

## News from Range States

### Croatia

#### ***The Lošinj Dolphin Reserve: two decades of work for a conservation success story?***

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During the late 1980s research and conservation of cetaceans was still a mystery in many places around the coasts of the Mediterranean Sea. This was the time when the Adriatic Dolphin Project (ADP) was started in the sheltered waters of the islands of Lošinj and Cres in the Northern Adriatic, Croatia. Not to stray into too many details, as far as we are aware, the project was started by an enthusiastic young man and his mentor (i.e., Giovanni Bearzi and Giuseppe Notarbartolo di Sciarra) with the intention of providing enough data to complete a B.Sc. thesis. When we look at that time, we can see that the idea of few years of research developed into something much greater. The ADP, initiated in 1987, was run by the Tethys Research Institute, an Italian NGO, until the late 1990s. At that time it became obvious that the project outgrew its original idea and a local organization was needed. So, in 1999 the Blue World Institute of Marine Research and Conservation, a Croatian NGO, was founded to take over the ADP and develop it further together with new projects and activities that were urgently needed in the wider Adriatic area.

Since its inception, the ADP was scientific research with the intention of understanding the biology and ecology of the bottlenose dolphins inhabiting the area. The main research method used was (and still is) photo-identification. It remains the best tool to gather information on population structure and dynamics, including data on abundance, vital rates and social structure. During later years the project advanced into many new fields of research including genetics, behaviour, acoustics, habitat selection, impact of anthropogenic activities on population dynamics, toxicology, feeding habits, to name just a few.

The results of the analyses highlighted the need for conservation actions to maintain the resident population. When the protected area was first proposed, the size of the population was estimated at around 120 animals. Although these

data did not point to a dramatic decline in the numbers of individuals, the population size and the fact that it was unique in the Adriatic created the impetus to prepare a preliminary proposal for the establishment of a protected area.

The initial proposal was short and deliberately vague acting as a concept document, and leaving the definition of protection to decision-makers. But it did, however, create the base on which further discussions and proposals have developed. In 2002 Blue World formulated a revised proposal for the establishment of the protected area and named it "Lošinj Dolphin Reserve". Following the proposal, Blue World carried out a project funded by the Principality of Monaco through bilateral cooperation with the Croatian Ministry of the environment, entitled "The identification of critical habitats and the analysis of the management procedures for the future Lošinj-Cres marine protected area". This project clearly identified the area of Lošinj as critical habitat for this bottlenose dolphin population and provided further necessary data for the elaboration of the conservation needs.

So, what is it that makes this area so unique and important that it needs such care and attention? The proposed reserve is located in the eastern side of the northern Adriatic Sea. This geographical region, known as Kvarnerić, is punctuated by channels, islands and islets, submerged reefs and characterised by rocky shores that abruptly drop to depths of up to about 100 m (see map on page 24). Waters are oligotrophic and pollution is very localised and low. The proposed area of the reserve covers approximately 530 km<sup>2</sup> (with 154.5 km of coastline) encompassing a wide range of marine habitats, including rocky shores, submerged reefs, *Posidonia oceanica* meadows and mud seabed. Five of eight benthic biocenosis of the Lošinj Archipelago are classified according to MAP (Mediterranean Action Plan) as particularly valuable. Also, a number of protected and endangered animal species inhabit the area: molluscs, crustaceans, birds, marine

turtles and even recently a visiting monk seal.

The wider Kvarner region is affected by many anthropogenic activities that detrimentally influence its marine and terrestrial ecosystems. These include industrial maritime transport, shipbuilding, oil refineries, oil terminals, power stations, cement industry, tourism and fisheries.

Within the Lošinj and Cres Archipelago bottlenose dolphins (*Tursiops truncatus*) are the only regular cetacean species. In recent times, three other species have been recorded in the area. Common dolphins (*Delphinus delphis*) historically were fairly abundant and is now almost absent. Records of stranded animals also confirm that this species is to be considered extremely rare in the area. There are also a few records of stranded striped dolphins (*Stenella coeruleoalba*) and several documented encounters within the archipelago showing that the striped dolphin is possibly taking the niche left free by common dolphins. Finally, the first report of fin whales (*Balaenoptera physalus*) concerned a specimen stranded in Silba Island in 1990. Sightings of strayed fin whales have been recorded yearly around Pag Island between 1998 and 2002. Most of the observed individuals left the area within few days.

