zone 3 (especially at stations Z3-A and Z3-C) caused the meadow conservation status to change from GOOD to MODERATE.

4.2.7. Algal blooms and filamentous algae

A general visual assessment by boat using aqua scope in the monitoring areas showed the absence of (filamentous) macroalgal blooms.

4.2.8. Abundance of epiphytes

The average cover of the three categories was calculated and reported in Table 15:

Table 15. Average cover of the three categories (Encrusting layer, Erect layer and Turf layer).

	Z1-A	Z1-B	Z1-C	Z2-A	Z2-B	Z2-C	Z3-A	Z3-B	Z3-C
Encrusting layer	30%	35%	30%	30%	30%	35%	35%	30%	35%
Erect layer	5%	5%	5%	5%	5%	5%	10%	10%	5%
Turf layer	10%	10%	10%	10%	10%	15%	15%	15%	10%

As with the other study sites, the dominance of the *encrusting layer* (represented mainly by red calcareous algae) can be considered a positive condition of the quality status of seagrass meadows.

4.2.9. Associated communities

In the study area (within the corridors and in their proximity), no live or dead individuals of *Pinna nobilis* were found.

4.2.10. Lower limit of meadows and balise placement

In June 2019, as planned by the WP 3.1 activities, three marking points (balises - dead bodies) have been placed in the "Anchor site" on the seabed at the meadow edge of the (at 14 meters depth), along stretches of the lower limit characterized by degraded/risk conditions. In this case, only one section of the limit has been selected and divers took photographs (central and lateral) of the area where the balises were placed for future comparison, to highlight possible retreat or increase in the limit.

The selected limit did not correspond to the actual lower limit of the meadow as only the potential contours endangered by anchoring were considered. The depth of the upper limit (13,2 m) was measured at station Z1-C.

In August 2020, some photos of the balises were taken (Figure 28, Figure 29 and Figure 30). The analysis of these photos shows a stable or moderately improved condition of the meadows, as there were no signs of retreat and some denser patches of *Posidonia* were visible.

Figure 28. Balise (n. 2) placed by the edge of the meadow on the left of the central balise.

Figure 29. Balise (n. 1) placed by the edge of the meadow between the other two balises.

Figure 30. Balise (n. 3) placed by the edge of the meadow on the right of the central balise.

4.2.11. Type of substrate

Granulometric analyses are reported in Table 16:

Table 16. Results of the grain-size analyses.

	coarse sand %	medium sand %	fine sand %	silt %	clay %	Grain size classification
	Ø>64 mm	2<Ø<64 mm	0.063<Ø<2 mm	0.0039<Ø<0.063 mm	Ø<0.0039 mm	
Z1	0,00	0,00	99,99	0,01	0,00	Medium fine sand
Z2	0,00	0,00	97,61	2,34	0,05	Medium fine sand
Z3	0,00	0,00	97,60	2,17	0,23	Medium fine sand

4.2.12. Alien species

Although the invasive marine alga *Caulerpa cylindracea* has been observed in the last years, spreading throughout the Park, no alien algae were detected during the monitoring activities at the "Anchoring site" and at the "Diving site".

4.2.13. Presence/absence of habitat disturbance

At the "Anchoring site" (Zone 1 and Zone 2) signs of disturbance and some litter on the seabed were reported. At the "Diving site" (Zone 3) the meadow was continuous with low sedimentation and no visible signs of disturbance; only a few points were devoid of meadow, possibly due to anchoring (anchor and chains).

4.2.14. Monitoring of seagrass transplantation

In October 2019, at the Kornati NP site, two plots for pilot seagrass transplantation were identified at the "Anchoring site" (near Zone 1 and Zone 2), as planned in WP 4 activity 2 (Figure 31). These plots are characterized by the absence of seagrasses or by low meadows cover values and the evidence of frequent presence of anchored boats. The meadows of the donor site have been selected in the "Diving site".

Figure 31. Seagrass transplantation: donor site in "Anchoring site" and photo-mosaic of the transplanting areas.

The cuttings collected in the donor meadow were fixed to the arms of a biodegradable support and 12 patches composed each of 6 supports were placed in the area to be reforested (Figure 32).

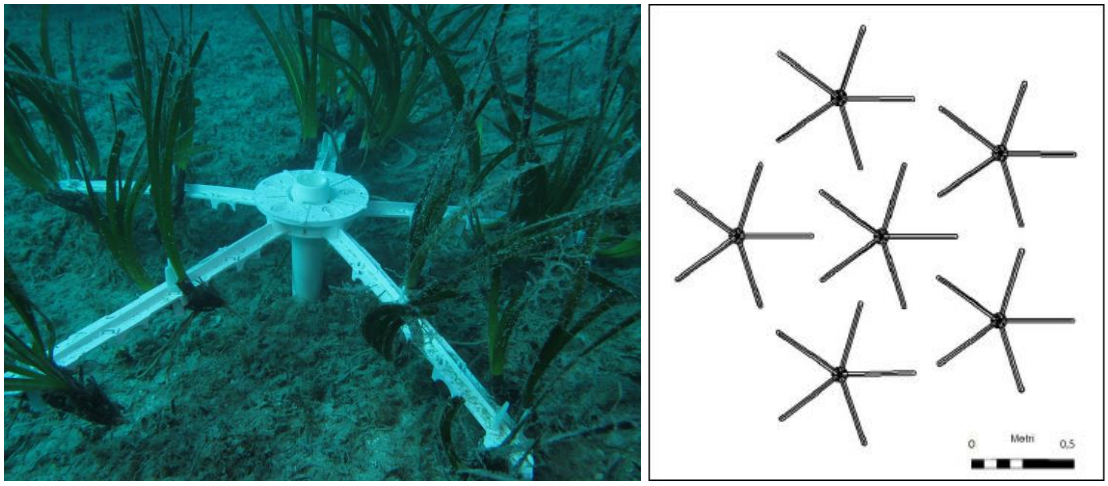

Figure 32. Examples of support with cuttings and of a "transplant patch".

Monitoring was carried out in October 2019, identifying, and labelling a total of 6 supports randomly distributed along the transplant patches. Shoot density, height of the longest leaf and length of the rhizome[3] were measured.

The results of the monitoring campaign carried out in June 2020 (as planned in WP 3 activity 3, Figure 34) are reported below (Figure 33) and it is important to underline that, since October 2019, the transplanted area in Kravljačica Bay has been frequently monitored and all transplants were in good conditions.

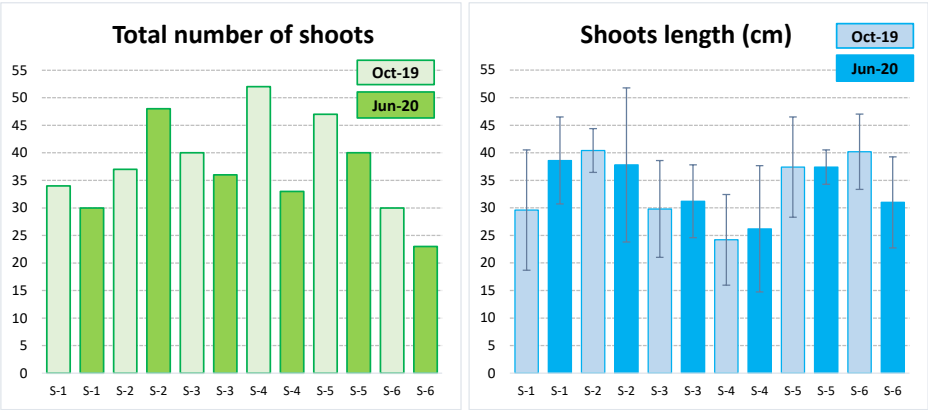

Figure 33. Total number of shoots and average values of rhizomes length and shoot length of the 6 monitored support (S-1, S-2, S-3, S-4, S-5 and S-6) in October 2019 and in June 2020.

The total number of shoots shows a decrease in 5 out of 6 measured supports; however, the leaf length

[3] Rhizome lengths data of June 2020 will be validated after next monitoring campaign.

shows no major fluctuations, highlighting a good vitality of the shoots that survived the transplanting phase from donor to transplant area (Figure 33).

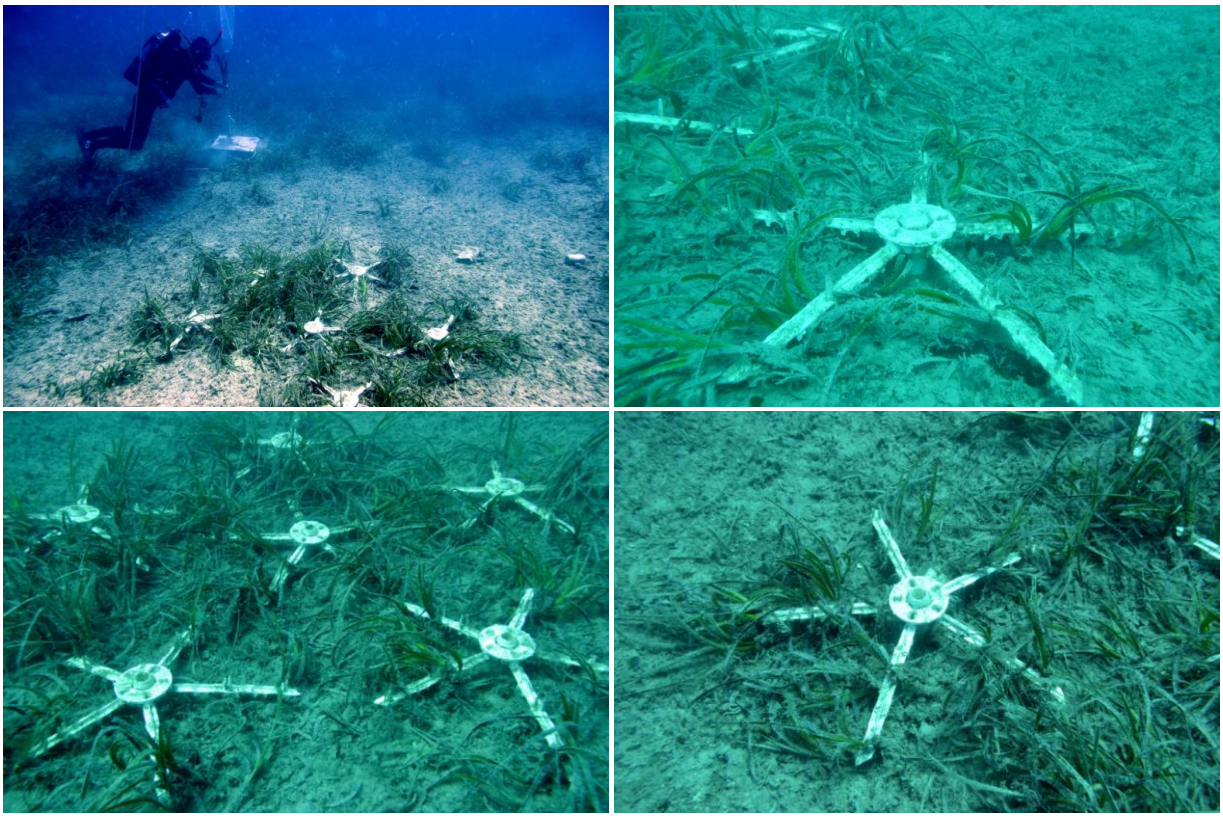

Figure 34. June 2020: seagrass transplantation monitoring activities in the Anchoring site.

4.3. Regional Natural Park of Coastal Dunes from Torre Canne to Torre San Leonardo

4.3.1. Monitoring area

In the Regional Natural Park of Coastal Dunes site, the annual monitoring campaign was carried out in mid-October in the Natura 2000 site "Litorale brindisino" (Figure 35).

The study area is located at about 500 meters from the coast and the zones are arranged almost parallel to the coastline. Z1 is the closest Zone, Z3 the most distant.

The three Zone were located on *P. oceanica* meadow, where anchoring pressures occur due to the presence of medium-sized boats. Within each Zone, three monitoring stations were placed at different depths (Stations Z1-A, Z1-B and Z2-C; Z2-A, Z2-B and Z3-C; Z3-A, Z3-B and Z1-C).

Figure 35. Sampling scheme applied to the monitoring Zones (1-2-3) in the Regional Natural Park of Coastal Dunes.

4.3.2. Distribution of seagrass meadows

The presence of *P. oceanica*, along the coast of the park, has been detected a few hundred meters offshore, at a depth of about 7 meters, where the upper limit showed an irregular pattern (Figure 36).

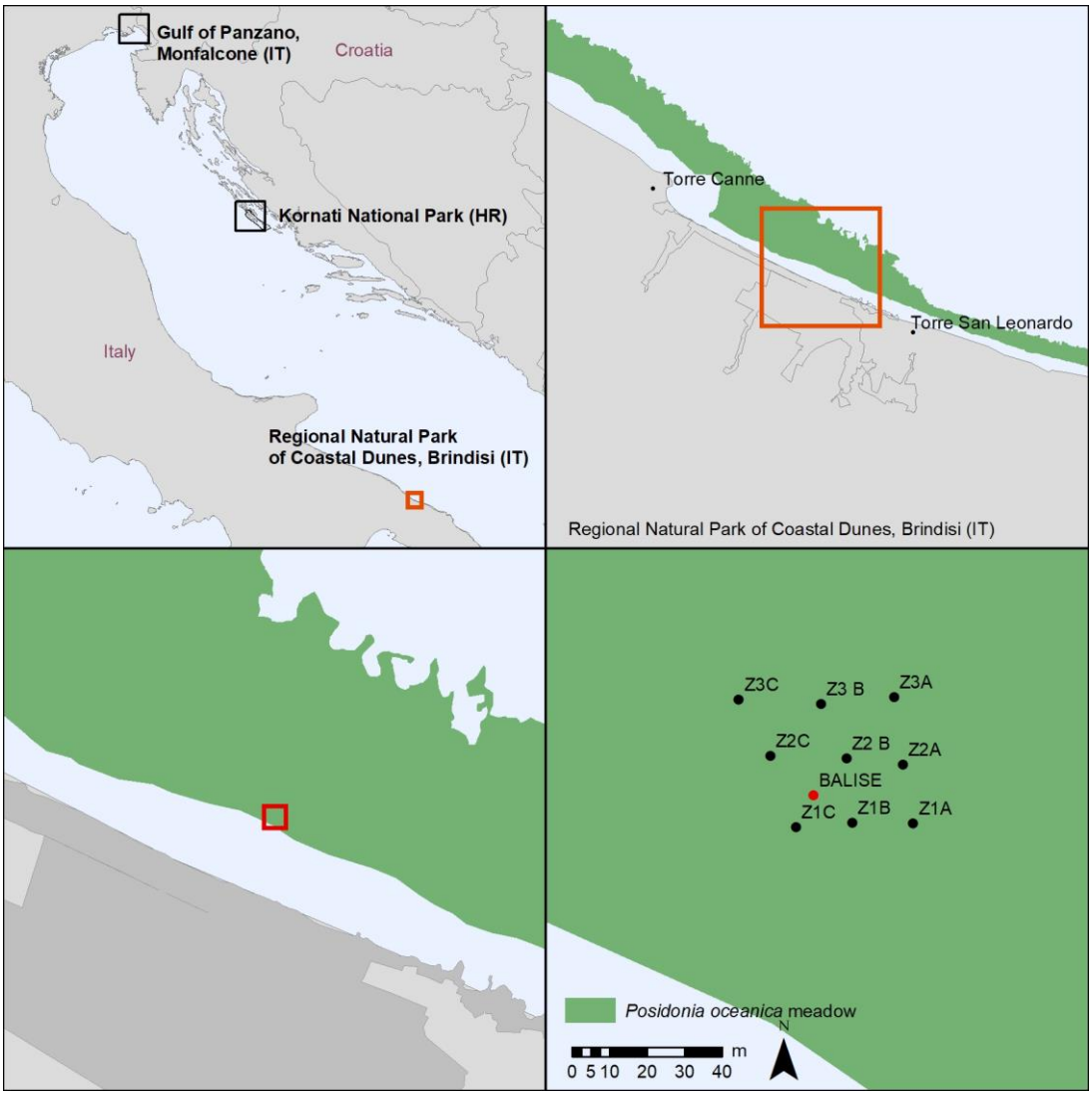

Figure 36. Seagrass distribution and monitoring stations in the Regional Natural Park of Coastal Dunes.

