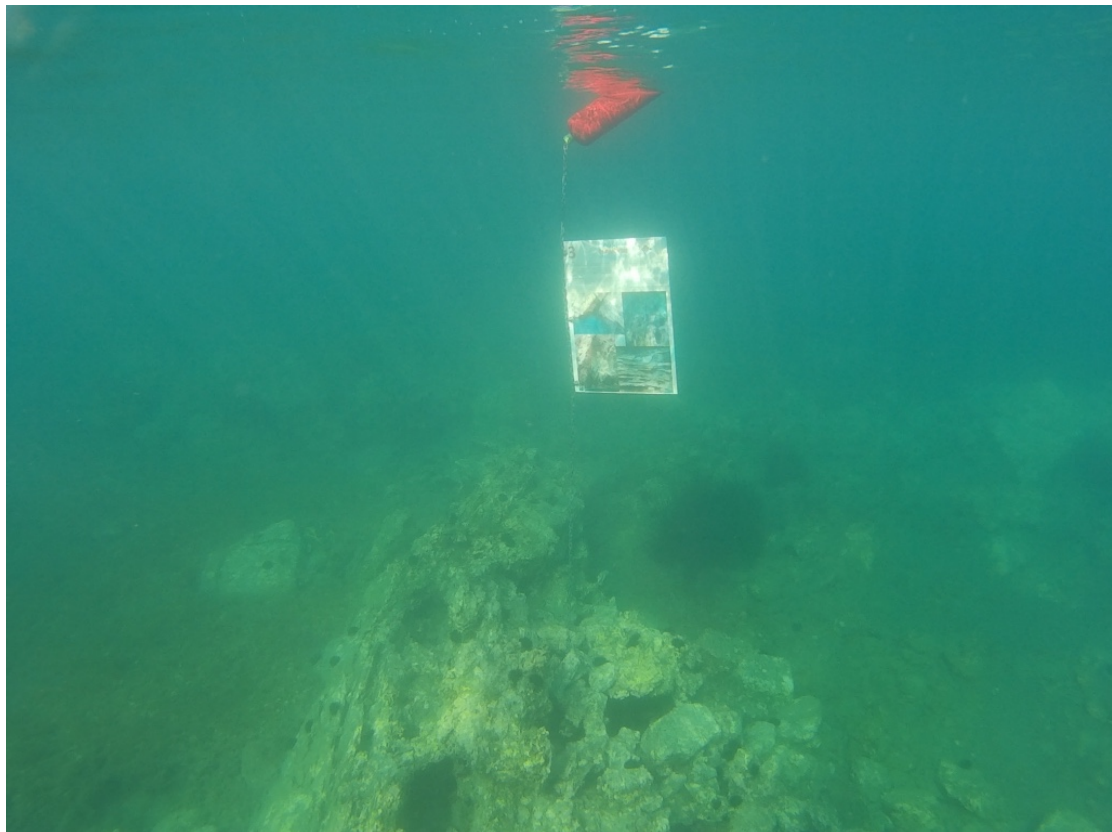


**NGO Mediterranean Center for Environmental Monitoring - MedCEM**

Project: ***“Support local community's involvement in protection and promotion of the potential marine protected area – Katič”***

**Environmental Impact Assessment**

**Installation of an underwater trail in the the future marine protected area – Katič**



**April 2019**

*MAIN FEATURES OF THE PROJECT* **“SUPPORT LOCAL COMMUNITY'S INVOLVEMENT IN PROTECTION AND PROMOTION OF THE POTENTIAL MARINE PROTECTED AREA – KATIČ”**

The contracting authority: Critical Ecosystem Partnership Fund - CEPF

Project No: **108820**

Name of the study: **Environmental Impact Assessment for  
«Installation of an underwater trail in the the future marine protected area – Katič»**

Legal representative of the Contracting authority: Dušan Varda

Study prepared by

**Dušan Varda  
Stefan Anđus  
Goran Petrović  
Jelena Mamuzić  
Đorđe Kovjanić  
Đorđe Gregović**

## INTRODUCTION

Underwater trail is worldwide recognized tool for education and tourist attraction in marine protected areas. It involves receiving the public in conditions that must be perfectly safe for an organized sport, tourism and educational activity, for which a fee may or may not be charged. Regulations linked to an underwater trail must consider all related rules both on land and sea. Thus planning the trail in the core zone of future MPA should be done with the highest respect to nature protection and best practice related to the matter.