In Spring 2005 a lone female monk seal (*Monachus monachus*) was sighted regularly in the area. It was the first recorded sightings in several decades as the species is considered geographically extinct in most of the Adriatic Sea. Although vagrant animals have been recorded in the southern part of the Adriatic, this specimen still remains in the area potentially indicating its even greater importance.

Distribution of bottlenose dolphins in the Kvarnerić area was assessed through boat-based surveys and photo-identification techniques. Analysis of the data collected shows that the area is now inhabited by approximately 100 bottlenose dolphins. Between 1995 and 2003 a significant 39% decline of their abundance was observed, which aroused great concern. This observation was worsened by a dramatic change in habitat use caused by the increasing number of pleasure boats within the proposed MPA. Adult apparent survival rate was estimated to be significantly lower than for any other bottlenose dolphin population in the world and first year calf survival was also estimated to be low. A decreasing trend in fecundity rate was observed. In addition, a population viability analysis indicated that the current rate of human-induced mortality is unsustainable. The chance of local extinction risk within three generations was estimated to be high (35%). Applying the IUCN Red List Criteria, the Kvarnerić population should be listed

as Endangered under Criterion C and E.

This area presents identified critical habitat for the species and as such requires conservation measures to be taken. Although the proposed MPA does not encompass the entire home range of the dolphins present, data comparison with other contiguous sites in Croatia (i.e., the Kornati Archipelago to the south, and Istria to the north) found only one match. This may suggest that the wider Lošinj area is a home to a defined and semi-closed population of dolphins. Genetic studies have indicated the existence of gene flow within an Adriatic metapopulation, however the precautionary principle should be applied in order to avoid potential local geographical extinctions. Continual monitoring of the population size and trend is therefore necessary to ensure the survival of this population.

The analysis of habitat preference or avoidance, based on nine years of data, showed that areas with high anthropogenic disturbance (such as maritime petrol stations, marine traffic routes etc.) present an important factor negatively affecting the distribution. This is particularly significant during the tourist season, when the number of people visiting the island increases 20-30 times compared to the number of winter residents. The main factors causing disturbance have been identified as man-made noise connected with an increase in boat traffic, and physical presence of fast-moving boats. Man-made noise has the potential of interfering with animal signalling, resulting in a variety of effects. Dolphin distribution throughout the years of 2004 and 2005 was related to the local sea ambient noise (S.A.N.) during both the tourist and non-tourist seasons at 10 fixed locations within the area of proposed MPA. Results showed a clear negative impact of man-made noise and an almost complete avoidance of the areas with high noise levels. Results also indicated that the decrease in the abundance of the Kvarnerić bottlenose dolphin population (or sub-population) over longer period and increase of the home-range are likely to be due to changes in the use of the archipelago by unregulated boat tourism.

Not surprisingly, the Kvarnerić bottlenose population distribution showed a strong overlap with trawling areas. The analysis of stomach contents of stranded animals collected prior to 2001 showed a clear preference for demersal fish. However, there are indications that during the last years the bottlenose dolphins' diet has changed. This can be explained considering that demersal species have been heavily exploited by local fishing industry and recently pelagic fish stocks have been increasing providing a new potential food source.

The Blue World Institute was founded in 1999 to carry out scientific research, conservation and education projects and promote environmental awareness in the Adriatic region. Initially, Blue World was formed with the direct intention to take over the research and public awareness actions of the Adriatic Dolphin Project (ADP), started and managed by the Tethys Research Institute since 1987

*Dolphin Day*, the main public awareness event organized to celebrate the dolphins and the sea, has become a traditional event every first weekend of August

Blue World cooperates with a number of organisations and institutions in Croatia and abroad.