The lower limit is much further offshore, at a depth that has not been investigated.

The site identified for the measurements and to carry out the pilot transplantations is approximately opposite Rosa Marina. The meadow coverage was approximately 70-75%, on matte, with the presence of numerous areas of inter-matte sandy deposits. Several areas of matte were observed where seagrass has certainly retreated, for reasons not directly related to anthropogenic pressure.

4.3.3. Percentage Cover and meadow continuity

The average coverage of *P. oceanica* ranged between 64% and 90% in Zone 1 (stations Z1-A, Z1-B and Z1-C), and between 47% and 62% in Zone 2 (stations Z2-A, Z2-B and Z2-C); in these Zones, the meadows were continuous. On the contrary, in Zone 3, with the exception of station Z3-A, the average coverage of *P. oceanica* was lower than in Zone 1 and 2 (16% - 18% - in stations Z3-B and Z3-C and 82% in Z3-A), highlighting a discontinuity of the meadow. The results are summarized in Figure 37.

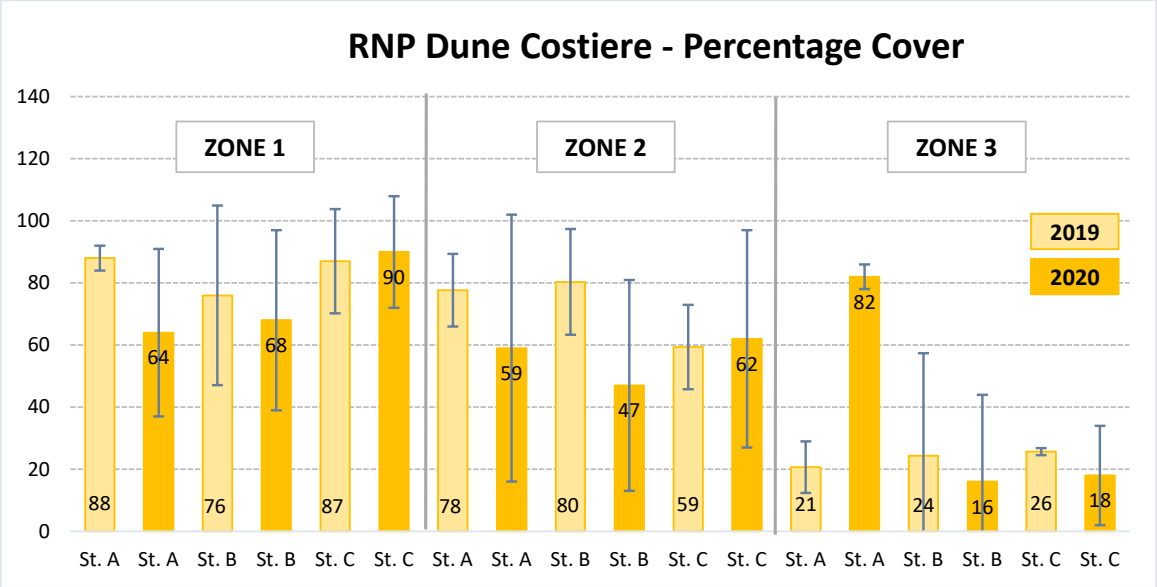

Figure 37. The average values of P. oceanica *percentage cover as measured at the sampling stations.*

As highlighted during the previous campaign (preliminary survey WP 3.1), the data analysis suggests the existence of differences along the stations between Zones 1 and 2 and Zone 3. In particular, the stations placed in Zone 1 and Zone 2 are characterized by higher percentage coverage than those in Zone 3, with the exception of station Z3-A. The comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) also shows a slight decrease in the average coverage at the monitoring stations with the exception of Z1-C, Z2-C, where there is a slight increase and Z3-A, where the increase is greater (and the difference between 2019 and 2020 values is statistically significant, $p<0,05$). The results are summarized in Figure 37 and confirm an irregular coverage pattern (in time and space) that was observed during the diving campaigns, highlighting erosion dynamics that do not respond to a determined trend.

4.3.4. Shoot density

In Zone 1 (stations Z1-A, Z1-B and Z1-C), the average density of *P. oceanica* shoots ranged between 304 and 317 shoots/m^2, in Zone 2 (stations Z2-A, Z2-B and Z2-C), the range of values of the parameter is 246-272 shoots/m^2 and equal to 295-342 shoots/m^2 in Zone 3. As already recorded in 2019, data analysis suggests the existence of limited differences along stations and Zones for shoot density and, in the Zone

3, the highest average values were recorded contrary to what was reported for coverage. Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) also shows a slight overall decrease in the mean shoot density at the monitoring stations with the exception of Z1-B and Z3-A, where an increase was detected. However, statistically significant differences ($p<0,05$) between the two density values (2019 and 2020) have been found only in two out of nine stations (Z2-A and Z3-B stations). The results are summarized in Figure 38.

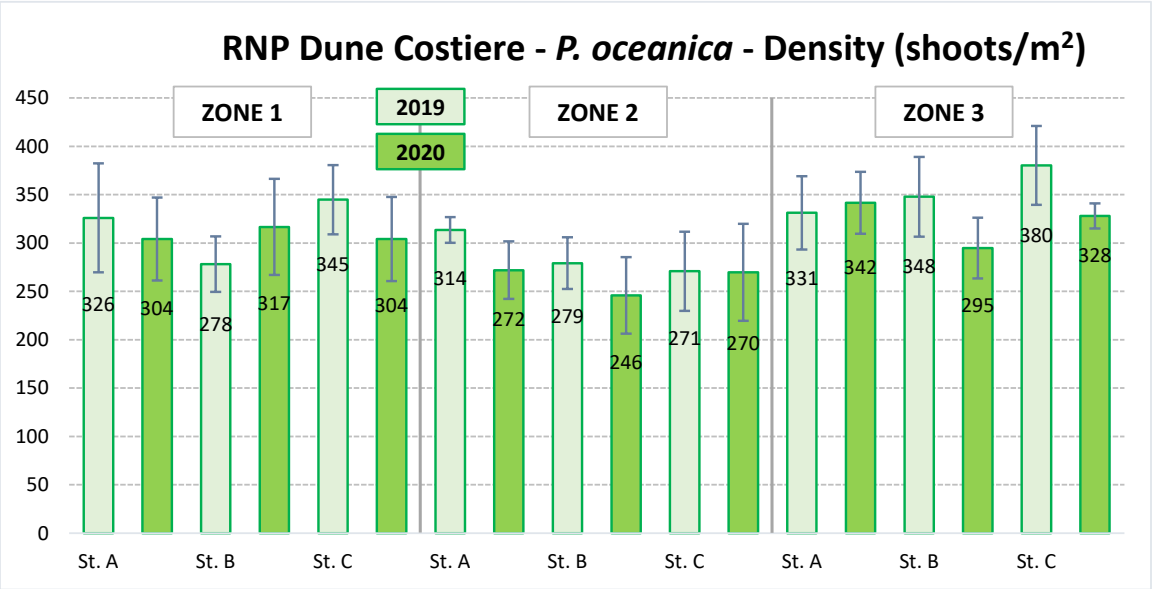

Figure 38. The average values of P. oceanica *shoot density as measured at the sampling stations.*

In Table 17, shoot density and depth values are related to the five classes for the final ecological classification (*sensu* WFD) (UNEP/MAP-RAC/SPA, 2011) (see par. 3.6.3 and par. 4.2.4).

Table 17. Shoot density and depth values in relation to the five classes for the final ecological classification (sensu WFD) (UNEP/MAP-RAC/SPA, 2011).

Zones	Z1	Z2	Z3
Density (shoots/m²) (average value)	308	263	322
Depth (m) (average value)	7	7	8
Ecological classification (sensu WFD)	POOR	POOR	POOR

Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows no changes in the ecological conditions of the meadow (still POOR in the three zones).

4.3.5. Shoot morphometric measurement

The mean shoot length of *P. oceanica* ranged between 34,4 and 43,6 cm in Zone 1 (stations Z1-A, Z1-B and Z1-C), 21,8 and 36 cm in Zone 2 (stations Z2-A, Z2-B and Z2-C), and 22,1 and 33,2 cm in Zone 3 (stations Z3-A, Z3-B and Z3-C).

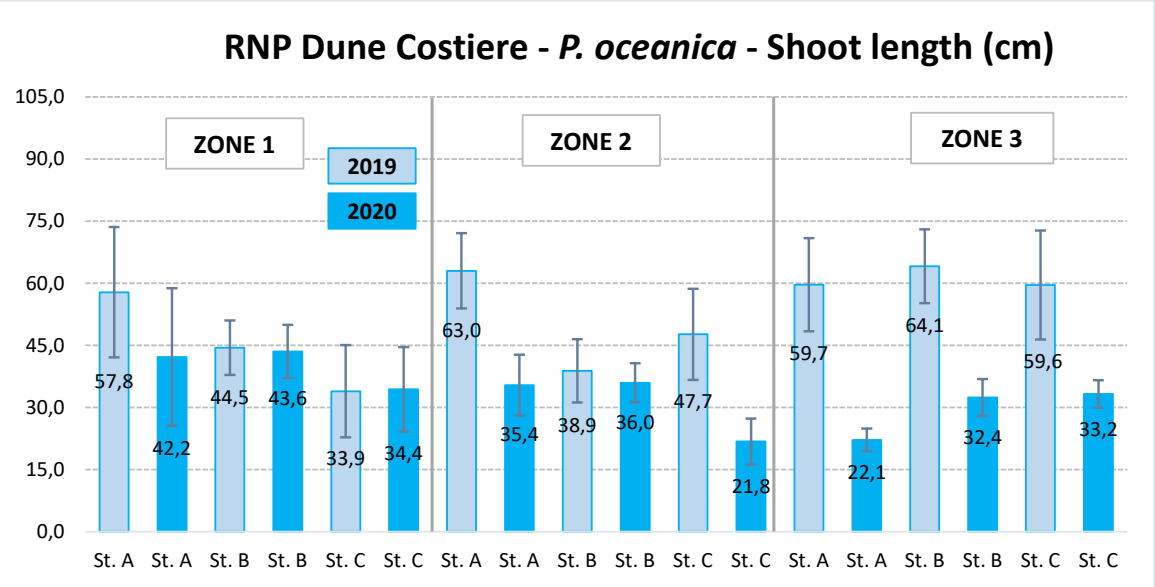

Figure 39. The average values of P. oceanica *shoot length as measured at the sampling stations.*

Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows an overall decrease in the average shoot length at the monitoring stations, especially at the stations in Zone 3. Statistically significant differences ($p<0,05$) between the two shoot length values (2019 and 2020) have been found in five out of six stations (Z2-A, Z2-C, Z3-A, Z3-B and Z3-C stations). The results are summarized in Figure 39.

Other derivate parameters are summarized in Table 18 (average values and standard deviations):

Table 18. Shoot width (cm/shoot), n. of leaves/shoot and leaf necrosis (% leaves/shoot) (verage values and standard deviations).

Zone 1		Z1-A	Z1-	Z1-C
Shoot width (cm/shoot)	**2020**	0,81±0,06	0,83±0,05	0,76±0,03
	2019	0,81±0,03	0,84±0,02	0,81±0,03
N. of leaves/shoot - 2020	**2020**	5,5±1,0	6,7±0,8	5,8±0,8
	2019	6,0±1,7	5,5±1,0	5,7±1,4
Leaf necrosis (% leaves/shoot)	**2020**	1,8±1,3	1,9±0,8	0,6±1,4
	2019	4,1±3,9	9,8±4,9	8,5±4,0

Zone 2		Z2-A	Z2-B	Z2-C
Shoot width (cm/shoot)	**2020**	0,87±0,04	0,82±0,03	0,79±0,02
	2019	0,80±0,03	0,83±0,04	0,84±0,04
N. of leaves/shoot	**2020**	6,0±0,6	6,0±0	4,8±0,8
	2019	5,5±1,2	5,3±0,5	5,2±1,3
Leaf necrosis (% leaves/shoot)	**2020**	0,8±0,8	1,0±0,8	0,6±0,7
	2019	5,9±5,1	7,7±4,3	11,2±6,6
Zone 3		**Z3-A**	**Z3-B**	**Z3-C**
Shoot width (cm/shoot)	**2020**	0,74±0,01	0,73±0,02	0,69±0,03
	2019	0,81±0,03	0,84±0,02	0,85±0,01
N. of leaves/shoot	**2020**	7,0±0,9	5,2±0,8	7,5±1,6
	2019	5,8±1,2	4,8±0,4	5,5±1,8
Leaf necrosis (% leaves/shoot)	**2020**	0,6±0,5	0	0,1±0,3
	2019	7,8±7,2	7,1±4,9	18,4±6,9

Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows an overall general decrease of leaf necrosis in *Posidonia*.

4.3.6. Leaf Area Index (LAI) and Conservation Index (CI)

To assess the conservation status of Posidonia meadows, two indices were applied: the Leaf Area Index (LAI) and the Conservation Index (CI).

Leaf Area Index (LAI)

LAI values are reported in Table 19 (average values and standard deviations):

Table 19. Leaf Area Index (LAI) average valeus (the values in brackets refer to 2019 Preliminary survey campaign).

Zone 1	Z1-A	Z1-B	Z1-C
LAI (station average value)	2,90 (4,06)	3,62 (2,96)	2,33 (2,71)
LAI (Zone average value)	2,95 (3,24)		
Zone 2	**Z2-A**	**Z2-B**	**Z2-C**
LAI (station average value)	1,95 (3,81)	1,76 (2,72)	1,06 (3,19)
LAI (Zone average value)	1,59 (3,24)		

Zone 3	Z3-A	Z3-B	Z3-C
LAI (station average value)	2,04 (4,92)	1,64 (4,41)	2,60 (5,59)
LAI (Zone average value)	2,09 (4,98)		

Comparison with data from the 2019 campaign (preliminary survey - WP 3 activity 1) shows an overall decrease of the LAI mean values at the three Zones, due to the decrease in the mean cover, shoots density and shoot length values.

