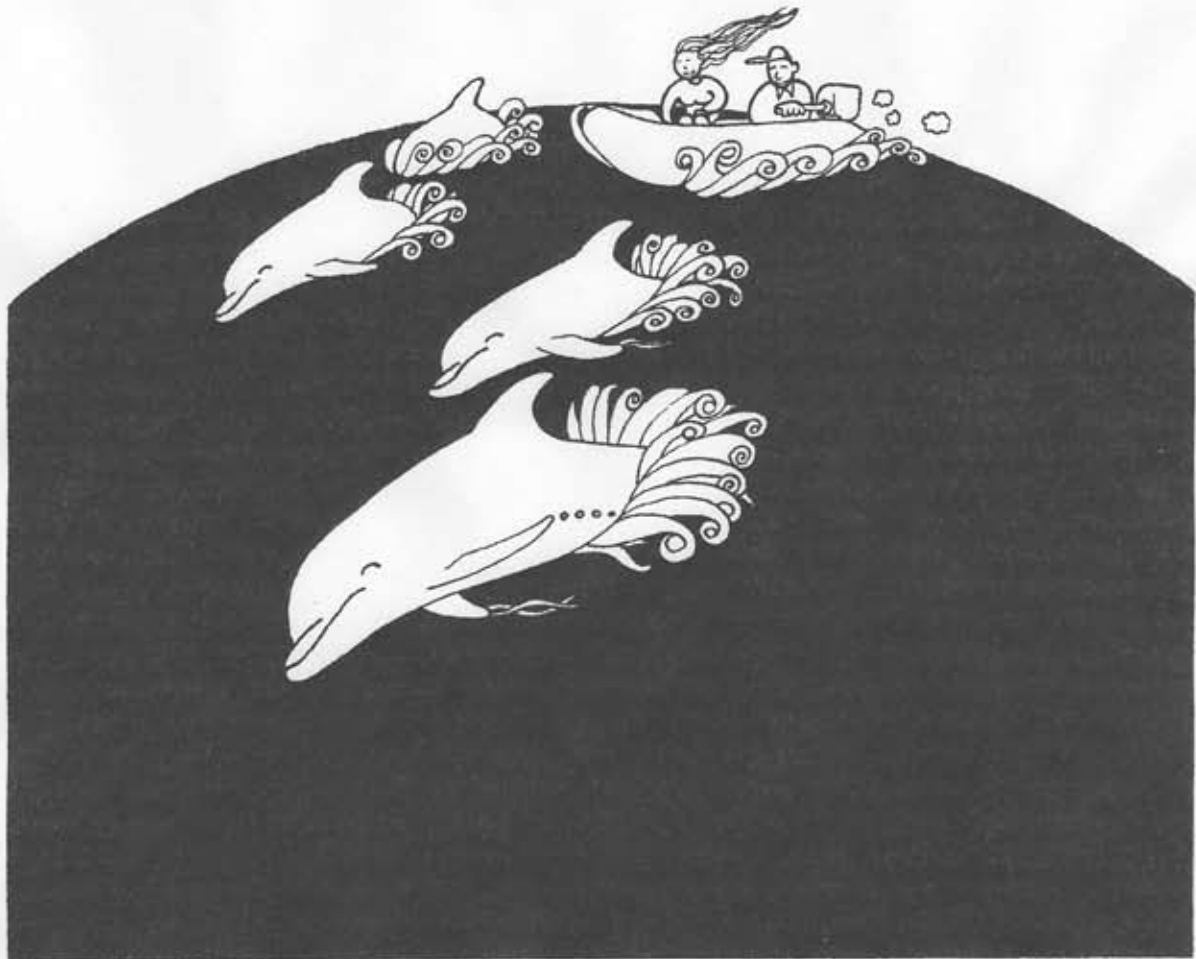


THE CRES-LOŠINJ DOLPHIN RESERVE

**Proposal for the institution of a Marine Reserve
in the waters adjacent to the eastern coast
of Cres and Lošinj**



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INTRODUCTION

On the land surface there are areas of special beauty deserving protection. There are many exceptionally attractive underwater areas as well. The life communities are even more fragile than those over the land surface, and they also need to be protected against excessive fishing, uncontrolled diving and all the damage resulting from those activities. Therefore, we propose the creation of a specially protected area, in which there would be some kind of tourist trade activities allowed.