## NON-TECHNICAL RESUME

### *Relevant legislation*

The concept of an underwater trail is something that Detailed Spatial Plan for Coastal Zone Management do not consider at all in previous plans. MedCEM already experienced labyrinth of legal explanation and excuses from various relevant institutions for solving this subject (Ministry of Sustainable Development and Tourism, Public Enterprise Coastal Zone Management, local Tourist organization...) – they do not foreseen necessity of implementing such activity in a future MPAs. Related to this subject (and aware of CEPF project plans related to this activity), at the end of 2018 MedCEM submitted official Comment and suggestions to Ministry of Sustainable Development and Tourism for take into consideration areas for Underwater trails on a future long-term Spatial planning of Coastal Zone Management. So far, we did not have any feedback about this matter.

Also, Montenegro didn't have for last several years any Law about Diving activities, that could explain or give any relevant solution for this problem. For all these reasons we believe that some problems with legal and spatial documentation, and approval from relevant institutions could occur. Project intention is to do our best for developing whole concept and every single detail related to Underwater trail installation on Katič. Knowing that in future Katič will be MPA for sure, implementation of Underwater trail could not be postponed endlessly. Everything related to this activity will be prepared, and in case of postponing start up of this activity, complete concept and infrastructure for Underwater trail will be ready for activation (anchors, chains, underwater tables, buoys).

The goal of this document is to point to crucial segments of the environment that can be endangered by the realization of this project, moreover to define the most important effects on the environment.

Montenegro has realized, long time ago, that tourism, especially in the coastal region, represents the key of long term economic prosperity of the country.

### **3. DESCRIPTION OF THE PROPOSED PROJECT**

#### **Underwater trail Katič**

The proposed project area is surrounding of two islets: Katič and Holy Sunday, in front of Petrovac

**How it was described in project proposal setting up an underwater trail around the island Katic:** This activity will be coordinated by NGO MedCEM with support of NGO Green Home and local organizations. Activity will have been realizing from **January 2020 – June 2020**. Preparation activity's implies collecting approvals, mapping locations, procurement of info tables as well design and printing posters and on the end setting up. Underwater Trail is a great place for beginners and anyone who wants to learn about marine life by reading the info tables along the trail. 8-10 points will be marked. On this tables will be presented marine life, with photos and information's about interesting, rare and vulnerable species. Managing of underwater trail will be delegated to local diving club.

Additionally, this project intent to promote "Diving with Groupers" as potential future activity that will contribute in raising awareness, education and nature conservation in this area. This should be also considered within concept of future underwater trail.

This activity will be realized by NGO MedCEM, taking into consideration their experience in the setting up underwater trails. Physical Plans for area managed by Public Enterprise Coastal Zone Management of Montenegro did not foreseen any areas for underwater trails. Basic EIA study on future underwater trail around Katič Islets should offer to all interested sides solutions for model of design, installation, use and maintenance trail in sustainable way, with the lowest impact on marine environment. Study should deliver preparations and steps needed for establishing an exemplary model of trail considering all specific location circumstances. As the most relevant and appropriate manual for planning installation of trail will be used WWF and MedPAN "UNDERWATER TRAILS Handbook" (2012).

Therefore, this document should give recommendations for successful and, for the guest, satisfying tourist experience that does not disturb the islets surrounding wildlife.

This Study should deliver proposal for the positioning of Katič underwater trail (map with points of interests), and identify the rules for organization all activities, specific requirements related to the site, means required to guarantee safety, possible systems of taxation and solutions for governing the site and conserve the environment. Study will propose possible thematic subject for tables on each specific point of interest related to nature or ecological values in this area.

