MedPAN South Pilot Project Croatia Biodiversity and socioeconomic assessments

Aerial view of Lastovo Islands Nature Park

With the collaboration of WWF Mediterranean and of international experts in the field of marine conservation, Sunce is leading efforts to support the management authorities of Croatian MPAs in improving the effective protection of marine the environment. A series of socio-economic and ecological assessments have been carried out in the past two years as baseline information for management planning.

Project studies:

- *Assessment of coastal fisheries resources of Lastovo Islands Nature Park*
- *Lastovo Islands Nature Park – Marine habitats and species mapping*
- *National Park Brijuni - Mapping of marine species and habitats*
- *Understanding the perception of fishermen of Lastovo Islands Nature Park*

Assessment of coastal fisheries resources of Lastovo Islands Nature Park

The first assessment of the status of fisheries resources of Lastovo Islands Nature Park (NP) was carried out to provide baseline data for future monitoring investigation of the effectiveness of fisheries management implemented in the Park.

In 2010, Lastovo NP through its Code of Conduct adopted a fishing regulation that divided the NP marine area into four fishing zones which are to be successively used in pairs with a temporal rotation of three years. In these zones, only 45 artisanal fishermen are authorized to fish and fishing gears and catch quantity are regulated.

Coastal fisheries resources were sampled by experimental trammel net applying a hierarchical experimental design (three factors: fishing zone, location, and site). Analyses were performed on total fish abundance and biomass, diversity indices, and multivariate abundance and biomass structure of caught assemblages. Overall, in experimental trammel net catches, 49 different fish species, 16 crustacean species and 2 cephalopod species were recorded. Among fish species, the most frequently observed were the forkbeard *Phycis phycis*, and the striped red mullet *Mullus surmuletus*, which were present in 93 % and 89 % of trammel net catches respectively. The dominant crustacean species was the spiny lobster *Palinurus elephas*, with overall occurrence frequency of 58 %. Cephalopods were more sporadically present in trammel net catches with the cuttlefish *Sepia officinalis* being the most represented species (occurring in 30 % of the catches).

Fishing boat in Lastovo Islands NP

Fisherman of Lastovo

No significant difference was found between species richness, total abundance or biomass when comparing the trammel net catches between the different fishing zones. Moreover, the abundance and biomass structure of caught assemblages is similar among fishing zones. Average catch per unit effort - CPUE (unit effort being one 33 m long trammel net) is 1,7 ± 0,1 kg / net (± SE). In this respect, the situation is quite favorable in the study area compared to many others in the Adriatic Sea. However, more concerning trends were provided by other parameters analysed.

Looking at biometry characteristics of commercially highly valuable species and thus most targeted species such as the largescaled scorpionfish *Scorpaena scrofa*, the striped red mullet *Mullus surmuletus*, the forkbeard *Phycis phycis*, and tha spiny lobster *Palinurus elephas*, it is evident that large specimens were only rarely caught. Average landing sizes are more than twice smaller than the maximum size known for these species. All of the aforementioned commercially targeted species showed no difference in abundance or average size and mass between the catches of different fishing zones.

Largescaled scorpionfish specimens (n. = 66) caught in the study area ranged between 11.3 - 41.8 cm total length (3.9 ± 0.8 cm) and 25 - 1134 g weight (286.8 ± 27.6 g). By taking into account minimal landing size of largescaled scorpionfish (25 cm) ordained by Fish and Other Sea Organisms Protection Decree (Official Gazette No. 63/2010), it can be seen that the overall catch is dominated by undersized largescaled scorpionfish specimens (57.6 %). The situation is even more concerning if biologically justified size at first sexual maturity is applied, which for this species is about 30 cm in total length. The proportion of immature specimens is thus 82 %.

Length and weight ranges of caught striped red mullet specimens (No = 255) were 15 - 29.5 cm (23.6 ± 0.1 cm) and 38 - 299 g (155.2 ± 2.5 g), respectively. Taking into account minimal landing size of this species (11 cm), no undersized specimens were present in the overall catch. Even when trammel net destructiveness is assessed considering biologically justified size at first sexual maturity (18 cm), the catches contained a low proportion of immature specimens (0.8 %).