To protect and conserve such marine region, we propose the choice of a target species, the bottlenose dolphin (*Tursiops truncatus*), of which a significant population resides in the area. Our choice rests on the following considerations:

1. Dolphins are predators at the top of the marine food chain, and thus are excellent biological indicators of the status of the environment they live in. Protecting dolphins and monitoring trends in their population means protecting all marine organisms living in their ecosystem, and the ecosystem itself.
2. Dolphins are extremely visible animals and also very popular with the public. Establishing a dolphin reserve would provide a remarkable image benefit on the area, as dolphins are known to the public as inhabitants of a clean, healthy sea.
3. Finally, protecting dolphins from uncontrolled tourist pressure and industrial fishing activities means also protecting small-scale, local artisianal fishing, an activity that has coexisted for centuries in balance with the dolphins but that today is at even greater risk of disappearing.

The suggested protection of the area must be considered within the main framework of the Management Plan for the Conservation of the Cres-Losinj Archipelago, coordinated by the Island Development Center of Mali Losinj. At the same time this is a suggestion to the legislative body. The old law of nature protection did not regulate these matters. In this way, we would become a part of the overall world nature protection actions.

Zone 1

by Tethys Research Institute

1.1. Geographic limits

Cape Sv. Duh - 44°40'00" N 14°36'50" E - 44°30'00" N 14°41'50" - Cape Radovan, then following the eastern coast of Losinj (see map enclosed).

1.2. Special interest of the area concerning the dolphin population

In 1987 the Tethys Research Institute, a non-profit research and conservation organization specialized in the study of marine mammals based in Milano, Italy, started a long term study of the socio-ecology of a community of bottlenose dolphins in the waters east to the islands of Losinj and Cres. After a preliminary reconnaissance study in 1987 and 1988, the Tethys Institute conducted systematic observations during summer 1990 and 1991, and continuously from the first of March 1992. Methods included photoidentification, focal group behavioural sampling and acoustic monitoring.

About 150 dolphins were photoidentified, based on permanent marks on their dorsal fins.

Repeated sightings of recognizable individuals demonstrated a high degree of site fidelity in several individuals, especially in the area surrounding the islands of Trstenik and Oruda.

The density of dolphins in this area is high, and there are indications of good health of this population, as compared to other Mediterranean populations.

The area seems very important as a feeding and breeding ground. Calves and juveniles are often seen, and occasional sightings of newborns emphasizes the importance of the site as a nursery area.

Scientific data collected during the six-year survey stressed the extraordinary potential of the area for the understanding of the social-ecology and biology of the resident bottlenose dolphins population. Such an opportunity has no equals to date in the Mediterranean and already generated a wide interest in the scientific community.

Moreover, dolphins are easy to approach and to observe, and are usually very friendly to humans, suggesting a high recreational and educational potential of the population.

1.5 Conservation measures

In order to prevent a decline of the size of the local population of bottlenose dolphins, as it has been witnessed throughout the coastal zones of the entire Mediterranean Sea, it can be anticipated that some regulations and limitations of human activities will be necessary. Such limitations will mostly involve fishing activities and boating activities. However, we suggest that regulations can be formulated in ways which will result in a substantial advantage for the local users (small-scale artisanal fishermen and dolphins alike), by preventing foreign and industrial operators from subtracting the fish resources present in the reserve. Furthermore, it is to be expected that the minor boating limitations imposed in the vicinity of the dolphins will be greatly compensated by the attraction factor presented by these animals, and will result in an increase of the tourist value of the area.

In particular, it is proposed:

A. Fishing regulations

1. That small-scale artisanal fishing be allowed in the protected zone by permit only to local operators, with a fixed maximum limit of permits, in compliance with the regulations in force, and with periodical monitoring of the status of the main fish stocks
2. That professional fishing be prohibited to non-local operators
3. That the main fish species be protected during their reproductive season
4. That species in need of total protection or of particular conservation measures be identified
5. That critical habitats (particularly important for reproduction or feeding) for species of economic importance be set aside and banned from fishing to allow repopulation
6. That effects on fish fauna by sport fishermen be investigated, so that appropriate rules can be applied

B. Boating regulations

1. That a behavioural code to be followed in the presence of dolphins be enforced
2. That dolphin harassing be prevented by imposing limits in presence of the animals (e.g., never chase the dolphins, never head in the dolphins' direction when at a distance smaller than 100 m from the animals, impose speed limits within 200 m from the animals, etc.)

