

**REPORT ON THE ACTIVITIES AIMED AT ENSURING  
AN EFFICIENT, LONG-TERM CONSERVATION OF  
THE *POSIDONIA OCEANICA* MEADOW LOCATED  
ON THE SLOVENIAN COAST BETWEEN THE  
TOWNS OF KOPER AND IZOLA IN THE NORTHERN  
ADRIATIC**



MEMORANDUM OF UNDERSTANDING CONCLUDED BETWEEN

*the Institute of the Republic of Slovenia for Nature Conservation  
the International Cooperation for Environment and Development of the Principality of  
Monaco  
the Regional Activity Centre for Specially Protected Areas*

Piran, February 2004

# REPORT ON THE ACTIVITIES AIMED AT ENSURING AN EFFICIENT, LONG-TERM CONSERVATION OF THE POSIDONIA OCEANICA MEADOW LOCATED ON THE SLOVENIAN COAST BETWEEN THE TOWNS OF KOPER AND IZOLA IN THE NORTHERN ADRIATIC

## Background

The present document reports on the activities carried out in the framework of the Memorandum of Understanding concluded between:

- the Institute of the Republic of Slovenia for Nature Conservation (former MZVNKD Piran)
- the International Cooperation for Environment and Development of the Principality of Monaco
- the Regional Activity Centre for Specially Protected Areas (RAC/SPA).

Under this MoU, the Institute of the Republic of Slovenia for Nature Conservation carried out activities aimed at ensuring an efficient, long-term conservation of the *Posidonia oceanica* meadow located on the Slovenian coast between the towns of Koper and Izola in the Northern Adriatic. To this end it was agreed that the Institute of the Republic of Slovenia for Nature Conservation should undertake the following tasks:

1. Procurement of aerial photographs fro the investigated area
2. Cheking the results of aerial photography by SCUBA diving
3. Elaboration of a map of the meadow using Geographical Information System
4. Study of the main ecological parameters in the meadow
5. Marking the lower limit of the meadow
6. Installing signposts with the main characteristics of P. oceanica and the conservation measures adopted

According to the proposed timetable, the activities should be implemented within the year 2003.

## Introduction

*Posidonia oceanica* (L.) Delile is, together with *Cymodocea nodosa* (U.) Ascherson, the most common seagrass in the Mediterranean. It is widespread in the whole basin except for the area close to the strait of Gibraltar, the North Adriatic, the coast of Israel, the Bosphorus, the sea of Marmara and the Black Sea. According to Benacchio (1938) it was quite common also on the silty bottom of the Gulf of Trieste in the North Adriatic. Further investigations however showed a drastic change in its distribution in the Gulf of Trieste, the northernmost part of the Adriatic (Vukovič, 1982). It is very likely that at present there are only two localities left - one tiny patch of 2 m<sup>2</sup> in the proximity of the Italian town Grado and one very restricted meadow on the Slovenian coast. The meadow of *Posidonia oceanica* on the Slovenian coast (Fig. 1) is located between the towns of Koper and Izola. A preliminary and approximate mapping of the area that was carried out in 1993 showed that the meadow is approximately 1 km long, starts close to the coastline and extends 50 m off shore - water depth app. 4 m (Vukovič and Turk, 1995, Turk et al., 2002).

Up to now the area of the meadow is included in the state and local physical plans as future protected area and at the same time *Posidonia oceanica* is listed in the governmental decree on rare and endangered species that was adopted by the Slovene parliament in 2002. Further more it is listed in Annex II of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean as endangered species while the EU Habitat Directive 92/43/EEC of 21<sup>st</sup> of May 1992 defines its meadows as priority habitat type. The protection of *Posidonia oceanica* and its meadows is thus one of the top priorities in the field of nature conservation. However, in order to properly define the potential threats and therefore apply efficient conservation measures to this unique meadow, further research and monitoring was necessary.

The importance of further research and monitoring is even greater due to the foreseen changes concerning the main coastal road that is now going along and very close to the coastline. The new coastal road, that is bound to be built in the forthcoming years, will be moved into a tunnel, and will as a consequence, "free" the coastline and make it available for other activities, mainly recreation and tourism. Due to that, increased pressure for beach enlargement, piers, maritime traffic and other recreational and tourist facilities is expected. Without a proper legislation, accurate maps of the sea bottom and its habitat types, a well-defined monitoring and awareness campaign, the expected pressure for the development of recreational facilities could jeopardise the conservation of the meadow.



Fig. 1: A closer look into the meadow.