Conservation Index (CI)

The CI values are reported in Table 20 (average values and standard deviations):

Table 20. Conservation Index (CI) average values.

Zone 1	Z1-A	Z1-B	Z1-C
CI (station average value)	0,72	0,73	0,90
CI (Zone average value)	0,78 (good conservation status)		

Zone 2	Z2-A	Z2-B	Z2-C
CI (station average value)	0,65	0,53	0,62
CI (Zone average value)	0,60 (moderate conservation status)		

Zone 2	Z2-A	Z2-B	Z2-C
CI (station average value)	0,86	1,00	1,00
CI (Zone average value)	0,95 (high conservation status)		

The decrease (compared to 2019) in the percentage cover values recorded in 2020, especially in Zone 1 and Zone 2 caused the change of the conservation status of the meadow from HIGH to GOOD in Zone 1 and from GOOD to MODERATE in Zone 2.

4.3.7. Algal blooms and filamentous algae

The visual assessment by boat using aqua scope in the monitoring areas showed the absence of (filamentous) macroalgal blooms.

4.3.8. Abundance of epiphytes

The average coverage of the three categories was calculated and reported in in Table 21:

Table 21. Average cover of the three categories (Encrusting layer, Erect layer and Turf layer).

	Z1-A	Z1-B	Z1-C	Z2-A	Z2-B	Z2-C	Z3-A	Z3-B	Z3-C
Encrusting layer	30%	35%	35%	40%	35%	30%	40%	30%	30%
Erect layer	5%	5%	5%	5%	5%	5%	10%	5%	5%
Turf layer	5%	10%	10%	10%	5%	5%	10%	5%	5%

As with the other study sites, the dominance of the *encrusting layer* (represented mainly by red calcareous algae) can be considered a positive condition of the quality status of seagrass meadows.

4.3.9. Associated communities

No live or dead individuals of *Pinna nobilis* were found in the study area (within the corridors and in their proximity).

4.3.10. Lower limit of meadows and balise placement

In September 2019, three marking points (balises - dead bodies) have been placed between Zone 1 and Zone 2 on the seabed by the edge of the meadow (positioned at a depth of 7,5 meters), along sections of the lower limit characterized by degraded/risk conditions (erosion and retreat of the meadow).

As in the kornati NP site, only one section of the limit was selected where the balises were placed for future comparison to highlight possible retreat or increase of the limit that was characterized by erosion and retreat of the meadow and did not correspond to the proper lower limit of the meadow (as only possible endangered contours were considered).

In October 2020, during the first monitoring campaign, foreseen in WP 3, some photos of the balises were taken (Figure 40, Figure 41 and Figure 42). The analysis of these photos shows a stable condition, as there are no signs of retreat. It is important to note that one balise (the one located at the edge of the meadow to the left of the central balise) was not found during the monitoring activities. However, during the second monitoring campaign, carried out in February 2021, the “missing” balise was repositioned because it was found a few metres away from its original position, completely covered by sand.

Figure 40. The two balises still present (n.1 and n.3) in October 2020.

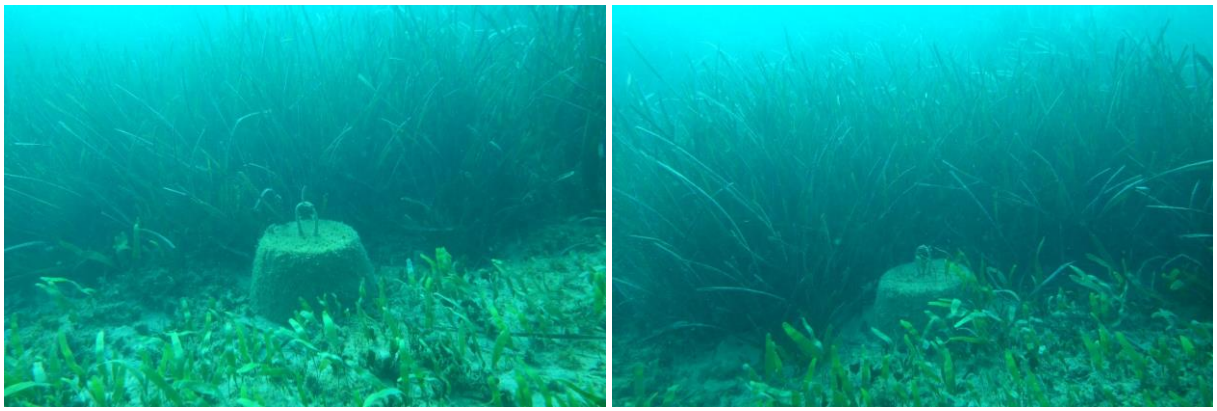

Figure 41. On the left, balise (n. 1) originally placed by the edge of the meadow between the "missing" balise and the third one. On the right, balise (n. 3) placed by the edge of the meadow on the right of the central balise.

Figure 42. Details of Balise (n. 3), covered by the green alga Caulerpa prolifera.

4.3.11. Type of substrate

Granulometric analyses are reported in Table 22:

Table 22. Results of the grain-size analyses.

	coarse sand %	medium sand %	fine sand %	silt %	clay %	Grain size classification
	Ø>64 mm	2<Ø<64 mm	0.063<Ø<2 mm	0.0039<Ø<0.063 mm	Ø<0.0039 mm	
Z1	0,00	0,00	18,36	68,40	13,23	Clayey-sandy silt
Z2	0,00	0,00	13,21	69,51	17,28	Clayey-sandy silt
Z3	0,00	0,00	26,74	64,41	8,85	Slightly clayey fine sand silt

4.3.12. Alien species

No alien species were found in the study area during the monitoring activities. However, it is important to emphasize the abundant presence of *Caulerpa prolifera* (a "green alga"), an indigenous species congeneric of *Caulerpa taxifolia* and *Caulerpa racemosa* which are invading some areas of the Mediterranean. In fact, regressed meadows are prone to invasion by one or more of the potential substitutes for *P. oceanica* such as this algal species (in particular, *C. racemosa*) or the other common Mediterranean seagrass *Cymodocea nodosa*.

4.3.13. Presence/absence of habitat disturbance

Concerning human disturbance and evidence of mechanical pressures, none were observed in or near the monitoring Zones.

4.3.14. Seagrass transplantation

In the RNP Coastal Dunes site, the area to perform the pilot seagrass transplantation (planned in WP 4 activity 2) has been identified near Zone 1. This area is characterized by the absence of seagrasses (bare seabed) or low meadows coverage values and the frequent presence of anchored boats (Figure 43).

The transplantation, originally planned in October 2020, was postponed (due to difficulties in obtaining permits from the competent authorities and to the COVID-19 emergency) and carried out at the end of February 2021.

Figure 43. RNP Coastal Dunes: Seagrasses transplantation area and laying buoys area.

5. CONCLUSIONS

The comparison of the data collected during the monitoring campaigns carried out in 2020 with those collected during the preliminary survey (preliminary survey - WP 3 activity 1 - 2019) shows that:

- at the Panzano Bay, no anomalies have been found; the increase of the length of *C. nodosa* shoots is due to the different sampling seasons, at the beginning and at the end of the vegetative cycle respectively;
- at the Kornati NP, changes in the mean values of the main parameters were found. In the "Diving site", the decrease *recorde*d in the percentage cover in Zone 3 caused the shift of the conservation status from GOOD to MODERATE. However, at the "Anchoring site" in Zone 1 the increase of shoots density resulted in an improvement of the ecological conditions of the meadow, from BAD to POOR. Furthermore, the analysis of balises shows a stable or moderately improved condition of the meadows, as there were no signs of retreat and some denser patches of *Posidonia* were observed;
- at the RNP Coastal Dunes, changes in the mean values of the main analyzed parameters were found. However, comparison with data from the 2019 campaign shows no change in the ecological state of the meadow (still POOR in th*e three z*ones). The decrease (compared to 2019) in the percentage cover values recorded in 2020, especially in Zone 1 and Zone 2, caused the change in the conservation status of the meadow from HIGH to GOOD in Zone 1 and from GOOD to MODERATE in Zone 2. The analysis of the balises showed a stable condition, as there were no signs of retreat.

Regarding the update on the state and progress of the seagrass transplantations (planned in WP 4 activity 2), it is important to underline that:

- at the Panzano Bay in January 2021, a monitoring of the restored site was carried out, highlighting that approximatively 95% of the plugs transplanted in September 2020 were still in place;
- at the Kornati NP site, the total number of shoots showed a decrease in 5 out of 6 stands; however, the increase of length of the leaves which does not show great fluctuations, showed a good vitality of the shoots that survived the transplanting phase from donor to transplant area;
- at the RNP Coastal Dunes site, the transplant, originally planned in October 2020, was postponed, and carried out in February 2021.

6. AKNOWLEDGEMENTS

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In the Regional Natural Park Coastal Dunes, the monitoring campaign was carried out with the collaboration of the “Lega Navale”, section of Ostuni.

Thanks for the cooperation received from the competent Offices of the Maritime Authority (“Capitaneria di Porto” of Monfalcone and “Delegazione di Spiaggia” of Ostuni).

In the Kornati NP, the survey was carried out by the competent partners, with the expert support of the Najada Diving of Murter.

In addition to the partners directly involved in the field activities, a special thanks go to the professors A. Falace and A. Sfriso, respectively of the UNITS (PP2 CONISMA) and UNIVE (PP7 CORILA) partners, for the comments and suggestions necessary for the completion of the document.

7. REFERENCES

Airoldi L., Cinelli F., 1997. Effects of sedimentation on subtidal macroalgal assemblages: an experimental study from a Mediterranean rocky shore. *J. Exp. Mar. Biol. Ecol.*, 215: 269-288.

Ballesteros E., 1987. Structure and dynamics of the leaf phytoepiphytes of *Posidonia oceanica* (L.) Delile in Tossa de Mar (Catalonia, Western Mediterranean). *Butlletí dela Institució Catalana d'Història Natural*, 54: 13-30.

Bianchi C.N., Pronzato R., Cattaneo-Vietti R., Benedetti Cecchi L., Morri C., Pansini M., Chemello R., Milazzo M., Fraschetti S., Terlizzi A., Peirano A., Salvati E., Benzoni F., Calcinai B., Cerrano C., Bavestrello G., 2004. Hard bottoms. *Biol. Mar. Medit.*, 11(suppl. 1), 185-215.

Borum J., Duarte C.M., Krause-Jensen D., Greve T.M., 2004. European Seagrasses: An Introduction to Monitoring and Management (The M&MS Project, Copenhagen). Pp.95.

Buia M.C., Gambi M.C., Dappiano M., 2004. Seagrass systems. *Biol. Mar. Medit.*, 11 (Suppl. 1): 133-183.

Casier R., 2011. Marine Protected Areas in the Mediterranean Sea. Alfred Toepfer Natural Heritage Scholarschip 2011. Awarded on the EUROPARC Conference 2011 in Bad Urach, made possible by the Alfred Toepfer Stiftung F.V.S.

Charbonnel E., Boudouresque C.F., Meinesz A., Bernard G., Bonhomme P., Patrone J., Kruczek R., Cottalorda J.M., Bertrandy M.C., Foret P., Ragazzi M.., Le Direac'h L., 2000. Le Réseau de Surveillance Posidonies de la Région Provence-Alpes-Côte d'Azur. Première partie: présentation et guide méthodologique. Année 2000. Région PACA, Agence de l'Eau RMC, GIS Posidonie, CQEL 13, CQEL 83, Conseil Général 06, GIS Posidonie publ.: 1-76.

Díaz-Almela E., Duarte C.M., 2008. Management of Natura 2000 habitats. 1120 **Posidonia* beds (*Posidonion oceanicae*). European Commission.

Duarte C.M., Kirkman H., 2001. Methods for the measurement of seagrass abundance and depth distribution, in: Short, F.T. et al. (Ed.) Global seagrass research methods. pp. 141-153 In: Short, F.T.; Coles, R.G.; Short, C.A. (Ed.) (2001). Global seagrass research methods. Elsevier Science: Amsterdam. ISBN 0-444-50891-0. VII, 473 pp.

Gerakaris V., Panayotidis P., Vizzini S., Nicolaidou A., Economou-Amilli A. 2017. Effectiveness of *Posidonia oceanica* biotic indices for assessing the ecological status of coastal waters in Saronikos Gulf (Aegean Sea, Eastern Mediterranean). *Mediterranean Marine Science*, 18, 161-178.

Irving A.D., Connell S.D., 2002a. Interactive effects of sedimentation and microtopography on the abundance of subtidal turf-forming algae. *Phycologia*, 41: 517-522.

Irving A.D., Connell S.D., 2002b. Sedimentation and light penetration interact to maintain heterogeneity of subtidal habitat: algal versus invertebrate dominated assemblages. *Mar. Ecol. Prog. Ser.*, 245: 83-91.

ISPRA, 2012. Elemento di Qualità Biologica Angiosperme Scheda metodologica ISPRA per il calcolo dello stato ecologico secondo la metodologia PREI. Procedure di campionamento per la raccolta dati. http://www.isprambiente.gov.it/files/icram/scheda-metodologia-posidonia-new.pdf/view

Ivković N., 2015. Invasive tropical algae of genus *Caulerpa* in the Adriatic Sea. Thesis performed at Subdepartment of Water Ecology. Pp. 22.

Martínez-Crego B., Prado P., Alcoverro T., Romero J., 2010. Composition of epiphytic leaf community of *Posidonia oceanica* as a tool for environmental biomonitoring. *Estuarine, Coastal and Shelf Science*, 88: 199-208.

Mihelcic V., Ramov M., 2018. Specific fishing regulations in Croatia: the case of Kornati National Park and Telašćica Nature Park. Presentation (MedPAN Workshop 2018).

Montefalcone M., 2009. Ecosystem health assessment using the Mediterranean seagrass *Posidonia oceanica*: A review. *Ecological Indicators*, vol. 9 (4): 595-604.

Pergent G., Pergent-Martini C., Boudouresque C.F., 1995. Utilisation de l'herbier à *Posidonia oceanica* comme indicateur biologique de la qualité du milieu littoral en Mediterranée: état de conneissances. Mésogée, 54: 3-29.

Pergent-Martini et al., 2005. Descriptors of *Posidonia oceanica* meadows: Use and application. *Ecological Indicators*, 5: 213-230.

UNEP/MAP - RAC/SPA, 2009. Rapport sur le projet MedPosidonia. Rais C., Pergent G., Dupuy de la Grandrive R., Djellouli A. eds. Document d'information pour la neuvième réunion des points focaux nationaux pour les ASP, Floriana – Malte, 3 – 6 juin 2009, CAR/ASP Publ., UNEP(DEPI)/MED WG.331/Inf. 11: 1-107 + annex.