#### **General features of underwater trails**

MPAs can be regarded as sustainable development labs working for effective ocean and coastal management. Out of the tools that contribute to educating and raising public awareness of the environment in MPAs, "underwater trails" have swiftly

gained recognition as practical and effective, embodying the concept of sustainable development.

1. **Underwater trail could be defined** as instrument for sustainable development. Underwater trail is an example of action taken for the sustainable development of a territory. Economic, environmental and social, aspects can be taken into account:

*From an economic perspective:* It is an tool to develop sustainable, environmentally-friendly and responsible tourism, a job-creating instrument and a professional training tool for stakeholders having a connection with the marine environment (even indirect)

*From a environmental perspective:* It is an environmental conservation instrument in land-use management as it contributes to channelling visitor flows and thus reduces their impact on the environment. Also, it is an environmental education tool for a large target group including school pupils and young people by integration into educational projects.

*From a social perspective:* It is an personal development tool suitable for all (children, families, seniors), and also could be an instrument for integrating people with social or physical difficulties.

2. **As a land-use management tool:** given the pressure on Mediterranean ecosystems, underwater trails may play a role in their management.

*The role of underwater trails in environmental management:* Most MPAs plan their action using a management plan/scheme. This, usually, encompasses: action to protect or restore the environment, management of uses and pressure, and environmental awareness-raising and education. U/W trails are one of the strategies for channeling visits to a determined area, while fostering environmental education that a manager may include in the management plan.

*Priorities for an underwater trail:* Presentation of the environment, environmental education and awareness-raising, communication, and promoting heritage and the marine environment. Underwater trail is a way of teaching users to view the sea differently, as a living environment with strengths and weaknesses. Users must be encouraged to adopt appropriate behaviour to protect the sites.

An underwater trail is also a source of economic activity, creating jobs and generating revenue if an admission fee is charged. That revenue can then be reinvested in site management – these trails are tools integrated into management plans.

3. **Regulations:** presents a list of regulatory aspects that any project must take into account within the framework of domestic legislation.

4. **Educational aspects and methods:** target groups, different approaches to educational practices, content and methods, possible tools.

5. **Designing an underwater trail :** addresses the actual creation of an underwater trail, from choosing the site through to organisation, necessary resources and cost.

**6. The economic approach to the underwater trail** : addresses the various business models that project leaders may consider based on case studies.

From an economic perspective, underwater trail is activity that generates market and / or non-market income and benefits the local population (leisure, sense of territorial ownership), tourists (discovery), professionals (indirect impact and derived benefits) and institutional stakeholders (promotion).

While underwater trails can yield profits, they also incur expenditure. The decision to create an underwater trail will depend on the answers to the following questions : How much will it cost? Will the income generated cover all or part of the costs? What economic model should be chosen?

The choice of an economic model involves both the choice of management and the financing method: There are **2 management models** : direct management by the operator of the area or management delegated to a third party. There are **2 types of funding** : public or private funds (sponsorship) if users are not charged to do the trail, or funding by users, when a fee is charged for the activity.

Depending on the case, **this financial participation by visitors may cover the full cost or a varying portion of the costs** incurred by the operator. Between the two extremes, there is a **broad range of mixed solutions** which are perfectly suited to the various types of underwater trail and MPA managers, and to the various stages in the activity's development (start-up, growth and full development).

*All of characteristic of underwater trails listed above should be considered by future management body in a purpose of establishing the most appropriate model for Katič area and it's needs. Whatever decision will be, there should be reconsideration from several stakeholders how this concept could be realized in the best acceptable way for all parties. However, importance and positive effect that installation of underwater trail will bring into future functioning of MPA should not be under question by any meaning.*

### **Natural characteristic of the Katič area**

#### **LANDSCAPE**

Islets are upper part of the underwater reef that stretches in North-South direction and consists of layers of sediment lime stones that is characteristic of whole surrounding area. Aside of Holy Sunday (islet named by the small chapel on it) and Katič (islet under vegetation), there is a third peak of reef that raise up from bottom until 1-2 meter bellow surface and it is called Donkova Seka. Above water, this islets offers a perfect habitat for various sea birds (at least 5 bird species are common on this spot) that are present in great numbers relating to the size of the islets.