Since 2004 Blue World is a Partner of ACCOBAMS

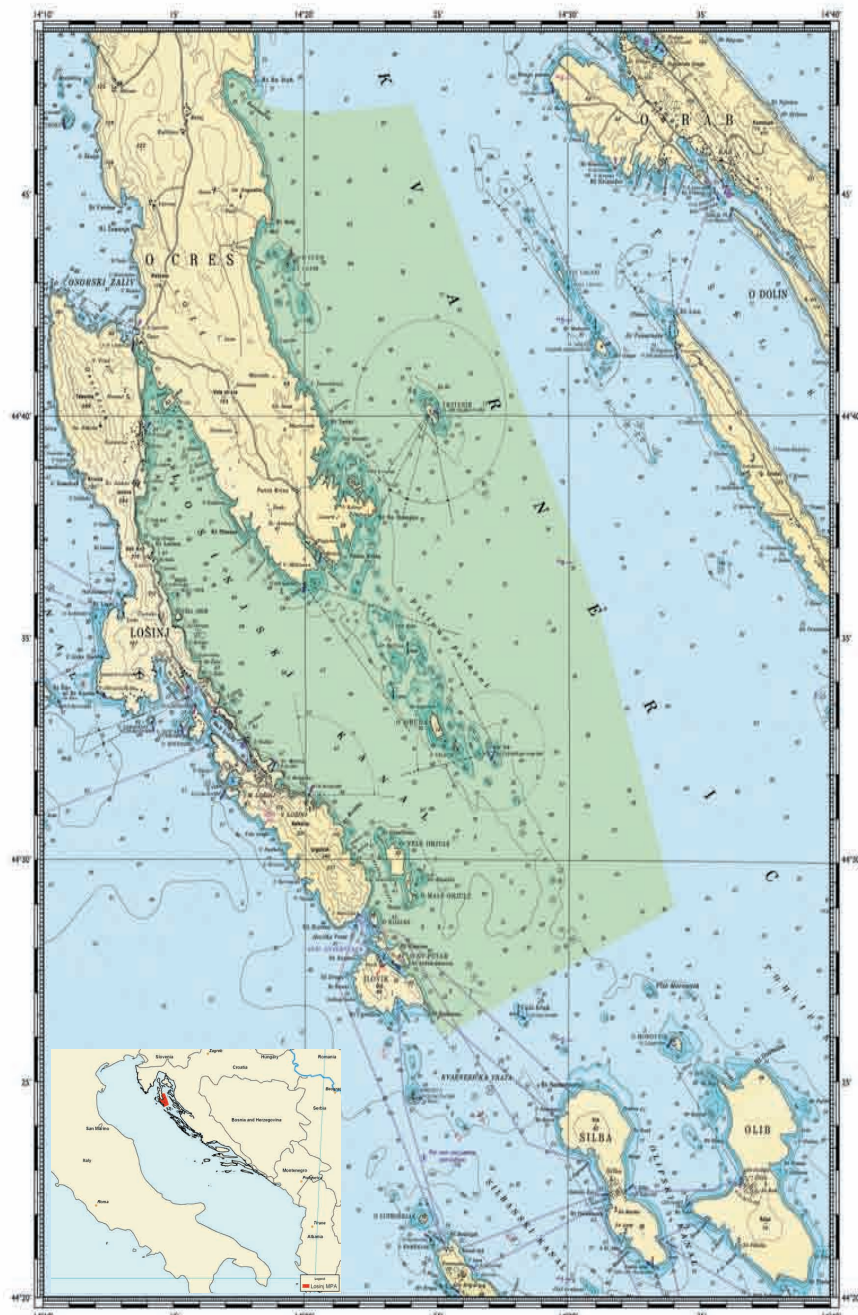
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It seems that due to the nature of marine ecosystems, fluid and difficult to study, the use of indicator species and in particular of the flagship species concept may be better suited for the conservation of the habitats of charismatic species. As a result of flagship species protection and conservation actions taken, the entire ecosystem becomes protected. And what better flagship species than bottlenose dolphins?

The Lošinj population of bottlenose dolphins remains small and vulnerable. Statistical model-

ling and data analysis show that this population needs urgent protection against the numerous threats which it is facing. These threats range from direct killing and overfishing to anthropogenic disturbance. In order to protect this population a set of measures need to be taken which will try to mitigate these negative influences. Our proposal is to establish a marine protected area that would integrate conservation with sustainable development of the local, insular community.

The Lošinj  
Dolphin Reserve  
(in green)  
(map courtesy  
of Blue World)




COOPERATION ACROSS BORDERS ANTE LITTERAM

## ***The early days of the Adriatic Dolphin Project***

*Giovanni Bearzi reports on his experience in Croatia*

I first went to Lošinj in 1987 with my father's inflatable boat, living in a camping. I was told that dolphins around Lošinj and Cres were easy to find, and could be approached from small boats. That sounded very interesting to me, as I was looking for ways to carry out a dolphin study for my Biological Sciences thesis at the University of Padua, Italy. By that time I had been surveying portions of the Mediterranean from oceanographic vessels, recording cetacean sightings. However, I was hoping to get a little closer to the animals, rather than just identifying the species and counting them while passing by. I soon realised that Lošinj offered amazing opportunities. Bottlenose dolphins were easy to find, they could be photographed individually (which later allowed the identification of most community members) and they could be followed at close quarters during their daily movements, thus allowing to collect information on their behaviour. The first time I came back home after two weeks in Lošinj I knew for sure that my life had changed - I finally had found what I was looking for. I completed my thesis on northern Adriatic dolphins, and then Giuseppe Notarbartolo di Sciarra and myself decided that it was worth to continue, under the umbrella of the young Tethys Research Institute. Our aim was to start a long-term study to replicate in the Mediterranean what the likes of Randy Wells and Bernd Würsig had done in other parts of the world.