In the overall catches, 284 specimens of forkbeard were recorded. Their length and weight ranges were 12.1 - 55.2 cm (29.9 ± 0.3 cm) and 43 - 1467 g (321.2 ± 12,6 g), respectively. Since no minimal landing size has been set for this species, no destructiveness analysis was carried out. 115 caught spiny lobster specimens ranged in size from 10.4 to 37.5 cm (21.1 ± 0.5 cm) and weight range was 26 - 1 207 g (259.2 ± 18.8 g). Assessing the destructiveness of trammel nets for spiny lobster population by taking into account minimal landing size of this species (24 cm), there were 67.8 % of undersized specimens in the overall catch. Moreover, applying a biologically justified size at first sexual maturity, which for spiny lobster is 28 cm, the proportion of undersized specimens reached the alarming 92.2 %.

Results indicated that, after a 6 month period of enforcing a restrictive fishing protocol, no evidence of benefits to littoral fisheries resources has occurred. Results of the study are important baseline information for monitoring the effectiveness of the fishery management strategy proposed at Lastovo NP.

Map of the temporal rotation zones of Lastovo Nature Parks.

Benthic species: blennies (above), echinoderms, and annelids (below).

Lastovo Islands Nature Park – Marine habitats and species mapping

For several years Association Sunce has been mapping marine species and habitats in the Nature Park Lastovo Islands. This area is characterized by exceptional complexity of the underwater landscape, and thus by a diversity of habitats and species richness. Considering the large extension of the marine area included in the Lastovo NP, habitat mapping remains a major challenge to site characterisation.

From June 21st to July 3rd 2010, mapping was conducted at 37 locations and the state of seagrass meadows were measured in 9 locations of Lastovo NP. Mapping was conducted by trained volunteer scuba divers of the Association Sunce and 3 volunteers of the Biology students association BIUS.

Local fishermen and divers provided important support in the field work. The integration of 2011 data collection with previous years can be considered sufficient to produce habitat map of the central island of Lastovo and surrounding islands.

Mapping was financed by the project "Strengthening the network of marine protected areas in Croatia – MedPAN South" lead by WWF Mediterranean, and by "Marine Natura 2000 sites in Split-Dalmatia County" project from the Matra Programme.

Undersea of "Lastovo islands" still remains undiscovered especially in the area of Lastovnjaci and Vrhovnjaci islands whose depths yet have to be drawn in habitats maps. Luckily the underwater beauties of the Lastovo are unrivaled and we look forward to future field research.

Map showing the study area and dive sites in Lastovo Islands NP

Marine habitats of the northern part of Lastovo NP (left) and Sunce diving team ready for underwater survey (right)

Map showing the study area and dive in sites in Brijuni National Park

National park Brijuni - Mapping of marine species and habitats

Due to historical circumstances marine biodiversity of the National Park Brijuni is today one of the best preserved in the Adriatic Sea. For the same circumstances, this area was also for many years far from the eyes of public and scientists. Today, a public institution managing the park seeks to get better understanding on the functioning of Brijuni marine ecosystem in order to manage it even better and to transfer gained knowledge and experience to other protected areas in the country and the world.

In 2010, Association Sunce contributed to these efforts. From 13th to 23rd of May, marine species and habitats were mapped thanks to the coordinated work of 13 volunteer scuba divers of the Association Sunce and 3 volunteers of the Association BIUS. 60 locations around Veliki Brijun and adjacent islets were mapped setting the baseline for drawing the map of marine habitats of the marine area of the park. Over 100 new marine species were added to the existed species list of the park.

Mapping was implemented in the framework of the project "Strengthening of the Marine Protected Areas network in Croatia – MedPAN South Project". Significant logistical and technical support was provided by the National Park Brijuni public institution.

National park Brijuni

Spiny lobster, *Palinurus elephas*, commonly caught species in Lastovo Island NP

Understanding the perception of fishermen of Lastovo Islands Nature Park

In 2010, an assessment of the fishing resources of Lastovo Islands Nature Park (NP) was conducted by interviewing the fishermen who have the authorisation to fish in the marine area of the park.

A total of 19 examinees completed the pool, which represents the 42.2% of the total number of authorised fishermen (n.=45). Questionnaires have not always been adequately filled since the fishermen did it individually and not in cooperation with the interview team, who could not ensure that questions were properly understood. As a consequence, results of this assessment are preliminary and are intended to provide information for managers for future management planning and monitoring.

Results are reported by themes.