UNEP/MAP - RAC/SPA, 2011. Draft Guidelines for the Standardization of Mapping and Monitoring Methods of Marine Magnoliophyta in the Mediterranean. Tenth Meeting of Focal Points for SPAs Marseilles, France, 17-20 May 2011, RAC/SPA Publ., UNEP(DEPI)/MED WG 359/9. 1-63.zx

UNEP/MAP - RAC/SPA, 2014. Monitoring protocol for *Posidonia oceanica* beds. By Guala I., Nikolic V., Ivesa L., Di Carlo G., Rajkovic Z., Rodic P., Jelic K., Ed. RAC/SPA - MedMPAnet Project, Tunis. 37 pages + annexes.

WATER FRAMEWORK DIRECTIVE 2000/60/EC. Council Directive of the European Parliament of 23 October 2000 establishing a framework for Community action in the field of water policy. Official Journal of the European Union, 22/12/2000, L 327.

8. ANNEXES

- Field Data Sheets.
- Laboratory Data Sheets.

Field Data Sheets

Bay of Panzano (Monfalcone)

European Regional Development Fund

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 18-09-2020 **Zone and sampling station:** Z1 - A (MONFALCONE)

Depth: 1,90 m

Coordinates: 45°46'45,81" - 13°32'12,51"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): CYMODOCEA MEADOW

Seagrass: CYMODOCEA NODOSA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 30 x 30 cm

Replicate	No of shoots	Depth (m)	Notes
1	71	1,90	/
2	40	1,90	/
3	52	1,80	/
4	61	1,90	/
5	49	1,80	/
6	52	1,90	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1-A (MONFALCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Cn	1000		Cn	540		Cn	1000	
			S2	610				
			Cn	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	-
2	-	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 18-09-2020 **Zone and sampling station:** Z1-B (MONTALCONE)

Depth: 2,10 m

Coordinates: 45°46'45,47" - 13° 32' 19,19"

Coordinator: A. RISMONDO

Operators: A. RISMODO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): CYMODOCEA MEADOW

Seagrass: CYMODOCEA NODOSA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 30 x 30 cm

Replicate	No of shoots	Depth (m)	Notes
1	48	2,10	/
2	53	2,10	/
3	60	2,10	/
4	61	2,00	/
5	57	2,00	/
6	52	2,10	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1 -B (MONFALCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Cn	1000		Cn	1000		Cn	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	(
2	(	/
3	(	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 17-09-2020 **Zone and sampling station:** Z1-C (MONFALCONE)

Depth: 4,2 m

Coordinates: 45° 46' 37,97" - 13° 32' 27,58"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): /

Seagrass: /

Other Seagrasses: /

Meadow continuity: yes / ~~no~~

Type of substrate: SANDY - SILTY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 30 x 30 cm

Replicate	No of shoots	Depth (m)	Notes
1	/	/	/
2	/	/	/
3	/	/	/
4	/	/	/
5	/	/	/
6	/	/	/

Collection of shoots for laboratory analyses: yes / ~~no~~

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1 - C (MONFACCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Sa	1000		Sa	1000		Sa	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

WP 3.3 - Monitoring campaigns

Date: 07-10-2020 **Zone and sampling station:** Z2-A (MONTAIACONE)

Depth: 1,10 m

Coordinates: 45°45'34,13" - 13°31'36,79"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): ZOSTERA NOLTEI MEADOW

Seagrass: ZOSTERA NOLTEI

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY - SILTY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 30 x 30 cm

Replicate	No of shoots	Depth (m)	Notes
1	189	1,10	/
2	209	1,00	/
3	193	1,00	/
4	168	1,10	/
5	224	1,10	/
6	261	1,10	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: ZZ-A (MONFALCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Zn	1000		Zn	350		Zn	400	
			Sa	470		Sa	510	
			Zn	1000		Zn	890	
						Sa	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 07-10-2020 Zone and sampling station: Z2-B (MONFALCONE)

Depth: 1,4 m

Coordinates: 45°45'28,69" - 13°31'54,79"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): CYMODOCEA MEADOW

Seagrass: CYMODOCEA NODOSA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY - SILTY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: ~~30~~ x ~~30~~ cm

Replicate	No of shoots	Depth (m)	Notes
1	41	1,4	/
2	37	1,3	/
3	59	1,3	/
4	47	1,4	/
5	62	1,4	/
6	79	1,4	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z2-B (MONFALCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Cn	1000		Cn	620		Cn	420	
			Sa	730		Sa	490	
			Cn	1000		Cn	870	
						Sa	930	
						Cn	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 17-09-2020 Zone and sampling station: Z2-C (MONFALCONE)

Depth: 2,4 m

Coordinates: 45° 45' 23,05" - 13° 32' 32,63"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): CYMODOCEA MEADOW

Seagrass: CYMODOCEA NODOSA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: ~~yes~~ / no

Shoot density

Size of sampling units: 30 x 30 cm

Replicate	No of shoots	Depth (m)	Notes
1	45	2,4	/
2	40	2,5	/
3	68	2,4	/
4	73	2,4	/
5	52	2,5	/
6	67	2,4	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z2 - C (MONFALCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Cn	1000		Cn	1000		Cn	240	
						Sa	300	
						Cn	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	2	1
2	1	/
3	1	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 07-10-2020 Zone and sampling station: Z3-A (MONTALCONE)

Depth: 2,00 m

Coordinates: 45°45'06,27" - 13°31'54,88"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): ZOSTERA MARINA MEADOW

Seagrass: ZOSTERA MARINA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY - SILTY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 30 x 30 cm

Replicate	No of shoots	Depth (m)	Notes
1	22	1,90	/
2	34	2,00	/
3	19	2,10	/
4	25	2,00	/
5	31	2,00	/
6	27	2,10	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z3-A (MONFALCONE) **Page:** 2.2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Zm	1000		Zm	1000		Zm	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 07-10-2020 **Zone and sampling station:** Z3-B (MONFALCONE)

Depth: 2,20 m

Coordinates: 45°45'09,33" - 13°32'06,01"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): CYMODOCEA MEADOW

Seagrass: CYMODOCEA NODOSA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY - SILTY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: ~~30~~ x ~~30~~ cm

Replicate	No of shoots	Depth (m)	Notes
1	58	2,20	/
2	69	2,20	/
3	75	2,10	/
4	48	2,20	/
5	63	2,20	/
6	55	2,10	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

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EUROPEAN UNION

Zone and sampling station: Z3-B (MONFALCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Cn	1000		Cn	730		Cn	480	
			Sa	790		Sa	550	
			Cn	1000		Cn	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 17-09-2020 **Zone and sampling station:** Z3-C

Depth: 2,6 m

Coordinates: 45° 45' 11,00" - 13° 32' 35,82"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - E. CHECCHIN

Habitat characterization and disturbance (potential pressures in the area and signs of impact): CYMODOCEA MEADOW

Seagrass: CYMODOCEA NODOSA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: ~~yes~~ / no

Shoot density

Size of sampling units: 30 x 30 cm

Replicate	No of shoots	Depth (m)	Notes
1	48	2,6	/
2	73	2,6	/
3	61	2,5	/
4	80	2,6	/
5	89	2,6	/
6	88	2,5	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z3-C (MONFALCONE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
Cn	1000		Cn	1000		Cn	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	1	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Field Data Sheets

Kornati NP

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 16-05-2020 **Zone and sampling station:** Z1-A (KORNATI-NP)

Depth: 10,6 m

Coordinates: OLD: 43° 49' 29,24" - 15° 16' 30,15" NEW: 43° 49' 28,88" - 15° 16' 30,19"

Coordinator: ZRINKA JAKL

Operators: F. DOKOZA - V. STRIGO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): A LOT OF MUD AND DEAD MATTE, BAD VISIBILITY. A LOT OF BOTTLES, CANS PLASTIC CONTAINERS. POSIDONIA MEADOW IS NOT COMPACT AND DOESN'T HAVE CONTINUITY.

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: NO

Meadow continuity: yes/~~no~~

Type of substrate: SANDY / SILTY / MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: ~~40~~ x ~~40~~ cm

Replicate	No of shoots	Depth (m)	Notes
1	16	9,8	
2	39	9,4	
3	30	9,5	
4	21	10,2	
5	41	11,4	
6	31	11,4	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1-A (KORNATI-NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	60		P	30		P	70	
D	100		D	90		D	120	
P	130		P	130		P	160	
D	210		D	200		D	290	
P	260		P	290		P	360	
D	340		D	440		D	430	
P	390		P	470		P	580	
D	420		D	550		D	640	
P	440		P	600		P	850	
D	480		D	620		D	990	
P	530		P	640		P	1000	
D	720		D	880				
P	750		P	910				
D	860		D	1000				
P	1000							

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 16-06-2020 **Zone and sampling station:** Z1-B (KORNATI NP)

Depth: 13,4 m

Coordinates: OLD: 43°49'29,90" - 15°16'31,10" NEW: 43°49'29,53" - 15°16'31,23"

Coordinator: Z. JAKL

Operators: Z. JAKL - A. PIPLOVIĆ

Habitat characterization and disturbance (potential pressures in the area and signs of impact): A LOT OF MUD AND DEAD MATTE. BAD VISIBILITY. A LOT OF BOTTLES, CANS PLASTIC CONTAINERS. POSIDONIA MEADOW IS NOT COMPACT AND DOESN'T HAVE CONTINUITY

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: yes / ~~no~~

Type of substrate: SANDY - SILTY - MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes/~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	38	13,7	/
2	36	14,3	/
3	19	12,9	/
4	27	12,2	/
5	33	12,6	/
6	22	12,5	/

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1-B (KORNATI - NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
D	320		P	90		D	60	
P	410		D	200		P	80	
D	560		P	400		D	100	
P	580		D	420		P	130	
D	610		P	440		D	200	
P	620		D	630		P	260	
D	900		P	940		D	740	
P	940		D	1000		P	780	
D	1000					D	820	
						P	900	
						D	930	
						P	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 16-06-2020 **Zone and sampling station:** Z1-C (KORNATI NP)

Depth: 13,9 m

Coordinates: OLD: 43°49'30,90" - 15°16'31,90" NEW: 43°49'30,85" - 15°16'31,98"

Coordinator: Z. JAKL

Operators: A. KOVAČEV - A. PARADINOVIĆ

Habitat characterization and disturbance (potential pressures in the area and signs of impact): A LOT OF MUD AND DEAD MATTE, BAD VISIBILITY
A LOT OF BOTTLES, CANS PLASTIC CONTAINERS
POSIDONIA MEADOW IS NOT COMPACT AND DOESN'T HAVE CONTINUITY

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: yes / no

Type of substrate: SANDY - SILTY - MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	23	14,5	
2	19	14,5	
3	26	14,1	
4	17	14,0	
5	12	14,0	
6	20	13,9	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1-C (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
D	40		D	20		D	10	
P	80		P	40		P	50	
D	130		D	90		D	80	
P	150		P	170		P	100	
D	220		D	240		D	140	
P	300		P	260		P	250	
D	450		D	310		D	270	
P	580		P	360		P	360	
D	660		D	480		D	440	
P	680		P	500		P	460	
D	710		D	780		D	680	
P	730		P	790		P	700	
D	1000		D	1000		D	770	
						P	800	
						D	830	
						P	850	
						D	920	
						P	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 16-06-2020 **Zone and sampling station:** ZZ-A (KORNATI NP)

Depth: 13,0 M

Coordinates: OLD: 43°49'28,80" - 15°16'31,09" NEW: 43°49'28,47" - 15°16'31,12"

Coordinator: Z. JAKL

Operators: F. DOKOZA - V. STRIGO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): A LOT OF MUD AND DEAD MATTE. BAD VISIBILITY. A LOT OF BOTTLES, CANS PLASTIC CONTAINERS. POSIDONIA MEADOW IS NOT COMPACT AND DOESN'T HAVE CONTINUITY.

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: yes / ~~no~~

Type of substrate: SANDY - SILTY - MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	14	11,9	
2	18	13,0	
3	9	13,5	
4	13	14,4	
5	15	13,9	
6	10	12,8	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z2-A (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
D	40		P	110		D	90	
P	50		D	220		P	170	
D	170		P	240		D	220	
P	190		D	530		P	260	
D	300		P	600		D	290	
P	310		D	700		P	300	
D	450		P	760		D	340	
P	470		D	780		P	390	
D	520		P	800		D	450	
P	540		D	980		P	490	
D	570		P	1000		D	620	
P	600					P	630	
D	630					D	750	
P	730					P	780	
D	840					D	880	
P	860					P	910	
D	1000					D	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 16-06-2020 **Zone and sampling station:** ZZ-B (KORNATI NP)

Depth: 15 6 m

Coordinates: OLD: 43°49'29,20"-15°16'31,50" NEW: 43°49'29,48"-15°16'31,81"

Coordinator: Z. JAKL

Operators: Z. JAKL - A. PIPLOVIĆ

Habitat characterization and disturbance (potential pressures in the area and signs of impact): A LOT OF MUD AND DEAD MATTE. BAD VISIBILITY. A LOT OF BOTTLES, CANS PLASTIC CONTAINERS. POSIDONIA MEADOW IS NOT COMPACT AND DOESN'T HAVE CONTINUITY

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: yes / no

Type of substrate: SANDY - SILTY - MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40.. x 40. cm

Replicate	No of shoots	Depth (m)	Notes
1	23	15,0	
2	22	15,7	
3	34	15,8	
4	31	15,3	
5	41	14,7	
6	32	14,4	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z2-B (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	60		D	80		D	40	
D	430		P	100		P	100	
P	480		D	280		D	190	
D	600		P	330		P	300	
P	650		D	400		D	460	
D	710		P	460		P	560	
P	780		D	520		D	600	
D	810		P	540		P	720	
P	840		D	570		D	980	
D	890		P	620		P	1000	
P	1000		D	650				
			P	890				
			D	910				
			P	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	1	1
2	1	1
3	1	1

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

WP 3.3 - Monitoring campaigns

Date: 16-06-2020 **Zone and sampling station:** ZZ-C (KORNATI NP)

Depth: 14,3 m

Coordinates: OLD: 43°49'29,99" - 15°16'33,50" NEW: 43°49'30,33" - 15°16'33,00"

Coordinator: Z. JAKL

Operators: A. KOVAČEV - A. PARADINOVIĆ

Habitat characterization and disturbance (potential pressures in the area and signs of impact): A LOT OF MUD AND DEAD MATTE. BAD VISIBILITY
A LOT OF BOTTLES, CANS PLASTIC CONTAINERS
POSIDONIA MEADOW IS NOT COMPACT AND DOESN'T HAVE CONTINUITY

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: yes / no

Type of substrate: SANDY-SILTY MUD

For *Posidonia oceanica*: **Upper limit depth ..... / Lower limit depth: .....**

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	18	15,1	
2	13	14,8	
3	22	14,7	
4	9	15,3	
5	21	14,3	
6	19	15,2	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z2-C (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	10		D	10		D	90	
D	80		P	50		P	160	
P	120		D	100		D	190	
D	200		P	170		P	240	
P	270		D	280		D	280	
D	580		P	330		P	350	
P	670		D	350		D	430	
D	690		P	440		P	660	
P	760		D	600		D	730	
D	800		P	650		P	940	
P	810		D	680		D	960	
D	850		P	770		P	1000	
P	950		D	980				
D	1000		P	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 15-06-2020 **Zone and sampling station:** Z3-A (KORNATI NP)