In 1990 Giuseppe and I crossed the border between Italy and former Yugoslavia with a busload of enthusiasm and hope. With us there was Laura Bonomi, one of the finest field workers I ever met. We managed to find a sponsor for the boat, an outboard engine, basic research equipment (a reflex camera, a tape recorder and the first GPS model available on the market), plus a little money for the renting of a house and for the gasoline. Nobody cared much about earning a salary, or turning the project into some sort of business (which it never became). All we wanted was to find the dolphins and get to know them better. And that's what we did, eventually, facing all sort of difficulties, dealing with damaged boats, broken engines, political trouble, much frustration, cold winters, lack of money, countless hours writing proposals and entering data, personal difficulties and the whole set of problems that come with a field project. But also hundreds of unforgettable hours spent with the animals, known one by one as good friends. The joy of being at sea, alone or with some of the many extraordinary people who joined me in that adventure. Observing dolphins, and eventually understanding at least in part what was going on, what they were doing, what they were likely to do next, and who was there socialising with Taba and Pinna Vibrante.

Although research was our main activity, the Adriatic Dolphin Project developed into something more than just a dolphin study. It soon attracted interest from enthusiastic local supporters such as Arlen Abramic, and then Nena Nosalj and many others. Nena, in particular, was instrumental in enhancing the public awareness potential of the project and allowing us to share whatever we learned about the local dolphins with the general public and the media. The Dolphin Day was one of her many brilliant ideas. She and Arlen also "forced" me to make dozens of presentations in front of a public that ranged from tourists to fishermen, from refugee children to commando soldiers. Today, I'm so glad I did all that, contributing to the development of what is now one of the most successful and long-lasting dolphin projects in the Mediterranean, and setting the stage for the next round of fine people, Drasko, Pete, Caterina and all the others, to whom we eventually passed the baton. After almost two decades, it is nice to see that the Adriatic Dolphin Project has managed to overcome many apparently insurmountable problems, and that Blue World is now doing such an excellent work, with about the same spirit and motivation we had in the early days. I wish that all will continue to produce outstanding conservation results, shining as a testimony that commitment by enthusiastic individuals can make a difference in this world. 

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The Croatian Law on Nature Protection provides different categories of protection being granted to species, biocenoses, ecosystems or landscapes. Based on the review of the Law, Blue World has proposed the creation of the "Special Zoological Reserve for Bottlenose Dolphins". Special zoological reserves are a very strict category of protection granted by the Government and based on a formal proposal prepared by the relevant ministry. What we found of particular importance, apart from the very high and strict category of protection, was the fact that: a) some type of activities that do not jeopardise the protection goals are allowed, and b) management of such reserve can be given to a local public institution. The knowledge we have gathered assures us that these two facts will be crucial for the creation of an effective protected area.

Based on many years of integration into the local community and thousands of hours of interviews, discussions, lectures and debates, we realised that the hearts and minds of the people on the island have changed. Dolphins have changed from being a blight in the sea to become the symbol of Lošinj and the most recognizable feature the island has to offer – a real flagship species. The local community is aware of the strain that the environment is feeling: fish stocks are depleted and the island is overcrowded during the 2-3 summer months. Change needs to be done urgently. Blue World in cooperation with the local community is convinced that appropriate protection of bottlenose dolphins as a flagship species can help to conserve the entire ecosystem. Lošinj is now known as 'the island of dolphins', so it now seems right that protection be managed locally. Initially, we need a clear equitable set of measures to stop further degradation. Together we have proposed a mandatory speed limit for all boats passing through the area, the closing of certain areas for fishing, the banning of some types of fisheries and fishing licences issued only to local fishermen. Of course, after the initial measures, a clear management plan should take into consideration nature conservation, the local economy and different social issues, and be adapted accordingly.