Finally, further measures should be studied, such as a control of the amount of trash (especially floating plastic debris) discharged in the area, and the monitoring of the levels of man-made toxic compounds (such as organochlorines and pesticides) at different levels of the local trophic chains, including dolphins and fish for human consumption.

Zone 2

by Vlado Balenovič'

2.1. Territory

This area would be spread from Cape Tarej on the SE coast of Cres to the island Cutin Mali along the same part of the SE coast of Cres (see map enclosed). It would be 17 nautical miles long. The width of the protected area need not to be more than 0,5 nautical miles, because the cliff, which is in places visible over the water surface, spreads very close to the coast of the island.

2.2. Geographical features

The area suggested for protection is not well accessible either from the land or from the sea side. There are two coves in the area which provide wind protection and shelter (Kruscica and Koromacina), and the bay Galboka, near the island of Cutin, but not in the area itself. The area is dangerous for sailing in the north wind (bura), and is not easily accessible in the south wind (jugo), though it is well protected from west and south west winds. Navigating channel is way out of the area. There is a partly concrete road from Belej to Koromacina cove, and another concrete one from Orlec to Mali Bok. Quite a bad road leads to Galboka through the village of Plat. The main road Cres-Merag passes ca. 1 Km off Kruscica.

2.3. Description of area husbandry and impact of possible protection on the population

The area is not populated along the coast. All the settlements are situated inland. There is no economic reason for fishing, this area being relatively poor in fish, which was devastated by fishermen from the island of Krk and Rab. Trawling is already forbidden to 1 nautical mile offshore. Not a single persons existence is connected to this area, but if it could be given some tourist trade value it could provide the means of existence for a number of people.

2.4. Description of the submarine area

The description of the submarine area corresponds to the description of the island of Cutin enclosed to this text.

The overgrowth on the bottom is of exceptional beauty and very well preserved, what unfortunately cannot be said about the fish stock. Small uncommercial fish is still present in bigger number, but bigger fish has been devastated by fishing. The same goes for lobster, although this area has been very rich in it.

The vertical cliff under the sea surface is rich with thoroughly overgrown caves. If it is accomplished to protect this area, it will be necessary to examine the submarine area of the cliff closely.

2.5 Conservation measures

In this second area, very endangered by human impact, we suggest the following measures in addition to those proposed for Zone 1:

1. To prohibit navigation (allowed by permit only)
2. To prohibit fishing, diving, harvesting and so on (by permit only, and in a limited way, should be allowed sea watching, excursions, dolphin watching)

Zone 3

by Vlado Balenovic'

This area (see map enclosed) is very small, covering only a few hundred meters of the vertical rock at a depth of 5-45 m. A higher grade of protection is needed here. The licence could be obtained only with a thorough description of the underwater activities. We suggest that individual entrance licences be established. The area is of a special interest to students and biologists, showing many different species at small depths. It is also very suitable for underwater photography.

For more detailed information about the particular biological interest of this zone, see the enclosure of dr. Elvis Zahtila.

4. Benefit of the protection

4.1. Expected advantages

With these conservation measures we expect advantages such as:

1. substantially protect marine ecosystem, by creating a core area where fishes, cephalopods and crustaceans can live and breed, repopulating even surrounding areas
2. to preserve the cultural heritage and the professional image of fishermen
3. maintain indefinitely a high dolphin concentration in the area, and the good health of the population
4. increase public awareness concerning dolphins and the good health of the local marine environment
5. generate substantial income locally with the organization of dolphin-watching and sea-watching tours
6. create working opportunities locally
7. increase research opportunities

4.2. Protecting the present circumstances in the area

The area suggested for the protection is deeply embedded in the European continent, only a few hours away from the central European countries; this could be well exploited for the tourist trade. There are very few areas so near to central Europe which are ecologically so well preserved and unpolluted. It would be a shame to let it be destroyed. We have to understand that our country has its beauties under the sea surface too, and that we should use this property in some way.