In the framework of the SAP BIO project (Strategic Action Plan for the Conservation of marine and coastal biodiversity in the Mediterranean region), carried out by the Regional Activity Centre for Specially Protected Areas in Tunis, National Reports were prepared in order to define the state of art in the field of biodiversity conservation and foresee the due future activities. In the Slovene As a follow-up of the National Report, a National Action Plan for the conservation of the *Posidonia oceanica* meadow was drafted. Its main objectives are in line with the Action Plan for the conservation of marine vegetation in the Mediterranean Sea, adopted by the contracting parties to the Barcelona Convention in the year 1999 and with the provisions of the EU Habitat directive. The main targets of the action plan could be summed as follows:

- legal protection of *Posidonia oceanica* and the establishment of a protected area that would include the meadow;
- better knowledge of the extension of the area covered by *Posidonia oceanica* based on an accurate cartography of the meadow;
- better knowledge on the main ecological parameters in the area covered by the meadow;
- raising public awareness.

The possibility to carry out most of the activities, foreseen in the action plan, came with the signature of the Memorandum of Understanding (referred hereafter as MoU) between the Institute of the Republic of Slovenia for Nature Conservation, the International Cooperation for Environment and Development of the Principality of Monaco and the Regional Activity Centre for Specially Protected Areas (RAC/SPA) of

the Barcelona Convention. According to the MoU, the Institute of the Republic of Slovenia for Nature Conservation, through its Regional Office Piran, was entrusted to carry out activities aimed at ensuring an efficient, long-term conservation of the *Posidonia oceanica* meadow. The activities would at the same time fulfill some of the actions foreseen in the MAP Action Plan for the Conservation of Marine Vegetation in the Mediterranean Sea. To undertake this activities, financial was granted by the International Cooperation for Environment and Development of the Principality of Monaco and RAC/SPA.

### **Implemented activities**

The implementation of the activities foreseen in the action plan and financed according to the MoU were carried out in the year 2003. The Regional Office in Piran coordinated all the activities and at the same time used them successfully as a tool to increase public awareness concerning nature conservation. A description of the implemented activities is given hereafter.

#### **Aerial photography**

Mapping of seagrass meadows has become an indispensable tool not only for developing and managing the coastal area but also for a proper research and monitoring of the structure and dynamics of the meadows in view of their management and protection. Aerial photography and further image processing appears to be a technique which is particularly suitable in shallow waters, as it is the case of the investigated meadow. The aerial photographs (Fig. 2) were taken and processed in winter 2002/2003 in the period of greater transparency of the water and when the nearby *Cymodocea nodosa* is not yet developed.



Fig. 2: DOF of the area.

The results of aerial photography were checked later on by SCUBA diving. The field work confirmed very clearly the appropriateness of aerial photography in the case of the investigated site and enabled also the drawing of accurate transects. On the

basis of aerial photos and field data, a map of the meadow was elaborated. The task was carried out with the collaboration of the Group for Coastal Ecosystems at the University of Corte (Corsica).

The mapping of the meadow confirmed the results from the preliminary investigation on the distribution of *P. oceanica* in the area. The meadow is formed of islands of *P. oceanica* of different size and shape. The distribution of the islands is determined mainly by the presence of soft bottom, “trapped” between the layers of sandstone, which builds the hard sea bottom along the Slovenian coast.

### Study of the main ecological parameters in the meadow

In order to improve our knowledge on the environmental conditions that influence the development of the meadow, a programme for the study of the main ecological parameters was prepared in collaboration with the National Institute of Biology - Marine Biology Station in Piran (Fig. 3). Two were the main aims of the program. The first was to state the actual ecological conditions on the area and the second one was to define an appropriate long-term monitoring of the investigated parameters in order to be able to define effective conservation measures.



Fig. 3: Research boat of the Marine Biology Station on the investigated area.

The investigation, was carried out twice – winter and summer 2003. The sampling site was located on one of the medium sized patches of *P. oceanica*, approximately 25 meters from the shoreline, at water depth 2,5 meters.

Beside temperature and transparency, the investigation (Fig. 4) included the the following parameters:

- light conditions on the sea bottom;
- sedimentation rate;
- mikrophytobenthos species;
- mikrophytobenthos primary production;
- meiofauna species;
- nutrients in interstitial water;
- sediment metabolism expressed through respiration.



Fig. 4: Benthic chamber and fine scale microprofiler

#### Marking the lower limit of the meadow

In order to be able to monitor the development of the meadow, 6 marks were placed at its lower limit while 4 of them were used to mark the outer border of one single patch. Due to the shallowness of the area the marking was carried out with polyethylen boards fixed on iron rods that were nailed into the hard sea bottom (Fig. 5). The marks were numbered, information on their purpose was added and the exact coordinates were determined. In accordance with the methodology used in *GIS Posidonie*, photographs of the situation were taken in order to enable the follow-up of the evolution of the meadow and the eventual changes in its limits.