The creation of the reserve provides the impetus to start the real work on conservation issues in this region. The same enthusiasm that has brought us to this point, where creation of the reserve is only a matter of days, will help us develop the area that will become a conservation model for similar places along the Mediterranean coast. To achieve such result there is a long list of provisions. The first and most important is a steady funding for the management of the reserve. At this point it is not important who will manage the area, but whether there will be sufficient resources to elevate it from paper to reality. This funding will need to be ensured, at least at the beginning, by state and local authorities. The second issue will be the elaboration of clear, concise and equitable management objectives and an appropriate management plan. During the plan's development it will be of the utmost importance to ensure transparency of the procedure within the local community and to include all potential stakeholders in its development. Case studies tell us that the effectiveness of the reserve can only be achieved with local support. The challenge is to make the local community feel like it is a part of the reserve, and to let the local people understand the benefits brought by the conservation of marine biodiversity and by sustainable management of resources. The creation of the Lošinj Marine Education Centre (LMEC) in 2003 represents a high profile first step in what is hoped to be a long and fruitful cooperation between Blue World and the local authorities. The centre aims to promote sustainable development and promote the protected area. Information displays, interactive programmes, lectures, specialised workshops, coastal walks and boat tours all offered by LMEC are an effective way to promote the local natural heritage and to increase the environmental awareness as a whole.

Finally, the continuation of the long-term monitoring programme is the only way to verify if the future MPA will meet its objectives and the conservation status of the bottlenose dolphin population. To that, Blue World will ensure its contribution by maintaining and improving the work carried out in the project that started this entire story – the Adriatic Dolphin Project. 

## BREAKING NEWS

### **PRESS COMMUNIQUE' - DOLPHIN PROTECTION IN ADRIATIC SEA: AN EXAMPLE OF HOW APPLIED RESEARCH HELPS EFFECTIVE CONSERVATION OF MEDITERRANEAN BIODIVERSITY**

On Sunday 6th August, during the celebration of the 14th Dolphin Day, held regularly since 1993 on the island of Lošinj, the State Secretary of the Ministry of Culture of the Republic of Croatia, Dr. Jadran Antolovic, declared the establishment of the Lošinj Dolphin Reserve (Ministry of Culture, Republic of Croatia, UP/I-612-07/06-33/676, 532-08-02-1/5-06-1, July 26, 2006). With him to celebrate this occasion were the Executive Secretary of the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS), Dr. Marie-Christine Van Klaveren and the Assistant Minister for Nature Protection, Mr. Zoran Sikic. The celebration was hosted at the Lošinj Marine Education Centre the base for the activities of the Blue World Marine Institute for Research and Conservation. This achievement was also marked with congratulations sent by the President of the Republic of Croatia, Mr. Stjepan Mesic for the successful fruition of research work undertaken by Blue World and concerted cooperation with representatives from the State Institute for Nature Protection, the Croatian Natural History Museum and the ACCOBAMS Secretariat.

The area (<http://www.blue-world.org/MPA/>) is protected under the Croatian Law on nature protection as Special Zoological Reserve for bottlenose dolphins (*Tursiops truncatus*) and as such is subject to the strictest type of protection regime. Initially, the area receives "preventive protection" with protection from the development of any new human activities, for a maximum of three years. This will allow the establishment of a management body and the preparation of a management plan for the permanent Reserve. After this period the designation will become permanent through a Decree of the Government. The Lošinj Dolphin Reserve represents the first MPA dedicated specifically for the protection of one dolphin population in the Mediterranean. It is the biggest marine protected area in the entire Adriatic, totaling 526 square kilometres.

Together with bottlenose dolphins, this Reserve will help conserve a number of other endangered and protected species of flora and fauna and their critical habitats found within the designated area. For example, wintering sites of loggerhead turtle (*Caretta caretta*), sea grass (*Posidonia oceanica*) beds, coral biocenoses and nesting sites of the common European Shag (*Phalacrocorax aristotelis*). Moreover, recent research identified 152 species of marine flora, 303 species of marine invertebrates (7 strictly protected, 9 protected) and 112 species of fish (19 endangered species in Croatia) within the area. This area is known also for its important underwater archaeological sites particularly the site where the Greek bronze statue, a priceless replica of Lizip's Apoksymenos, was discovered.

The designation of this Reserve was based on the findings of a set of focused research projects carried out by Blue World Institute on critical factors affecting distribution and abundance of bottlenose dolphins in this area over the last 12 years, and the local socio-economic impact of this designation. These studies are contained in two PhD thesis carried out in cooperation with the Sea Mammal Research Unit, University of St Andrews (UK), University College London (UK) and Tethys (Italy). These academic theses represent a growing trend in combining academia with policy implementation and were fundamental in stimulating the development of the reserve. This designation represents one of the few examples of how policy makers and researchers can effectively work together toward a common goal.

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