Depth: 9,5 m

Coordinates: 43°48'32,69" - 15°15'18,90"

Coordinator: Z. JAKL

Operators: F. DOKOZA - V. STRUGO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SAND - MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	69	9,2	
2	62	9,6	
3	72	9,8	
4	58	9,9	
5	64	9,8	
6	49	9,8	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS — EUROPEAN UNION

Zone and sampling station: Z3 - A (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	70		P	20		P	30	
D	170		D	40		D	140	
P	300		P	100		P	220	
D	390		D	270		D	240	
P	460		P	280		P	340	
D	480		D	410		D	510	
P	500		P	440		P	640	
D	620		D	500		D	720	
P	710		P	680		P	810	
D	750		D	760		D	850	
P	780		P	880		P	920	
D	820		D	960		D	980	
P	860		P	1000		P	1000	
D	890							
P	1000							

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 15-06-2020 **Zone and sampling station:** Z3-B (KORNATI NP)

Depth: 9,5 m

Coordinates: 43° 48' 32,20" - 15° 15' 18,20"

Coordinator: Z. JAKL

Operators: Z. JAKL - A. PIPLOVIĆ

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SAND - MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	58	9,7	
2	49	9,9	
3	62	9,4	
4	~~75~~	9,0	
5	42	8,6	
6	55	8,8	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z3-B (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
D	80		D	20		P	140	
P	620		P	140		D	170	
D	640		D	160		P	470	
P	760		P	240		D	520	
D	780		D	270		P	790	
P	1000		P	290		D	830	
			D	320		P	910	
			P	430		D	940	
			D	450		P	960	
			P	690		D	980	
			D	720		P	1000	
			P	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 15-06-2020 **Zone and sampling station:** Z3-C (KORNATI NP)

Depth: 10,1 m

Coordinates: 43° 48' 32,00" - 15° 15' 17,50"

Coordinator: Z. JAKL

Operators: A. KOVAČEV - A. PARADINOVIĆ

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SAND - MUD

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	38	10,7	
2	31	10,5	
3	52	10,3	
4	43	10,0	
5	61	10,1	
6	57	10,2	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z3-C (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	50		P	10		P	50	
D	120		D	40		D	70	
P	150		P	90		P	110	
D	200		D	220		D	130	
P	220		P	280		P	270	
D	340		D	300		D	350	
P	370		P	380		P	400	
D	400		D	410		D	430	
P	480		P	500		P	540	
D	520		D	590		D	650	
P	700		P	640		P	680	
D	800		D	700		D	700	
P	820		P	800		P	860	
D	900		D	820		D	900	
P	950		P	940		P	920	
D	970		D	1000		D	1000	
P	1000							

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 16-06-2020 **Zone and sampling station:** BALISE (KORNATI NP)

Depth: 14,0 m

Coordinates: 43° 49' 31,10" - 15° 16' 32,59"

Coordinator: Z. JAKL

Operators: F. DOKOZA - V. STRUGO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: yes / ~~no~~

Type of substrate: SANDY - SILTY

For *Posidonia oceanica*: **Upper limit depth ..... / Lower limit depth: .....**

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: **yes / ~~no~~**

Shoot density

Size of sampling units: ..... x ..... cm

Replicate	No of shoots	Depth (m)	Notes
1			
2			
3			
4			
5			
6			

Collection of shoots for laboratory analyses: yes / ~~no~~

Collection of sediment for laboratory analyses: yes / ~~no~~

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: BALISE (KORNATI NP) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Field Data Sheets

RNP Dune Costiere

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EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z1-A (RNP DUNE COSTIERE)

Depth: 7,0 m

Coordinates: 40°48'59,81" - 17°31'25,11"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: -

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: -

Algal blooms and filamentous algae: -

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	44	7,0	
2	45	6,9	
3	50	7,0	
4	42	7,0	
5	61	7,1	
6	50	7,0	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1 - A (RNP DUNE COSTIÈRE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	200		P	440		P	210	
D	420		SA	580		D	310	
P	590		P	780		P	1000	
D	1000		SA	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z1-B (RNP DUNE COSTIERE)

Depth: 7,0 m

Coordinates: 40°48'59,83" - 17°31'24,42"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	40	7,1	
2	48	7,0	
3	45	7,0	
4	52	7,0	
5	58	7,1	
6	61	7,0	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: ~~Z1~~-B (RNP DUNE COSTIERE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	110		P	240		P	110	
D	130		D	380		D	200	
P	260		SA	490		P	500	
D	350		D	900		SA	610	
P	610		P	1000		P	1000	
D	660							
P	1000							

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1		
2		
3		

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z1-C (RNP DUNE COSTIERE)

Depth: 6,8 m

Coordinates: 40° 48' 59,81" - 17° 31' 23,78"

Coordinator: A. RUSMONDO

Operators: A. RUSMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	48	6,8	
2	38	6,8	
3	45	6,9	
4	58	6,8	
5	49	6,8	
6	54	6,7	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z1 - C (RNP DUNE COSTIERE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	280		P	1000		P	280	
D	340					D	340	
SA	490					P	600	
D	580					D	850	
P	1000					P	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z2-A (RNP DUNE COSTIERE)

Depth: 7,1 m

Coordinates: 40° 49' 00,32" - 17° 31' 25,01"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses:

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: ..... x ..... cm

Replicate	No of shoots	Depth (m)	Notes
1	39	7,1	
2	43	7,0	
3	46	7,1	
4	38	7,1	
5	44	7,0	
6	51	7,1	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: ZZ-A (RNP DUNE COSTIERE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	210		P	110		P	300	
SA	310		SA	200		D	350	
D	510		D	900		P	1000	
P	1000		SA	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z2B (RNP DUNE COSTIERE)

Depth: 8,1 m

Coordinates: 40°49'00,39" - 17°31'24,38"

Coordinator: A. RUSMONDO

Operators: A. RUSMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	31	8,1	
2	36	8,1	
3	44	8,2	
4	49	8,2	
5	37	8,1	
6	39	8,2	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: ZZ-B (RNP DUNE COSTIERE) **Page:** 22

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
D	80		D	40		P	220	
P	140		P	200		D	260	
D	220		D	440		P	1000	
P	1000		SA	820				
			D	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z2-C (RNP DUNE COSTIERE)

Depth: 7,3 m

Coordinates: 40° 49' 00,43" - 17° 31' 23,51"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: ~~yes~~ / no

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	36	7,3	
2	33	7,3	
3	48	7,3	
4	55	7,2	
5	45	7,2	
6	42	7,3	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: ZZ-C (RNP DUNE COSTIÈRE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	210		P	240		P	190	
D	1000		D	410		D	300	
			P	480		P	420	
			D	520		D	460	
			P	1000		P	1000	

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z3-A (RNP - DUNE COSTIERE)

Depth: 8,4 m

Coordinates: 40°49'00,91" - 17°31'24,93"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: /

Meadow continuity: yes / ~~no~~

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	48	8,4	
2	62	8,3	
3	58	8,3	
4	50	8,4	
5	55	8,3	
6	55	8,4	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z3-A (RNP DUNE COSTIERE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	220		P	210		P	220	
D	380		SA	350		D	380	
P	1000		P	180		P	1000	
			D	570				
			P	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z3-B (RNP DUNE COSTIERE)

Depth: 8,3 m

Coordinates: 40°49'00,87" - 17°31'24,10"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses:

Meadow continuity: yes / ~~no~~

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: /

Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: ~~40~~ x ~~40~~ cm

Replicate	No of shoots	Depth (m)	Notes
1	55	7,9	
2	44	7,8	
3	43	8,1	
4	50	8,1	
5	42	8,0	
6	49	8,1	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z3-B (RNP DUNE COSTIERE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
SA	1000		P	90		SA	1000	
			SA	440				
			P	680				
			SA	770				
			P	920				
			SA	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** Z3-C (RNP - DUNE COSTIERE)

Depth: 8,1 m

Coordinates: 40°49'00,92" - 17°31'23,17"

Coordinator: A. RISMONDO

Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

Seagrass: POSIDONIA OCEANICA

Other Seagrasses: -

Meadow continuity: yes / ~~no~~

Type of substrate: SANDY

For *Posidonia oceanica*: Upper limit depth ..... / Lower limit depth: .....

Presence of alien species: -

Algal blooms and filamentous algae: -

Presence of *Pinna nobilis*: yes / ~~no~~

Shoot density

Size of sampling units: 40 x 40 cm

Replicate	No of shoots	Depth (m)	Notes
1	55	7,8	
2	53	7,9	
3	52	8,0	
4	49	8,1	
5	54	8,0	
6	52	7,8	

Collection of shoots for laboratory analyses: ~~yes~~ / no

Collection of sediment for laboratory analyses: ~~yes~~ / no

Interreg Italy - Croatia SASPAS

EUROPEAN UNION

Zone and sampling station: Z3-C (RNP DUNE COSTIERE) **Page:** 2/2

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O
P	70		P	30		SA	1000	
SA	200		SA	220				
P	290		P	450				
SA	630		SA	780				
P	730		P	840				
SA	1000		SA	1000				

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

WP 3.3 - Monitoring campaigns

Date: 21-10-2020 **Zone and sampling station:** BALISE (RNP-DUNE COSTIERE)

Depth: 7,6 m
Coordinates: 40°49'00,08" - 17°31'23,99"

Coordinator: A. RISMONDO
Operators: A. RISMONDO - M. CONSENTINO

Habitat characterization and disturbance (potential pressures in the area and signs of impact): POSIDONIETUM

→ THE BALISE N°2 WAS NOT FOUND

Seagrass: POSIDONIA OCEANICA
Other Seagrasses: /
Meadow continuity: yes / no
Type of substrate: SANDY

For *Posidonia oceanica*: **Upper limit depth ..... / Lower limit depth: .....**

Presence of alien species: /
Algal blooms and filamentous algae: /

Presence of *Pinna nobilis*: **yes / ~~no~~**

Shoot density

Size of sampling units: ..... x ..... cm

Replicate	No of shoots	Depth (m)	Notes
1			
2			
3			
4			
5			
6			

Collection of shoots for laboratory analyses: yes / ~~no~~
Collection of sediment for laboratory analyses: yes / ~~no~~

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EUROPEAN UNION

Zone and sampling station: BALISE (RNP DUNE COSTIERE) **Page:** 2./2.

% Coverage **Size of sampling units: transect 10 m**

Replicate 1			Replicate 2			Replicate 3		
C	i	O	C	i	O	C	i	O

C = categories

P = P. oceanica
Cn = C. nodosa
Zm = Z. marina
Zn = Z. noltei

D = Dead *matte*
M = Mud
Sa = Sand
St = Stones/Pebbles
R = Rock

O = other species

i = intercept (cm)

Notes:

Presence and density of *Pinna nobilis* *

Replicate	No of alive individuals	No of dead individuals
1	/	/
2	/	/
3	/	/

* density is measured counting all individuals encountered within a 1 m corridor for both sides of each of three transects 10 m long and evaluating their status (dead or alive)

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Laboratory Data Sheets

Bay of Panzano (Monfalcone)

Zone and sampling station: Monfalcone - Z1A

Seagrass: *Cymodocea nodosa* **Page: 1/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	7,5	47,4	0,35	2
1	7,5	15,2	0,35	0
2	9,3	36,6	0,35	1
2	9,3	33,9	0,35	1
2	9,3	7,2	0,35	0
3	11,1	46,6	0,40	1
3	11,1	40,2	0,4	0
3	11,1	26,9	0,35	0
4	8,3	41,5	0,35	1
4	8,3	22,7	0,35	0
5	9,5	43,8	0,4	1
5	9,5	30,9	0,35	1
5	9,5	7,5	0,35	0
6	7,9	35,1	0,40	1
6	7,9	20,4	0,35	0
6	7,9	6,7	0,35	0
7	8,1	34,5	0,35	1
7	8,1	17,5	0,35	0
7	8,1	4,3	0,35	0
8	6,9	33,2	0,35	1
8	6,9	12,7	0,35	0
9	5,5	28,9	0,35	1
9	5,5	15,5	0,35	0
10	9,7	51,7	0,40	2

Zone and sampling station: Monfalcone - Z1A

Seagrass: *Cymodocea nodosa* **Page: 2/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
10	9,7	32,7	0,35	1
10	9,7	12,9	0,35	0
11	9,3	45,3	0,35	1
11	9,3	31,9	0,35	0
11	9,3	13,2	0,35	0
12	8,5	44,6	0,40	2
12	8,5	27,8	0,35	0
12	8,5	11,1	0,35	0
13	7,8	41,3	0,35	1
13	7,8	22,2	0,35	0
14	11,1	47,2	0,35	1
14	11,1	41,3	0,35	1
14	11,1	4,1	0,35	0
15	9,9	39,3	0,4	1
15	9,9	28,7	0,35	0
15	9,9	5,4	0,35	0
16	8,2	33,7	0,40	2
16	8,2	21,5	0,35	0
17	7,7	40,8	0,40	1
17	7,7	20,6	0,35	1
17	7,7	5,8	0,35	0
18	6,9	44,4	0,35	1
18	6,9	27,9	0,35	0
18	6,9	11,6	0,35	0

Zone and sampling station: Monfalcone - Z1A

Seagrass: *Cymodocea nodosa* **Page: 3/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
19	9,2	44,5	0,4	1
19	9,2	30,9	0,35	0
20	10,5	48,7	0,40	1
20	10,5	42,3	0,35	0
20	10,5	29	0,35	0

Note: _____

_____

Zone and sampling station: Monfalcone - Z1B

Seagrass: *Cymodocea nodosa*

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	5,4	35,1	0,3	1
1	5,4	20,9	0,3	0
2	8,7	34,5	0,4	2
2	8,7	33,9	0,35	1
2	8,7	28,1	0,35	0
2	8,7	9,1	0,35	0
3	11,4	33,3	0,35	2
3	11,4	30,1	0,35	1
3	11,4	26,5	0,35	0
4	9,1	37,1	0,35	1
4	9,1	22,2	0,35	0
4	9,1	10,4	0,35	0
5	9,9	33,5	0,35	1
5	9,9	26,6	0,35	1
5	9,9	12,1	0,35	0
6	8,7	34,8	0,35	1
6	8,7	22,2	0,35	0
7	8,7	34,8	0,35	1
7	8,7	22,2	0,35	0
8	10,7	38,8	0,4	1
8	10,7	26,6	0,35	1
8	10,7	9,9	0,35	0
9	11,1	39,9	0,40	2
9	11,1	31,1	0,35	1