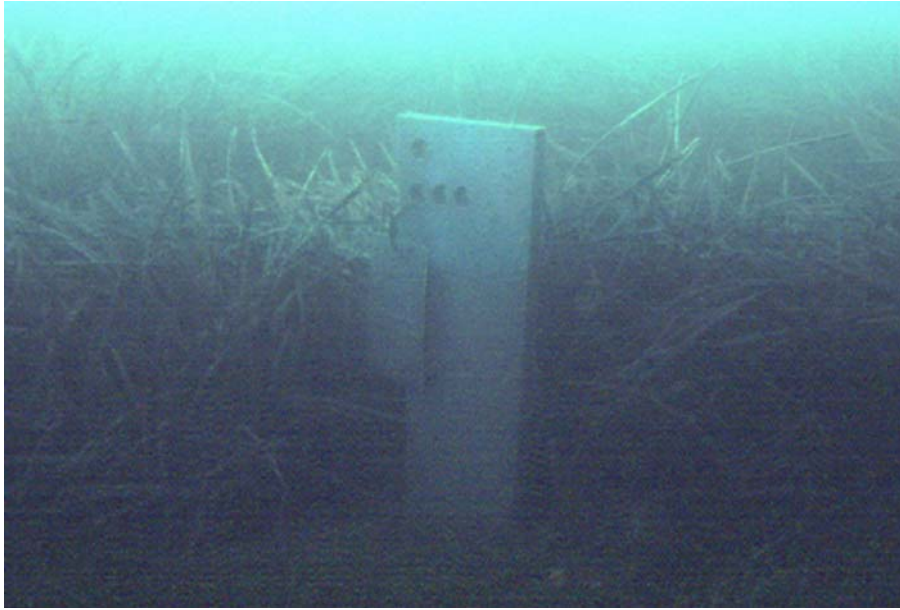


Fig. 5: Mark (no. 8) on the lower limit of the meadow.

Due to low transparency in the days following the instalation of the marks, the photo documentation of the marks and the lower limit is supposed to be repeated in february 2004.

## Installing signposts



Due to the fact that the meadow is located in an urbanised area with a rather intense recreational use, especially in summer, the signposts represent an important tool in spreading the awareness on the importance of the meadow and its conservation (Fig. 6). Taking into account the specificity of the area, five signposts, explaining the main characteristics and importance of *Posidonia oceanica* and the conservation measures adopted, were foreseen.

One signpost was put in place in the nearby public bath in Žusterna. Two of them will be placed in the two car parking lots, used intensively in summertime by bathers. The last two will be placed within the foot and cycle path, on the western and eastern end of the area.

Fig. 6: Signpost with the main information on the meadow.

## Increasing public awareness

As mentioned above, all the activities were used as a tool to increase public awareness concerning the importance of the meadow and the need for its conservation. However several special events were organised in order to inform the public on the activities carried out in the framework of the project. The events included a press conference, a field trip, lectures by Gerard Pergent and Christine Pergent-Martini from the University in Corte and the opening of an exhibition

dedicated to *P. oceanica* meadows, their importance and role (Fig. 7, 8, 9). The project was presented also at the 2<sup>nd</sup> Mediterranean Symposium on Marine Vegetation, held in Athens in December 2003.



Fig. 7 and 8: Poster, introducing the exhibition on the characteristics and role of the meadows in the marine environment and opening of the exhibition.





**Izjemno rastišče pozejd**  
**Koper – Istrani in drugi, ki jih zanimajo**  
 dneh lahko ogledali razstavo o pozejd  
 ste najseverneje v Sredozemlju. Razsta  
 stvo narave iz Pirana in Morske biološki  
 Koprju. Odprli so jo minuli petek, ko so  
 Regionalnega centra za zavarovana ob  
 Pergent Martini in Frederic Platini, pre  
 okolja in razvoja Kneževine Monako. Oj  
 rastišče na pitvini Brajde, kjer pa je po  
 je mogoče videti samo še dobro razrađ  
 treba edinstveno rastišče čimprej ustr

## Zavarovana pozejdonka

Travnik pozejdonke med Žusterno in Rexom na seznamu zaščitenih območij Natura 2000

**ŽUSTERNA** - Sredozemski pisanke  
 znane Zavoda za varstvo narave in  
 Travnik pozejdonke med Žusterno in  
 Travnik pozejdonke za območje Natura  
 2000. Gre za ureilo varovanih območij,  
 ki jo je skoraj desetletje obkrože EU in  
 temoži na dveh steklokih, plitvi in  
 habilitati.