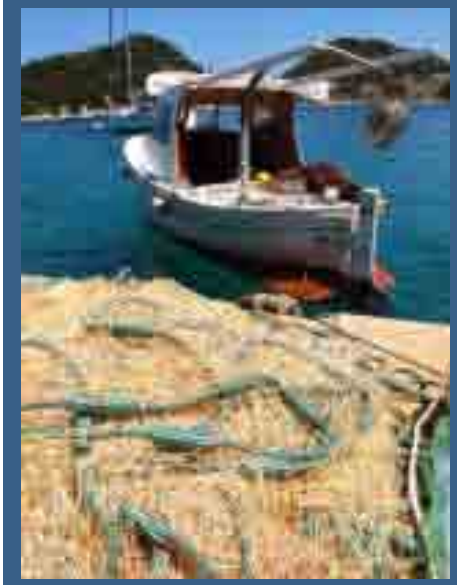
Marine protected area

The first 14 questions of the pool show that fishermen generally support the creation of marine protected areas in Lastovo. More than 80% of the local fishermen agree completely or partially with the fact that marine protected area is a good tool for conservation and sustainable management of marine environment, important for the restoration of fish populations, necessary to ensure sustainable fishing, prevent overfishing and increase biodiversity. Doubts were expressed by the 21.1% if selected areas were the most effective way of protection and if they would contribute to the quality of life of local residents and local economy.

Park boundaries and rules

About 80% of respondents knew that there had been a public discussion on sea borders of Lastovo Island NP. They were all familiar with the park boundaries and almost all said they know the fishing zones boundaries, although 21.1% answered incorrectly the question concerning the fishing zones which are currently no-take. Yet, 78.9% of respondents knew the value that made Lastovo Islands a Nature Park and they cited natural, historical and cultural values of the islands while in several cases, the declaration of the park is associated with preventing the devastation of the island by opening a quarry. Most of the respondents (about 68%) believed that the size of the Lastovo Islands NP is appropriate. Almost 90% were well acquainted with the rules of conduct to be applied within the park, and 63.2% of them considered that the rules are adequate. Interestingly, almost the same percentage of the fishermen believed that they were not sufficiently involved in decision making processes. The 68% of fisherman correctly stated that supervisors are legally responsible for the implementation of direct control over respecting the rules of conduct; however, 55.6% of them considered that their number is too small.

Results of the study are important baseline information for monitoring the effectiveness of the fishery management strategy proposed at Lastovo NP. At the present time, 67% of the fishermen believe that fishing is the greatest impact on the fish community of Lastovo archipelago and 63.2% of them responded that the fishing pressure is high or extremely high and consequently, most of them (68%) consider that the fish has been overfished. Nearly half of the respondents believed that fishing grounds in Lastovo archipelago area are as overfished as the surrounding areas, while a third of them think that Lastovo areas are more preserved. Furthermore, there is a difference in opinion of how well the existing rules protect the fish community. The majority of fishermen (78.9%) believe that smaller areas should be included in the Park and be completely banned from fishing, and their main reasons are the fish stock restoration, protection of spawning and enrichment of tourist attractions. Most of the respondents (60%) think that poaching in the park is frequent, while an additional third considers it to be sporadic.



Fishery boat at Lastovo Islands NP

Fishermen and Fishing

Most fishermen have been engaged in fishing for 10-20 years (42.1%), but there is an important number of those engaged in this activity for more than 30 years (31.6%). For 13 out of 19 individuals, fishing is not a primary activity.

Most respondents (81.3%) go fishing from a few times a week to every day. Respondents said they go fishing 5-30 days a month, 16 days on average. About 60% of fishermen go fishing throughout the year, and 40% of them only seasonally, but as a rule, fishing is most intense from spring to autumn months. The 81.1% of fishermen go fishing alone, while the remaining part goes with a family member. All fishermen have their own boat, which is usually 5-8 m long (80%). Fishermen believe that the most important problems of fishermen in the Lastovo Islands NP are following: the injustice of applying the same regulation to professional fishermen and local fishermen who have an additional economic activity and lack of control and non-compliance.

The most frequent allowed fishing tools used among the Lastovo fishermen are: Gillnet targeting scorpion fish and lobsters (often 47.4% and 21.2% very often), trammel net (often 26.3% and 5.3% very often), trammel net targeting cuttle fish (often 31.6 % and 5.3% very often), and long-line (often 26.3% and 10.5% very often). Other tools are used much less frequently and seasonally, for example gillnet targeting damselfish (*Chromis chromis)* in May and June.