Zone and sampling station: Monfalcone - Z1B

Seagrass: *Cymodocea nodosa* **Page: 2/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
9	11,1	18,7	0,35	0
10	7,9	31,4	0,35	1
10	7,9	12,9	0,35	0
11	8,5	34,7	0,35	1
11	8,5	26,1	0,35	1
11	8,5	22,5	0,35	0
12	6,8	33,6	0,35	1
12	6,8	22,9	0,35	0
13	10,1	35,8	0,35	1
13	10,1	23,7	0,35	0
14	11,2	34,8	0,35	1
14	11,2	28,8	0,35	0
14	11,2	11,4	0,35	0
15	9,3	37,7	0,4	1
15	9,3	21,9	0,35	0
15	9,3	15,2	0,35	0
16	6,9	31,5	0,3	1
16	6,9	19,7	0,3	0
17	7,8	40,1	0,35	1
17	7,8	27,6	0,35	0
17	7,8	9,9	0,35	0
18	9,7	37,8	0,40	2
18	9,7	31,1	0,35	1
18	9,7	19,5	0,35	0

Zone and sampling station: Monfalcone - Z1B

Seagrass: *Cymodocea nodosa* **Page: 3/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
18	9,7	8,7	0,35	0
19	10,5	36,8	0,35	1
19	10,5	28,1	0,35	0
19	10,5	18,9	0,35	0
20	9,9	37,1	0,35	1
20	9,9	30,2	0,35	0
20	9,9	15,8	0,35	0

Note: _____

_____

Zone and sampling station: Monfalcone - Z1C

Seagrass: *no seagrasses* **Page: 1/1**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)

Note: _____

_____

Zone and sampling station: Monfalcone - Z2A

Seagrass: *Zostera noltei*

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	6,1	28,7	0,1	1
1	6,1	10,2	0,1	0
1	6,1	1,3	0,1	0
2	11,8	32,3	0,1	0
2	11,8	22,6	0,1	0
3	9,4	29,1	0,15	1
3	9,4	7,1	0,1	0
4	8,5	29,9	0,1	0
4	8,5	15,2	0,1	0
4	8,5	3,3	0,1	0
5	9,1	27,7	0,1	1
5	9,1	18,3	0,1	0
5	9,1	7,7	0,1	0
6	10,2	33,3	0,15	1
6	10,2	20,8	0,1	0
7	7,8	28,5	0,1	1
7	7,8	17,4	0,1	0
7	7,8	8,1	0,1	0
8	9,5	30,1	0,1	0
8	9,5	20,5	0,1	0
8	9,5	10,8	0,1	0
9	8,9	33,3	0,1	1
9	8,9	20,1	0,1	0
9	8,9	11,5	0,1	0

Zone and sampling station: Monfalcone - Z2A

Seagrass: *Zostera noltei* **Page: 2/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
10	10,1	35,2	0,1	0
10	10,1	22,2	0,1	0
10	10,1	9,4	0,1	0
11	7,4	28,9	0,15	1
11	7,4	11,7	0,1	0
12	10,4	30,3	0,1	0
12	10,4	20,3	0,1	0
12	10,4	4,8	0,1	0
13	9,7	35,2	0,1	0
13	9,7	22,8	0,1	0
13	9,7	12,9	0,1	0
14	8,3	32,2	0,1	0
14	8,3	25,4	0,1	0
14	8,3	5,5	0,1	0
15	8,8	29,3	0,1	0
15	8,8	18,7	0,1	0
15	8,8	9,9	0,1	0
16	10,1	32,8	0,1	1
16	10,1	26,3	0,1	0
16	10,1	12,2	0,1	0
17	10,5	35,1	0,15	1
17	10,5	21,1	0,1	0
18	9,9	33,2	0,1	0
18	9,9	21,1	0,1	0

Zone and sampling station: Monfalcone - Z2A

Seagrass: *Zostera noltei* **Page: 3/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
18	9,9	10,4	0,1	0
19	10,8	34,9	0,1	0
19	10,8	18,9	0,1	0
19	10,8	7,8	0,1	0
20	7,7	27,8	0,1	0
20	7,7	16,5	0,1	0
20	7,7	8,8	0,1	0

Note: _____

_____

Zone and sampling station: Monfalcone - Z2B

Seagrass: *Zostera noltei*

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	10,7	38,5	0,35	2
1	10,7	37,4	0,35	1
1	10,7	18,5	0,35	0
2	9,1	46,2	0,30	1
2	9,1	30,9	0,30	0
2	9,1	3,4	0,30	0
3	10,1	55,8	0,35	3
3	10,1	31,5	0,35	1
4	8,9	49,8	0,35	2
4	8,9	37,2	0,35	0
4	8,9	16,8	0,30	0
5	10,5	40,2	0,35	1
5	10,5	38,9	0,35	0
5	10,5	11,2	0,3	0
6	9,4	44,8	0,35	1
6	9,4	39,9	0,35	0
6	9,4	15,2	0,35	0
7	9,9	47,8	0,35	2
7	9,9	41,1	0,35	1
8	10,3	51,1	0,35	2
8	10,3	47,8	0,35	1
8	10,3	21,1	0,35	0
9	10,7	54,8	0,35	2
9	10,7	47,7	0,35	1

Zone and sampling station: Monfalcone - Z2B

Seagrass: *Zostera noltei* **Page: 2/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
9	10,7	29,8	0,35	0
10	11,1	56,6	0,35	2
10	11,1	42,2	0,35	1
10	11,1	11,1	0,30	0
11	9,5	48,8	0,35	1
11	9,5	41,2	0,35	0
12	9,8	49,7	0,35	1
12	9,8	38,9	0,35	0
13	10,7	37,9	0,35	1
13	10,7	32,8	0,35	0
13	10,7	9,9	0,30	0
14	10,4	35,7	0,35	1
14	10,4	29,8	0,35	0
14	10,4	10,2	0,30	0
15	10,5	49,9	0,35	1
15	10,5	37,8	0,35	0
15	10,5	15,6	0,35	0
16	10,0	52,3	0,35	1
16	10,0	48,8	0,35	0
17	9,8	46,6	0,35	1
17	9,8	39,7	0,35	0
17	9,8	21,1	0,35	0
18	10,3	52,2	0,35	1
18	10,3	43,1	0,35	0

Zone and sampling station: Monfalcone - Z2B

Seagrass: *Zostera noltei* **Page: 3/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
19	10,1	51,8	0,35	1
19	10,1	46,1	0,35	1
19	10,1	8,9	0,3	0
20	10,5	58,6	0,35	2
20	10,5	42,5	0,35	1
20	10,5	27,7	0,35	0

Note: _____

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Zone and sampling station: Monfalcone - Z2C

Seagrass: *Zostera noltei*

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	12,3	50,7	0,40	4
1	12,3	48,1	0,40	1
1	12,3	20,2	0,35	0
2	12,1	71,8	0,40	3
2	12,1	37,8	0,40	1
3	11	48,8	0,35	3
3	11	36,6	0,35	1
4	11,8	55,6	0,40	1
4	11,8	45,1	0,35	1
5	12,1	66,9	0,4	2
5	12,1	43,1	0,4	1
5	12,1	15,2	0,35	0
6	11,7	65,2	0,40	2
6	11,7	41,1	0,4	1
7	10,8	59,9	0,4	1
7	10,8	40,7	0,4	1
8	9,1	43,7	0,35	1
8	9,1	29,9	0,35	0
9	11,2	63,4	0,35	1
9	11,2	35,5	0,35	0
10	11,8	58,7	0,40	2
10	11,8	41,3	0,35	1
10	11,8	22,7	0,35	0
11	12,2	68,9	0,40	3

Zone and sampling station: Monfalcone - Z2C

Seagrass: *Zostera noltei* **Page: 2/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
11	12,2	49,3	0,40	1
11	12,2	18,8	0,35	0
12	9,8	49,7	0,4	1
12	9,8	35,7	0,35	0
13	10,1	51,3	0,40	1
13	10,1	37,6	0,35	0
14	11,5	77,5	0,40	3
14	11,5	49,5	0,40	1
14	11,5	22,7	0,35	0
15	10,9	62,4	0,40	2
15	10,9	47,2	0,35	1
15	10,9	12,9	0,35	0
16	11,8	55,5	0,40	2
16	11,8	41,1	0,4	1
17	12,2	67,4	0,40	3
17	12,2	40,2	0,40	1
17	12,2	11,9	0,35	0
18	12,0	50,8	0,4	1
18	12,0	28,7	0,35	0
18	12,0	10,7	0,35	0
19	11,4	49,9	0,4	1
19	11,4	32,7	0,35	0
20	12,2	69,7	0,40	2
20	12,2	34,8	0,40	1

Zone and sampling station: Monfalcone - Z2C

Seagrass: *Zostera noltei* **Page: 3/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
20	12,2	18,7	0,35	0

Note: _____

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Zone and sampling station: Monfalcone - Z3A

Seagrass: *Zostera marina* **Page: 1/4**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	12,5	29,1	0,5	4
1	12,5	28,9	0,5	3
1	12,5	24,8	0,5	0
1	12,5	21,9	0,5	0
1	12,5	2,5	0,45	0
2	12	26	0,5	7
2	12	23,6	0,5	4
2	12	22,1	0,5	1
2	12	18,6	0,5	0
2	12	3,8	0,45	0
3	10,1	25,5	0,45	4
3	10,1	21,1	0,45	3
3	10,1	18,2	0,45	0
3	10,1	17,3	0,45	0
4	12,1	27,5	0,5	3
4	12,1	23,9	0,5	2
4	12,1	18,9	0,5	0
4	12,1	15,7	0,5	0
4	12,1	3,8	0,45	0
5	11,9	28,8	0,5	3
5	11,9	24,7	0,5	3
5	11,9	18,5	0,5	0
5	11,9	16,3	0,5	0
5	11,9	2,8	0,45	0

Zone and sampling station: Monfalcone - Z3A

Seagrass: *Zostera marina* **Page: 2/4**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
6	12,2	29,9	0,5	5
6	12,2	27,8	0,5	2
6	12,2	19,8	0,5	0
6	12,2	17,6	0,5	0
6	12,2	5,5	0,45	0
7	10,9	27,5	0,5	2
7	10,9	25,6	0,5	1
7	10,9	19,9	0,5	0
7	10,9	18,3	0,5	0
8	12,3	31,1	0,5	6
8	12,3	28,9	0,5	4
8	12,3	22,6	0,5	1
8	12,3	20,4	0,5	0
8	12,3	8,7	0,45	0
9	11,1	26,1	0,5	3
9	11,1	24,9	0,5	3
9	11,1	22,1	0,5	0
9	11,1	19,5	0,5	0
10	12,6	33,1	0,5	6
10	12,6	30,7	0,5	5
10	12,6	25,5	0,5	0
10	12,6	20,9	0,5	0
10	12,6	6,5	0,45	0
11	12,2	25,7	0,5	2

Zone and sampling station: Monfalcone - Z3A

Seagrass: *Zostera marina* **Page: 3/4**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
11	12,2	22,8	0,5	1
11	12,2	15,7	0,5	0
11	12,2	13,4	0,5	0
11	12,2	1,8	0,45	0
12	12,6	30,9	0,5	3
12	12,6	28,8	0,5	2
12	12,6	18,4	0,5	0
12	12,6	15,2	0,5	0
12	12,6	7,6	0,45	0
12	12,6	1,8	0,45	0
13	10,9	22,3	0,5	4
13	10,9	18,9	0,5	3
13	10,9	13,2	0,5	0
13	10,9	9,9	0,5	0
13	10,9	2,2	0,45	0
14	11,4	27,5	0,5	5
14	11,4	25,2	0,5	4
14	11,4	19,1	0,5	0
14	11,4	17,6	0,5	0
15	11,9	26,9	0,5	4
15	11,9	22,7	0,5	2
15	11,9	15,4	0,5	0
15	11,9	12,1	0,5	0
15	11,9	3,1	0,45	0

Zone and sampling station: Monfalcone - Z3A

Seagrass: *Zostera marina* **Page: 4/4**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
15	11,9	0,9	0,45	0
16	12,4	29,9	0,5	5
16	12,4	27,3	0,5	2
16	12,4	22,5	0,5	0
16	12,4	20,8	0,5	0
16	12,4	4,3	0,45	0
17	11,8	29,5	0,5	4
17	11,8	27,8	0,5	2
17	11,8	22,1	0,5	0
18	12,4	30,3	0,5	6
18	12,4	29,9	0,5	5
18	12,4	25,4	0,5	0
18	12,4	19,8	0,5	0
18	12,4	7,6	0,45	0
19	10,9	29,5	0,5	3
19	10,9	27,2	0,5	3
19	10,9	23,4	0,5	0
19	10,9	18,4	0,5	0
20	12,5	25,7	0,5	5
20	12,5	23,5	0,5	4
20	12,5	15,7	0,5	0
20	12,5	9,5	0,45	0
20	12,5	1,1	0,45	0

Note: _____

Zone and sampling station: Monfalcone - Z3B

Seagrass: *Cymodocea nodosa* **Page: 1/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	12	48,9	0,35	2
1	12	39,6	0,35	1
1	12	7,8	0,3	0
2	11,7	45,7	0,35	2
2	11,7	40,8	0,35	1
2	11,7	5,8	0,3	0
3	13,7	56,3	0,3	1
3	13,7	15,8	0,3	0
4	12,2	51,1	0,35	2
4	12,2	41,1	0,35	1
4	12,2	17,5	0,35	0
5	12,5	50,2	0,35	1
5	12,5	44,1	0,35	0
5	12,5	18,7	0,35	0
6	12,2	49,9	0,35	1
6	12,2	41,1	0,35	0
6	12,2	18,1	0,35	0
7	10,8	48,8	0,35	2
7	10,8	40,2	0,35	1
7	10,8	12,9	0,3	0
8	12	47,7	0,35	1
8	12	41,8	0,35	0
9	11,8	46,8	0,35	2
9	11,8	38,9	0,35	0

Zone and sampling station: Monfalcone - Z3B

Seagrass: *Cymodocea nodosa* **Page: 2/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
9	11,8	12,5	0,3	0
10	11,2	41,2	0,3	0
10	11,2	35,3	0,3	0
11	11,4	50,1	0,35	1
11	11,4	44,7	0,35	1
11	11,4	13,1	0,3	0
12	13,1	52,8	0,35	2
12	13,1	47,7	0,35	1
12	13,1	14,1	0,3	0
13	12,5	50,3	0,35	2
13	12,5	47,4	0,35	1
13	12,5	16,1	0,3	0
14	12,9	55,6	0,3	1
14	12,9	49,9	0,3	1
15	12,8	38,9	0,35	2
15	12,8	33,4	0,35	1
15	12,8	11,4	0,3	0
16	12,5	54,6	0,35	2
16	12,5	48,8	0,35	1
16	12,5	16,2	0,3	0
17	13,1	58,7	0,35	3
17	13,1	51,2	0,35	1
17	13,1	18,9	0,35	0
18	11,9	49,7	0,35	1

Zone and sampling station: Monfalcone - Z3B

Seagrass: *Cymodocea nodosa* **Page: 3/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
18	11,9	41	0,35	0
19	11,9	11,9	0,3	0
19	12,2	51,3	0,35	1
19	12,2	44,7	0,35	0
20	13,4	49,9	0,35	2
20	13,4	38,8	0,35	0
20	13,4	11,2	0,3	0