4.3. Regenerating the fish stock

The protection of the area and control of fishing and other extractive activities would help to restore the fish stock considerably only in a few years. If necessary, it is possible to regenerate the area by intensive stocking. Many experiences show that the areas of prohibited fishing (Zone 2 and 3) serve as a kind of generating force for the fish stock of the surrounding areas too.

4.4. Congruity with other reserves

Part of the suggested area corresponds to the ornithological reserve (vultures), which also anticipates restricted sailing in the area. The islands of Cutin are suggested for protection, being one of the biggest nesting places of sea gulls in this part of the Adriatic. The guarding service could be used for both reserves.

4.5. Touristic exploitation of the island

The turnover of the diving industry capital is just behind the one of the sailing industry. It can be surely said that it will develop even more in these parts. The visit to a protected area could crown every diving program. Moreover, there is no danger of overloading areas 2 and 3 by visitors, due to poor accessibility, prevailing meteorological conditions and distance from holiday resorts. If the area appeared overloaded, the number of divers could be restricted in certain parts or seasons by definite regulations for maintenance of the reserve.

5. Organizing the reserve

5.1. Legislative aspects

The reserve would be under protection of the State, which should be regulated by law. It would be ruled by the owner, the matter which also should be regulated by law.

5.2. Ways of using the reserve

The guarding of the reserve should be accomplished by the police and the reserve guards. The local inhabitants should be stimulated to enroll the reserve services. We suggest that the reserve be organized in the way that has been used all around the world, that is the system of licenced guides. Only the people educated as diving guides could get the permission to lead the groups into the protected area. They should be held responsible for all the activities of their guests. That would make the guides most interested in obliging the rules of the reserve. All other matters should be regulated by standing orders.

6. Conclusions

We emphasize that creating a dolphin reserve of this kind is probably the best way to preserve the local marine environment as a whole, preserving both artisanal fishing and fish stocks.

Moreover, dolphins are very popular and could become an image of the archipelago and of the high quality of its environment.

A dolphin reserve of this kind would be the first in the Mediterranean, and one of the very few in the entire world.

The submarine area of the Cutin Veliki and Cutin Mali islands and their surroundings

by Elvis Zahtila
CRM "Rudjer Boskovic", Rovinj

This area is significant for highly developed coral settlement, dominated by calcified algae, corals, mosses and sponges, and characterized by a great variety of corals and shapes.

It is important to emphasize that coral settlements can grow only in the areas of very clean water, with a high degree of transparency and a very low amount of particles in suspension. We have witnessed the decrease in the number of such areas.

Facies with *Paramuricea chamaelon* is the most pronounced of all, by the number of specimens and species living in it. These settlements are encouraged by dimmed light. They developed in the hard ground substratum in areas of high oxygen saturation, where the temperature and salinity levels are stable. Among them we find many rare species, some of them under protection: *Paramuricea chamaelon* and *Palinurus elephas*. The majority of these species rarely settle in polluted water, some of them even totally avoid it.

The advantage of the coral settlements in this area is their accessibility due to small depths they develop on. They can be found at a depth of 12 to 15 m, some specimens of *Paramuricea* starting to 20 m, which is considered very shallow for that species. The settlement is most beautifully developed at the depth of 28 to 40 m, on a vertical rock full of caves, incisions and clefts. Unfortunately this advantage, although enabling further scientific and touristic observations, could become the greatest disadvantage of the settlement. There are many divers but not many of them handle the submarine life with care, which can already be seen in some places of this settlement.

The settlement shelters not only sessile flora and fauna but also many brightly colored species of fish: *Labridae*, *Oblada melanura*, *Diplodus anularis*, *Diplodus vulgaris*, *Diplodus sargus*, *Dentex dentex*, *Scorpaena scrofa*, *Phycis blennioides*, *Gymnosarda* sp., and others.

The submarine area of the Cutin Veliki and Cutin Mali islands is one of the most interesting of the northern Adriatic. The accessibility of the settlement due to small depths will ease further scientific research - e.g., the research of the fauna in many submarine caves, which have been poorly researched in the Mediterranean till now.