Namen projekta je ohranjanje bio  
 ske raznovrstnosti in varovanje habita  
 toprednih rastlin in živalskih vrst. Proje  
 ta je predvsem našega mis  
 sistava za okolje, prostor in energijo, v

katerega so vključene tudi vse člane  
 Zavoda za varstvo narave.  
 Varovanje in ohranjanje travnika po  
 zedonke je obveza, ki izhaja tako iz  
 domače zakonodaje kot iz obsežnih  
 celovite konvencije. "Z nastopom v EU  
 naz k opredeljeni območja, namenjenega  
 varovanju tega posebnega svetlega  
 habita ali pa zavetje tudi evropskega  
 direktiva. Poleg območja varovanja je  
 potrebna opredeljena tudi ustrezne var  
 stvene ukrepe za ohranjanje travnika ter  
 zagotoviti dolgotrajno spreminjanje ra  
 stnišča," poudarja mag. Robert Turk,  
 vodja projekta pri Zavodu za varstvo  
 narave. Pozejdonka je sredozemski en  
 dežit in ena najbolj znanih, a tudi  
 najbolj ogroženih travnik Sredozemsk  
 ga morja. Edino rastišče pozejdonke v  
 Sloveniji je v 50 metrov širokem in  
 kilometer dolgem pasu med Koperom in  
 Trstom. Kot pravi Turk, pozejdonka ni  
 alga, pač pa cvetnica, kosej vilja rastlina  
 z visoki značilnostmi deli telesa. Konvenc  
 ja kopenskih, morskih, svetovni in plitkovi.  
 "Na prvi pogled je najbolj zanimivo na  
 mne, zato jo tudi najboljkrat imenujemo  
 bar morska trava," pravi Turk. Dodaja,  
 da so travniki pozejdonke, uprta  
 posebnosti za varski ekosistem tako z

viška protozoidne kralje in organske  
 snovi, poleg tega pa so življenjski pro  
 stor za številne morske organizme.  
 Ohranjanje in zavarovanje travnika  
 pozejdonke je namreč tudi pomemb  
 sporazum, vrednost 40.000 dolarjev, med  
 zavodoma, Regionalnim centrom za za  
 varovana območja v Trzinu in Uruckim  
 za mednarodno sodelovanje na podro  
 čju okolja in razvoja iz Monako. Do  
 kumenti med drugim predvideva tudi  
 financiranje raziskave ekoloških dejav  
 nikov na območju travnika, izdelava  
 znanstvenega posnetka območja, razrađ  
 istr splošje tega travnika in informat  
 ivne akcije.

Turk opozarja, da je rastišče pozejd  
 ke v Sredozemlju zaradi gradbenih del,  
 omenjanega, kolikorpa so odraja  
 vse manj, poleg tega pa travnike ogro  
 žajo tudi sedimentacija, postarjanje  
 svetlobe in postarjanje kralje na ob  
 Tajski R.3 Zavodoma Peter Mare, ki je  
 pred kratkim natančno preiskal hile  
 brez svojice katalizacije med Žusterno  
 in Rexom, pa mra, da lahko tudi to  
 predstavlja potencialno grožnjo za ra  
 stišče pozejdonke in govora k čimprej  
 naj koreninasti uvedeni tega območja.

NATAŠA ILIJA

Fig. 9: Some of the numerous newspaper reports on the implemented activities and on the collaboration between the Principality of Monaco, RAC/SPA and the Institute of the Republic of Slovenia for Nature Conservation.

### Conclusions

In concluding the present report we would like in the first place to stress the very positive impact, that the activities, financed through the Memorandum of Understanding, had on the local community, the different governmental bodies involved in the activities and on the general public. We strongly believe that beside the short-term effect on the concrete area and the specific conservation issue the impact was also a long-term one.

The short term effect concerns mainly the fact that the implemented activities coincided with the time in which public debate on the development of the area was taking place. The general public and the decisionmakers were able to get additional information on the importance of the meadow and on the necessity of its conservation and include this information in their decisions. Beside that, the interest of the international community for nature conservation (including the availability of funds) was clearly demonstrated. The information on the fact that the international community is supporting activities concerning protected areas and nature

conservation in general is a key issue in the concertation process, concerning concrete activities on the *P. oceanica* meadow but also concerning the future activities on other areas of conservation interest.

In stating the above we can conclude that the Memorandum of Understanding, concerning activities aimed at ensuring an efficient, long-term conservation of the *Posidonia oceanica* meadow located on the Slovenian coast between the towns of Koper and Izola in the Northern Adriatic, confirmed once again the very positive experience gained in previous projects.

We would also like to express our gratitude to the Regional Activity Centre for Specially Protected Areas of the Barcelona Convention from Tunis and to the International Cooperation for Environment and development of the Principality of Monaco for their financial and technical support. Special thanks are going to Mr. Chedly Rais, the scientific director of RAC/SPA, prof. Gerard Pergent and prof. Christine Pergent Martini from the University in Corte and last but not least to Mr. Frédéric Platini from the International Cooperation for Environment and Development of the Principality of Monaco.

Report prepared by

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Piran, February, 2004