Note: _____

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Zone and sampling station: Monfalcone - Z3C

Seagrass: *Cymodocea nodosa* **Page: 1/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
1	11,2	48,2	0,35	1
1	11,2	43,4	0,35	1
2	10,4	46,6	0,4	1
2	10,4	38,5	0,4	0
2	10,4	31,7	0,4	0
2	10,4	2,1	0,35	0
3	11,8	45,1	0,4	1
3	11,8	40	0,4	1
3	11,8	35,6	0,4	0
3	11,8	8,2	0,35	0
4	10,8	44,9	0,35	1
4	10,8	39,9	0,35	0
5	11,1	50,1	0,4	1
5	11,1	47,4	0,4	0
5	11,1	31,2	0,4	0
6	11,4	49,9	0,4	1
6	11,4	43,2	0,4	0
6	11,4	28,9	0,4	0
7	10,9	48,9	0,4	1
7	10,9	39,9	0,4	0
7	10,9	17,8	0,4	0
8	10,8	46,8	0,35	1
8	10,8	39,9	0,35	1
9	11	44,9	0,4	1

Zone and sampling station: Monfalcone - Z3C

Seagrass: *Cymodocea nodosa* **Page: 2/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
9	11	36,4	0,4	0
9	11	29,8	0,4	0
9	11	6,3	0,35	0
10	11,4	46,8	0,4	1
10	11,4	35,5	0,4	0
10	11,4	22,2	0,4	0
11	11,5	49,7	0,4	1
11	11,5	41,1	0,4	0
11	11,5	30,5	0,4	0
12	10,9	50,1	0,4	2
12	10,9	44,3	0,4	1
13	12	52,9	0,4	2
13	12	42,1	0,4	1
13	12	36,6	0,4	0
13	12	4,8	0,35	0
14	11,4	44,5	0,4	1
14	11,4	34,3	0,4	0
14	11,4	27,1	0,4	0
15	11,5	50,2	0,4	1
15	11,5	44,7	0,4	1
16	11	48,6	0,4	1
16	11	38,5	0,4	0
16	11	27,4	0,4	0
17	11,8	45,7	0,4	1

Zone and sampling station: Monfalcone - Z3C

Seagrass: *Cymodocea nodosa* **Page: 3/3**

	Leaves			
Shoot n.	Leaf sheath (cm)	Length (cm)	Width (cm)	Necrosis (%)
17	11,8	33,5	0,4	0
17	11,8	22,9	0,4	0
18	10,9	39,9	0,4	1
18	10,9	30,5	0,4	0
18	10,9	20,1	0,4	0
19	11,4	46,8	0,4	1
19	11,4	35,5	0,4	0
19	11,4	19,7	0,4	0
20	11,6	51,1	0,4	2
20	11,6	42,9	0,4	1
20	11,6	31,1	0,4	0
20	11,6	7,8	0,35	0

Note: _____

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Laboratory Data Sheets

Kornati NP

European Regional Development Fund

Zone and sampling station: Kornati NP - Z1A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	42,2	0,9	4,2	0					
1					2,6	45,8	0,9	0	+
1					3,4	31,7	0,9	2	-
1					3,4	15	1	3	-
2	62,2	1	4,7	0					
2					4,6	49,5	1	2	+
2					3,7	71,2	1	2	+
2					4,7	24,3	1	0	-
2					4,6	17,9	1	0	-
3	49	0,9	3,8	0					
3	60,8	0,9	4	0					
3					3,8	38,1	0,9	3	+
3					3,1	58,5	0,9	1	+
3					3,8	24,8	1	8	+
4	27,3	0,9	4	0					
4	40,3	0,9	3,8	0					
4					3	46,5	0,9	2	+
4					3,3	34,1	0,9	4	-
5	40,6	0,9	4	0					
5	30,8	0,9	3,8	0					
5					2,7	44,1	0,9	2	+
5					3,4	25,6	0,9	5	-
6	57,6	0,9	4,3	0					
6	49,8	0,9	4,5	0					

Zone and sampling station: Kornati NP - Z1A **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
6					3,2	24,6	1	1	-
6					3,7	19,2	1	1	-
6					4	31,4	1	2	-

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z1B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	49,2	0,9	3,8	2					
1	53,7	0,9	4	0					
1					3,7	34,5	0,9	0	-
1					3,9	20,6	0,9	4	-
2	42,1	0,9	4,5	2					
2	26,1	0,9	4,8	1					
2					3	49,1	0,9	1	+
2					3,5	33,2	0,9	5	-
2					3,7	18	0,9	1	-
3	2,4	0,9	3,5	0					
3	39,7	0,9	3,8	5					
3	27,4	0,9	3,5	5					
3					2,8	19,9	0,9	0	-
3					3,2	26,6	0,9	0	+
4	25,2	0,8	3,7	0					
4	34,3	0,8	3,8	0					
4					2,4	21,6	0,8	0	-
4					2,9	18,9	0,8	0	+
5	37,6	1	5,8	0					
5	26,9	0,9	5,5	0					
5	3	0,9	3,9	0					
5	7,7	0,8	4	0					
5					2,8	42,7	1	0	+
5					3,4	30,6	1	1	-

Zone and sampling station: Kornati NP - Z1B **Page:2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5					4,2	15	1	6	-
5					3,5	3,6	1	0	-
6	34,3	0,9	3,7	0					
6	8,6	0,9	3,7	0					
6	36,5	0,9	3,2	0					
6	7,2	0,9	4	0					
6					3,7	31,1	1	3	+
6					3,1	40	1	0	+
6					3,8	2	1	0	-
6					3,5	18,6	1,1	4	+
6					3,5	1	1,1	0	-
6					2,9	31,8	1	0	-

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z1C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	46,7	1	2,7	0					
1	37,9	1	2,8	0					
1					3,5	41,3	1	0	+
2	38,9	1	4,2	0					
2	51,2	1	4,2	0					
2	5,3	0,9	4	0					
2					4,3	31,7	1	0	+
2					3,7	49	1	0	+
2					4,2	22,2	1	0	+
3	39,6	0,9	4,4	0					
3	15	1	3,7	0					
3					3,8	24,7	0,9	0	+
3					3,7	35,8	1	0	+
3					3,7	17,1	0,9	0	+
4	9,2	0,9	4,2	0					
4	53,7	0,9	4,3	0					
4	41,4	0,9	4	0					
4					4,3	30,4	1	0	-
4					3,6	48,3	1	0	+
4					3,9	17,6	1	0	+
4					4,3	12,6	1	0	-
5	21,8	0,8	3,2	0					
5	28,3	0,8	3	0					
5	5,2	0,8	3	0					

Zone and sampling station: Kornati NP - Z1C **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5					2,4	25,3	0,8	0	+
5					2,7	17,4	0,8	2	+
6	27,9	0,8	3,4	0					
6	36,6	0,9	3,4	0					
6					3,4	21	0,9	0	+
6					3,1	32,9	0,9	4	+

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z2A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	4	0,8	3,5	0					
1	5,7	0,8	3,4	0					
1	31,4	0,8	3,7	0					
1					3,1	32,2	0,9	0	+
1					3,1	21,6	0,9	0	+
1					3,3	15,9	0,9	0	+
2	37,2	0,9	2,7	0					
2	17,5	0,8	2,7	0					
2					3,1	26,4	0,8	2	+
2					3,1	14,2	0,9	0	-
3	34,6	0,8	2,9	10					
3	23,1	0,8	2,8	0					
3	4	0,8	3,2	0					
3	1,7	0,8	3,2	0					
3					3,2	4,9	0,9	30	-
3					3,2	23,5	0,8	10	-
4	33,2	0,8	3,2	3					
4	23	0,8	3,2	0					
4					2,3	36,2	0,8	4	+
4					2,9	17,7	0,8	2	+
4					2,7	25,2	0,8	70	+
5	34,2	0,8	3,1	0					
5	24,1	0,8	3,1	0					
5					2,3	34,7	0,8	0	+

Zone and sampling station: Kornati NP - Z2A **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5					2,7	20,9	0,8	0	+
5					2,8	14,7	0,8	15	+
6	40,4	0,8	3,7	0					
6	27	0,8	3,9	20					
6	4				2,8	37,8	0,8	15	+
6					3,3	24,3	0,8	2	+
6					3,1	4,3	0,8	0	-

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z2B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	23,3	0,9	5	0					
1	47,5	0,9	5	8					
1	57,2	0,9	4,8	2	4	48,6	0,9	4	-
1					4,3	27	1	5	+
2	52,7	1	5,4	0					
2					3,3	61,7	1	10	+
2					4,4	43,2	1	2	+
2					4,4	29,2	1,1	6	+
2					4,4	19,5	1,1	4	+
3	19,2	0,9	4	0					
3	49,7	0,9	3,8	0					
3	43,8	0,9	4,5	0					
3					3,7	23,5	1	2	-
3					3,1	41,4	0,9	4	-
3					3,4	13,1	1	6	-
4	14,1	0,8	3	0					
4	5,4	0,7	2,9	0					
4	17,7	0,8	2,9	0					
4	23,5	0,9	3,2	0					
4					2,5	24,2	0,9	0	+
4					2,9	28,9	0,9	0	+
5	29	0,8	3,5	2					
5	16,7	0,8	4,2	0					
5	21,9	0,8	3,5	0					

Zone and sampling station: Kornati NP - Z2B **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5	24,8	0,8	4	0					
5					2,8	14,2	0,8	8	-
5					3,2	26,8	0,8	0	-
5					3,4	12,3	0,8	0	-
6	24,2	0,9	3,7	0					
6	38,6	0,9	3,7	0					
6					3,1	24,8	1	0	-
6					2,5	27,7	1	0	-
6					3,4	14	1	0	-
6					3,5	6,8	1	0	-

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z2C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	22,5	0,8	2	0					-
1	31	0,8	2,2	0					-
1					2,5	27,5	0,9	2	+
1					3,4	14	0,9	5	-
2	36	1	3,3	0					-
2	46,5	1	3,5	0					-
2	16	0,9	3,4	0					-
2					3,8	23,9	1	5	+
2					3,4	19,5	0,9	20	-
3	43,8	1	3,6	0					-
3	50,2	1	3,8	18					-
3					3,7	17,5	0,9	85	-
3					3,7	21,9	0,9	8	+
3					4,1	15,4	1	40	-
4	18,4	0,9	2,5	0					-
4	5,4	0,8	3,2	10					-
4	5,7	1	2,9	10					-
4	5,7	1	3,4	8					-
4	4,8	0,8	3,2	0					-
4					2	25,4	0,9	18	-
4					3,6	1	1,1	0	+
4					2,8	32,6	1	20	-
4					3,2	12,7	1	30	-
4					3,8	5,5	1	0	-

Zone and sampling station: Kornati NP - Z2C **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5	44,2	0,9	3,8	0					-
5	31,2	0,9	3,9	0					-
5					3,5	41,4	0,9	0	-
5					4	16,4	0,9	2	-
5					3,9	18,9	0,9	2	-
6	31,4	0,8	3,5	0					-
6	17,7	0,8	3,9	0					-
6	34,3	0,9	3,5	0					-
6					3,4	26,4	0,9	30	-
6					3,3	14,5	0,9	35	-

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z3A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	3	0,7	3	0					
1	51,5	0,8	3,3	10					
1					4	30,5	0,9	0	-
1					4,1	5,3	0,9	0	-
1					3,8	18	0,9	0	+
1					4,5	7,2	0,9	10	+
2	2,5	0,6	2,5	0					
2	5,7	0,7	3,2	0					
2					4,8	41	0,9	20	+
2					4,2	61,3	0,9	30	+
2					5,1	78,2	0,9	20	+
3	22	0,7	4	0					
3	38	0,7	3,8	0					
3					4,3	57	0,9	30	+
3					4,6	41	0,9	30	+
3					5,2	68	0,9	40	+
3					5	18	0,9	40	+
4	2,5	0,6	2,5	0					
4	18,3	0,7	3,5	0					
4	22,7	0,7	4	0					
4					4,7	38	0,9	10	-
4					4,7	12	0,9	10	+
4					4	68,5	0,9	10	+
5	2,8	0,6	2,8	0					

Zone and sampling station: Kornati NP - Z3A **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5	15,7	0,6	3,2	0					
5					4,2	20,5	0,9	0	-
5					4	31,7	0,9	0	-
5					4,2	15,3	0,9	0	-
5					5	78,2	0,9	10	+
5					5,2	80	0,9	10	+
6	4,2	0,6	3,8	0					
6	10,3	0,6	4	0					
6					5	68,1	0,9	0	-
6					5	75,3	0,9	10	+
6					5,1	88,1	0,9	10	+

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z3B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	11,3	0,5	3,1	0					
1					3,2	43,1	0,9	20	-
1					3	48	0,9	20	-
1					3,1	36,3	0,9	20	-
2	35	0,5	3	0					
2	13	0,6	3	0					
2	18	0,6	3,2	0					
2					2,8	21	0,9	5	-
2					3	18,8	0,9	15	-
2					3,1	12,5	0,9	10	-
3	9,7	0,6	1,9	0					
3	15,2	0,6	2	0					
3					2,1	30	0,9	10	-
3					2	19	0,9	10	-
3					2,3	14	0,9	10	-
4	40	0,6	3.3.	0					
4	26	0,6	2,9	0					
4	31	0,6	3	0					
4					3	13	0,8	0,8	-
4					3	28	0,9	0,9	-
4					3	22	0,9	0,9	-
5	12,3	0,6	3	0					
5	18,5	0,6	2,8	0					
5					2,8	17,3	0,9	5	-

Zone and sampling station: Kornati NP - Z3B **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5					2,7	24,2	0,9	5	-
6	10	0,6	2,8	0					
6	15,3	0,6	2,8	0					
6					3,2	19,3	0,9	5	-
6					3,1	29	0,9	10	-
6					3	24,5	0,9	10	-

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: Kornati NP - Z3C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
1	21,5	0,7	1,8	0					
1	32,1	0,7	2	0					
1	30,5	0,7	2,1	0					
1					3,3	32	0,8	0	-
1					3,9	41	0,8	0	-
1					3,9	42	0,8	5	-
2	9,3	0,6	2	0					
2	17,3	0,6	2	0					
2	10	0,6	2,1	0					
2					3,8	22	0,8	0	-
2					4,1	18	0,8	10	-
2					4,2	20	0,8	10	-
3	8,3	0,6	2,2	0					
3	7,7	0,6	3	0					
3	11,3	0,6	3	0					
3					3	23	0,8	10	-
3					3	11	0,8	20	-
3					3	28	0,8	10	-
4	5,2	0,6	3	0					
4	8,1	0,6	3	0					
4	11	0,6	3,5	0					
4					3,7	22,3	0,8	10	-
4					3,2	16,5	0,8	10	-
4					3,1	35	0,8	10	-