Common and target species of the dominantly used tools are:

- Gillnet: Elasmobranchii, grouper, lobster, monkfish
- Trammel net and cuttlefih gillnet: grouper, cuttlefish, forkbeard
- Longline: bream, conger eel, moray, rooster, hake

The total quantity of catch, and the average monthly and daily catch per individual catches could not be estimated from the pool answers for several reasons: most of the questions were not answered, and when they did answer, we can see from the results that the data, especially for average monthly catches, are not their mean values but the total monthly catch. All the fishermen sell their catch; while one third of respondents answered that a certain part of the catch is retained for their own use (consumption in family).

Within the park, on average, fishery activities at sea are controlled two times during the year. Most fishermen reported that the control is done by the Maritime Police (55.2%). The 47.4% of the respondents said that they often see supervisors in the control, but still they consider that the Park's waters are controlled less than 3 months per year (52.6%) and as many as 88.2% believed that patrolling should be more frequent.

Respondents believed that there are 5 – 40 professional fishermen (24 on the average), and 10 – 55 small scale fishermen (30 on the average). Fishermen believed that the number of professional fishermen remains the same while the number of people involved in the small coastal fishing on the island of Lastovo has not changed or is decreasing. Yet, half of them believe that small scale fishermen sell fish, but opinions are divided about the amount of catches.

Involvement of Local Population in the Park Issues

Almost all respondents believed that local people should be involved in decision-making process of Lastovo Islands NP and they mostly agreed that participation would be encouraged through public discussion and participation of local people in advisory bodies and working groups. Most of them believed that the Park is for the common good - government institutions (municipalities, counties), and local people of various professions see the advantage in the existence of the park. At individual level, respondents stated that the protection of the Park also fulfills their own interests (80%).

Interviewees' profile

All respondents were male, residents on Lastovo. They are mostly fishermen of 50 -59 years (44.4%), 40-49 years (22.2%) and those between 30-39 years (16.7%) had a secondary education. Half of the respondents stated their monthly income 3000 - 6000kn (around 400-800€; 53.8%). Respondents have different opinions on whether the existence of Lastovo Islands NP has negative, favorable or no effect on their sources of revenue. As positive reasons they cited: increased tourism demand and employment opportunities. The main negative reasons were additional restrictions imposed by fishing zones and consequently longer travel and stay at sea, additional taxes for concessions.

Lastovo Islands Nature Park

For more information please contact:

Zrinka Jakl, project coordinator

Association for Nature, Environment and Sustainable Development Sunce

Obala HNP 7

Split, Croatia

Phone: +385 21 360 779

Fax: +385 21 317 254

e-mail: info@sunce-st.org

SUNCE

Association for Nature, Environment and Sustainable Development Sunce was established as a response to the society's growing needs for quality directing, noticing and solving issues on environmental protection, and to ensure natural course of environmental processes. First activities of Sunce were directed towards solving local problems, and today Sunce acts at local, national and international level. We see nature and environment as basic values of the Croatian society, in which management must be approached through the implementation of guidelines for sustainable development.

www.sunce-st.org

WWF MEDITERRANEAN

WWF Mediterranean's mandate is to pursue WWF global priorities to conserve biodiversity and reduce the human footprint on nature in the Mediterranean. Complementing the work of the five WWF national organizations active in the region (France, Greece, Italy, Spain, and Turkey), WWF Mediterranean operates in fourteen countries: Albania, Algeria, Bosnia- Herzegovina, Croatia, Egypt, Lebanon, Libya, Montenegro, Morocco, Portugal, Serbia, Slovenia, Syria and Tunisia. WWF achieves its conservation objectives through field projects in priority landscapes, river basins and marine regions and through advocating improvements in regional and national policy processes affecting nature conservation and resource management. WWF Mediterranean and the other WWF offices involved in the region have together designed the Mediterranean Initiative, a common strategy to intensify WWF conservation efforts in the region. The Mediterranean Initiative is a response to the identification by WWF Global network of the Mediterranean as one of the Global Priority Places.

www.panda.org/msp

Photo credits: Sunce and WWF Claudia Amico