Zone and sampling station: Kornati NP - Z3C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Grazing
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	si - / no +
5	4,2	0,6	3	0					
5	22	0,6	3	0					
5	24	0,6	3	0					
5					2,5	21,3	0,8	0	-
5					2,5	36,8	0,8	5	-
5					2,5	41,8	0,8	10	-
6	10,3	0,6	1,8	0					
6	18,7	0,6	2,1	0					
6	12,3	0,6	1,3	0					
6					2,5	3,7	0,8	0	-
6					2,5	4,9	0,8	10	-
6					2,5	66	0,8	20	-

(* non-photosynthetic tissue)

Note: _____

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Zone and sampling station: RNP Dune Costiere - Z1A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	3,2	0,6	2,1,	0					
1	12,5	0,7	1,8	0					
1	22,5	0,7	1,8	0					
1					3	22,4	0,9	0	+
1					3	29,7	0,9	10	-
2	4,7	0,8	2,8	0					
2	16,1	0,8	2,8	0					
2	18,5	0,8	3	0					
2					2,8	26,1	0,9	0	+
2					2,8	11,7	0,9	0	+
2					3	55,1	0,9	20	+
3	2,4	0,8	2,4	0					
3	6,1	0,8	2,4	0					
3	10,9	0,8	2,6	0					
3	13	0,8	2,6	0					
4	5,4	0,9	2,4	0					
4	8,2	0,9	2,3	0					
4	22	0,9	2,4	0					
4	11,2	0,9	2,6	0					
4					3,1	36	0,9	0	-
4					3,1	39	0,9	0	-
4					3,1	44	0,9	5	-
5	4,9	0,6	2,5	0					
5	5,8	0,6	2,5	0					

Zone and sampling station: RNP Dune Costiere - Z1A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
5	12,9	0,6	2,5	0					
5					2,9	29	0,9	0	-
5					2,9	41	0,9	0	-
5					2,9	48	0,9	10	-
6	3,2	0,7	3,2	0					
6	5,8	0,7	3,2	0					
6	6,3	0,8	3,2	0					
6					3	37,9	0,9	0	-
6					3,1	48,3	0,9	15	-

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z1B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	4,1	0,9	2,8	0					
1	7,6	0,9	2,8	0					
1	15	0,9	2,8	0					
1	17,5	0,9	2,8	0					
1					3,2	38	0,9	0	+
1					3,4	24	0,9	0	+
1					3,8	20	0,9	15	+
2	11,1	0,8	3	0					
2	16,2	0,8	3	0					
2	18,6	0,8	3	0					
2					3,5	26,5	0,9	0	+
2					3,4	28,6	0,9	0	+
2					3,8	30,1	0,9	10	+
3	5,4	0,8	3,2	0					
3	12,7	0,8	3,2	0					
3	14,8	0,8	3,5	0					
3	15,9	0,8	3,5	0					
3					3,4	32,6	0,9	0	+
3					3,3	43,6	0,9	0	+
3					3,4	44	0,9	10	+
4	2,8	0,6	2,8	0					
4	4,9	0,7	3	0					
4	6,2	0,7	3	0					
4	13,8	0,7	3,2	0					

Zone and sampling station: RNP Dune Costiere - Z1B **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
4					2,8	15,5	0,9	0	+
4					2,8	16,5	0,9	0	+
4					2,8	32,1	0,9	0	-
4					3	42,8	0,9	10	+
5	3,2	0,7	3,2	0					
5	4,9	0,7	3,2	0					
5	5,5	0,7	3,2	0					
5	12,6	0,7	3,2	0					
5					3,1	28	0,9	0	+
5					3,1	37,4	0,9	10	-
6	3	0,7	2,8	0					
6	4,9	0,7	2,8	0					
6					3,6	16,5	0,9	0	+
6					3,4	15,6	0,9	0	-
6					3,6	44,7	0,9	0	+
6					4	48,5	0,9	20	-

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z1C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	3,1	0,8	3,1	0					
1	8,2	0,8	3,1	0					
1	22,5	0,8	2,5	0					
1					2,1	44	0,8	10	-
1					2,2	32	0,8	10	+
1					2,2	24	0,8	0	-
2	6,5	0,7	1,8	0					
2	8,3	0,7	1,8	0					
2	26,3	0,7	1,8	0					
2					1,8	15,3	0,8	0	-
2					2,1	2,4	0,8	0	-
3	4,8	0,8	2,12	0					
3	10,6	0,8	2	0					
3	11,2	0,8	2	0					
3					2	17,2	0,8	0	+
3					2	29,2	0,8	0	-
3					2	31,8	0,8	0	-
4	6,3	0,7	2,3	0					
4	4,7	0,7	2,7	0					
4	15,7	0,7	2,5	0					
4					2,1	14,5	0,8	0	+
4					2,2	17,5	0,8	0	-
4					2,2	14,2	0,8	0	+
5	4,2	0,7	2,8	0					

Zone and sampling station: RNP Dune Costiere - Z1C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
5	5,3	0,7	2,8	0					
5	12,8	0,7	2,8	0					
5	22	0,7	2,4	0					
5					2,4	22	0,8	0	-
5					2,4	25	0,8	0	+
5					2,4	34	0,8	0	+
6	3,2	0,7	2,5	0					
6	6,5	0,7	2,5	0					
6	12,8	0,7	2,5	0					
6					2,5	31,2	0,8	0	+
6					2,5	41,6	0,8	0	-

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z2A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	11,2	0,9	3,5	0					
1	0,6	0,9	3,5	0					
1	5,1	0,9	4,2	0					
1					3	12,5	0,9	0	+
1					3,1	42,2	0,9	6	+
1					3,1	32,6	0,9	0	-
2	5,4	0,9	4,8	0					
2	9,6	0,9	4,8	0					
2	0,9	0,9	4,4	0					
2					3,8	23,2	0,9	0	+
2					3	11,9	0,9	0	+
2					3,4	29,2	0,9	3	-
3	11,1	0,9	4,2	0					
3	7,8	0,9	4	0					
3	1,2	0,9	4,3	0					
3					3,5	32,8	0,8	10	-
3					2,9	13,6	0,8	0	+
3					3	32,2	0,8	4	-
4	8,2	0,8	3,5	0					
4	0,4	0,8	3,5	0					
4	2,9	0,8	3,5	0					
4					2,7	11,2	0,8	0	+
4					2,9	21,8	0,8	2	-
5	7,9	0,9	3,8	0					

Zone and sampling station: RNP Dune Costiere - Z2A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
5	13,2	0,9	3	0					
5	4	0,9	3,5	0					
5	0,2	0,8	2,8	0					
5					3,1	38,5	0,8	2	+
5					3,1	16,8	0,9	0	-
6	4,8	0,9	3,5	0					
6	1,2	0,9	3,5	0					
6	9,9	0,9	3,5	0					
6					3,8	14,9	0,9	0	+
6					2,9	13,5	0,9	0	+
6					3,2	14,9	0,9	0	+
6					2,8	29,1	0,9	2	-

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z2B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	9,5	0,8	2,8	0					
1	5,6	0,8	2,8	0					
1	1,8	0,8	3,3	0					
1					2,8	27,6	0,8	10	-
1					2,5	13,8	0,8	0	+
1					2,8	36,4	0,8	3	-
2	4,5	0,7	3	0					
2	11,1	0,8	3	0					
2	11,3	0,8	3	0					
2					3,2	19,7	0,8	0	+
2					3,2	23,4	0,8	0	-
2					3,4	17,8	0,8	0	-
3	3,6	0,8	4,3	0					
3	7,8	0,8	4,3	0					
3	13,2	0,9	4,3	0					
3					3,2	15,9	0,9	0	+
3					3,1	4,5	0,9	8	-
3					3,2	33,2	0,9	2	-
4	9,9	0,9	3,5	0					
4	0,7	0,9	3,5	0					
4	4,8	0,9	3,5	0					
4					3,1	34,2	0,8	2	+
4					3	13,2	0,8	0	-
4					3,2	27,7	0,8	3	-

Zone and sampling station: RNP Dune Costiere - Z2B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
5	10,2	0,8	4	0					
5	4,3	0,8	4	0					
5	1,1	0,8	4	0					
5					3,1	34,2	0,8	2	+
5					3	13,2	0,8	0	-
5					3,2	27,7	0,8	3	-
6	2,8	0,8	0,8	0					
6	11,4	0,8	2,8	0					
6	5,4	0,8	3	0					
6	15,3	0,8	2,8	0					
6					3	36,1	0,8	4	-
6					2,8	15,7	0,8	0	+

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z2C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	5,2	0,8	3,8	0					
1	1,3	0,8	4	0					
1	9,4	0,8	4	0					
1					2,8	16,4	0,8	0	+
1					3,1	28,4	0,8	2	-
2	5,3	0,7	2,8	0					
2	10,5	0,7	2,8	0					
2	0,7	0,7	2,8	0					
2					2,4	14,1	0,8	0	+
2					2,4	13,2	0,8	3	-
3	2,2	0,8	3	0					
3	7,9	0,8	2,8	0					
3					2,2	14,5	0,8	0	+
3					2,3	16	0,8	0	+
4	3,5	0,8	4	0					
4	7,9	0,8	4	0					
4	13,6	0,8	2,8	0					
4					2,5	17,9	0,8	0	-
5	10,5	0,8	2,8	0					
5	4,9	0,8	2,8	0					
5					2,1	14,3	0,8	2	+
5					2,4	16,5	0,8	0	+
5					2,2	7,9	0,8	0	+
5					2,3	9,4	0,8	1	+

Zone and sampling station: RNP Dune Costiere - Z2C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
6	7,1	0,8	2,7	0					
6	2	0,8	2,8	0					
6	6,1	0,8	3	0					
6					2,5	7,1	0,8	0	-
6					2,5	22,5	0,8	10	-

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z3A

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	2	0,6	2	0					
1	6,5	0,7	2	0					
1	12,8	0,7	2	0					
1					2,8	22	0,8	5	-
1					2,8	16	0,8	0	-
1					2,8	16	0,8	0	-
2	2,5	0,6	2,5	0					
2	4,5	0,7	2,5	0					
2	8,9	0,7	2,5	0					
2					2,5	14	0,8	0	+
2					2,6	16,8	0,8	0	-
2					2,6	21,5	0,8	5	-
2					2,6	23	0,8	5	-
3	2	0,6	2	0					
3	4,2	0,7	2,2	0					
3	7,6	0,7	2,2	0					
3	7	0,7	2,2	0					
3					2,5	12,5	0,8	0	+
3					2,5	16,1	0,8	0	+
3					2,5	11,7	0,8	5	-
3					2,5	17,3	0,8	0	-
4	2,4	0,6	2,4	0					
4	3,4	0,7	2,4	0					
4	6,9	0,7	2,4	0					

Zone and sampling station: RNP Dune Costiere - Z3A **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
4					2,1	9,8	0,8	0	-
4					2,2	14,3	0,8	0	+
4					2,2	17,8	0,8	0	-
4					2,2	20,1	0,8	5	-
4					2,2	20	0,8	0	-
5	2,4	0,7	2,4	0					
5	3,5	0,7	2,4	0					
5	5,4	0,7	2,4	0					
5					2,4	7,6	0,8	0	+
5					2,3	11,4	0,8	0	-
5					2,4	18,6	0,8	0	-
5					2,8	19,1	0,8	0	-
6	2,8	0,7	2,6	0					
6	4,5	0,7	2,6	0					
6	6,7	0,7	2,6	0					
6	8,9	0,7	2,6	0					
6					2,5	14,8	0,8	0	+
6					2,5	15,9	0,8	0	-

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z3B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	2,8	0,7	2,5	0					
1	4,9	0,7	2,5	0					
1	6,4	0,7	2,5	0					
1					3	35,2	0,8	0	-
1					3	30,4	0,8	0	+
1					3	19,6	0,8	0	-
2	2,8	0,7	2,7	0					
2	6,2	0,7	2,7	0					
2					3,1	32,4	0,8	0	+
2					3,1	26,4	0,8	0	-
3	3,2	0,7	2,8	0					
3	4,6	0,7	2,8	0					
3	8,2	0,7	2,8	0					
3					2,9	26,4	0,8	0	+
3					2,9	30,8	0,8	0	-
4	2,6	0,6	2,6	0					
4	3,9	0,7	2,6	0					
4	6,8	0,7	2,6	0					
4					3	28,6	0,8	0	-
4						32,3	0,8	0	-
5	2,9	0,6	2,9	0					
5	3,6	0,7	2,9	0					
5	4,9	0,7	3	0					
5	9,9	0,7	3	0					

Zone and sampling station: RNP Dune Costiere - Z3B

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
5					3,5	16,8	0,8	0	-
5					3,1	25,6	0,8	0	-
6	2,4	0,6	2,4	0					
6	5,1	0,7	2,4	0					
6	7,8	0,7	3	0					
6					2,8	11,6	0,8	0	+
6					3	23,1	0,8	0	-

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____

Zone and sampling station: RNP Dune Costiere - Z3C

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
1	2,5	0,6	2,6	0					
1	3,9	0,7	2,6	0					
1	6,1	0,7	2,6	0					
1	9,1	0,7	2,6	0					
1					2,8	16,5	0,7	0	+
1					2,8	17,2	0,7	0	+
1					2,8	22,1	0,8	0	+
1					2,9	26,9	0,8	0	+
2	2,8	0,6	2,8	0					
2	4,2	0,7	3	0					
2	6,9	0,7	3	0					
2	7,8	0,7	3	0					
2					2,9	11,8	0,7	0	+
2					2,9	19,3	0,8	0	+
2					2,9	27,3	0,8	5	+
2					3	32,7	0,8	0	+
3	2,7	0,6	2,7	0					
3	3,5	0,7	2,8	0					
3	8,3	0,7	3	0					
3	10,4	0,7	3	0					
3					2,7	16,9	0,7	0	+
3					2,8	20,8	0,7	0	+
3					2,8	26,5	0,7	0	+
4	3,1	0,6	3,1	0					

Zone and sampling station: RNP Dune Costiere - Z3C **Page: 2/2**

Seagrass: *Posidonia oceanica*

	Juvenile and intermediate leaves				Adult leaves				Apex
Shoot n.	Length (cm)	Width (cm)	non-ph. (cm) *	Necrosis (%)	Leaf base (cm)	Length (cm)	Width (cm)	Necrosis (%)	+ / - **
4	3,9	0,6	3,1	0					
4	5,2	0,6	3,1	0					
4	9,1	0,6	3	0					
4					3,6	23,8	0,7	0	+
4					3	27,1	0,7	0	+
4					3	29,6	0,7	0	+
5	2,4	0,6	2,4	0					
5	6,5	0,6	2,6	0					
5					2,9	19,5	0,7	0	+
5					2,9	26,3	0,7	0	+
5					3	31,2	0,8	0	+
6	3,1	0,6	3,1	0					
6	4,5	0,6	3,1	0					
6	5,3	0,6	3,1	0					
6	7,8	0,6	3,1	0					
6	11,5	0,6	3	0					
6					2,8	16,6	0,7	0	+
6					2,8	19,7	0,7	0	+
6					2,8	28,4	0,7	0	+
6					2,8	31,6	0,8	0	+
6					2,9	34,9	0,8	0	+

(* non-photosynthetic tissue) (** + = intact apex / - = eroded apex)

Note: _____