Underwater characteristic paysage is unique for whole Katič area. Underwater cliffs of sediment stones, rocks full of cracks and holes and sand pools in some parts of the bottom offers various types of habitats. That is reason the reason of unusual biodiversity at this place, that should be presented through underwater trail.



## **FLORA**

In terrestrial part of the Katič was not under detailed survey - there is visible domination of *Pinaceae spp.* on land. Marine environment survey shows several species that might be interesting for diving visitors. There is dominant and very dense *Posidonia oceanica* meadow that surround islets from all sides, as well as red, brown and green algae that are present on various depths in this area.

## **FAUNA**

Marine environment at this place offers various shapes of life, and gives perfect opportunity to make interesting underwater trail. Many species of fishes and phyla of invertebrates offer many possibilities to present importance of biodiversity at this spot.

## **IMPACT ON ENVIRONMENT**

Role of underwater trails in MPA could be compared with similarity to mountain tracks in some National park: they should direct visitors in the most effective route in chosen area. One of characteristic about underwater trails is that their installation is planned in the way to have less possible impact on environment. It is a carefully planned tool for organized visits to underwater values in particular area. All plans about use of materials, methods of installation, transportation, number of visitors and their behaving on trail - must consider the lowest possible impact on nature, regarded to capacities of particular area. In some MPAs, visiting an underwater trail is the only chance for tourists to approach and see the most protected and the most valuable parts of these areas. So, it is expected that underwater trail will contribute for better regulation in visitors activities in the most sensitive parts of an MPA, and in many ways it could lead to mitigation of negative anthropogenic impact to nature.

We can conclude that none of any crucial environment segments in MPA cannot be endangered with installation of an underwater trail around Katič island. It is hard to

predict at this point how many visitors can be expected during summer season, but for sure in first several years of functioning this underwater trail could not generate such high number of people that could make any severe impact on environment. On other side, positive educational and promotional effects on visitors that underwater trail could demonstrate related to the role of an MPA, could not be disregarded in any way, or compared to minimal negative effect that organized group of people with professional guidance could have in this area.

### **SUGGESTED MATERIALS FOR USE IN TRAIL INSTALLATION**

For installation of the elements of trail will be used materials and methodologies that are already proven and recommended as the most appropriate for this purpose. All of these elements are considered to be with lowest possible impact on environment or nature disturbance in this area. For anchoring buoys on points of interests is proposed using of 4 different types of anchors:

1. «Dead weight» (concrete block – this project is aiming to promote deadweights full of holes, with the function of the artificial reefs )
2. Sand screw (iron screw for the sandy/pebbles bottoms – Screws length of 150 cm, shaft diameter of 2,5, and disc diameter 25-30 cm, covered with several layers of paint for protection)
3. Spiral anchor «Harmony type P» (for use in *Posidonia*).
4. Using natural holes in bottom rocks for chain clutching

All these types of suggested anchoring buoys on the points of interests are designed as the ones with less possible impact on environment. Advantage of these anchors is also their ability to be removed or re-installed easily.

For underwater info tables will be used panted Forex tables of 10mm thickness. This material is in use for similar purposes, and shows a great resilience on mechanical and chemical disturbance from marine surrounding. Due to growth of algae and other marine organisms on all submerged surfaces (periphyton), these tables need to be cleaned underwater on a weekly basis.

Buoys used for point of interest should be visually distinctive from usual anchoring buoys, without possibility to be used as mooring for boats (no rings on a buoy). These buoys also should be made to be more easily to spot from distance, so they should have higher point above the water than usual buoys (such as flags or similar marks).

Chain will be used to connect all elements of the point of interest (anchors, tables, buoys). Depending on thickness of metal and wear off in maritime conditions, this chains might be needed to be replaced on each new season.

Boats that will bring tourist to visit underwater trail should use ecological moorings on Eastern part of Katič island.



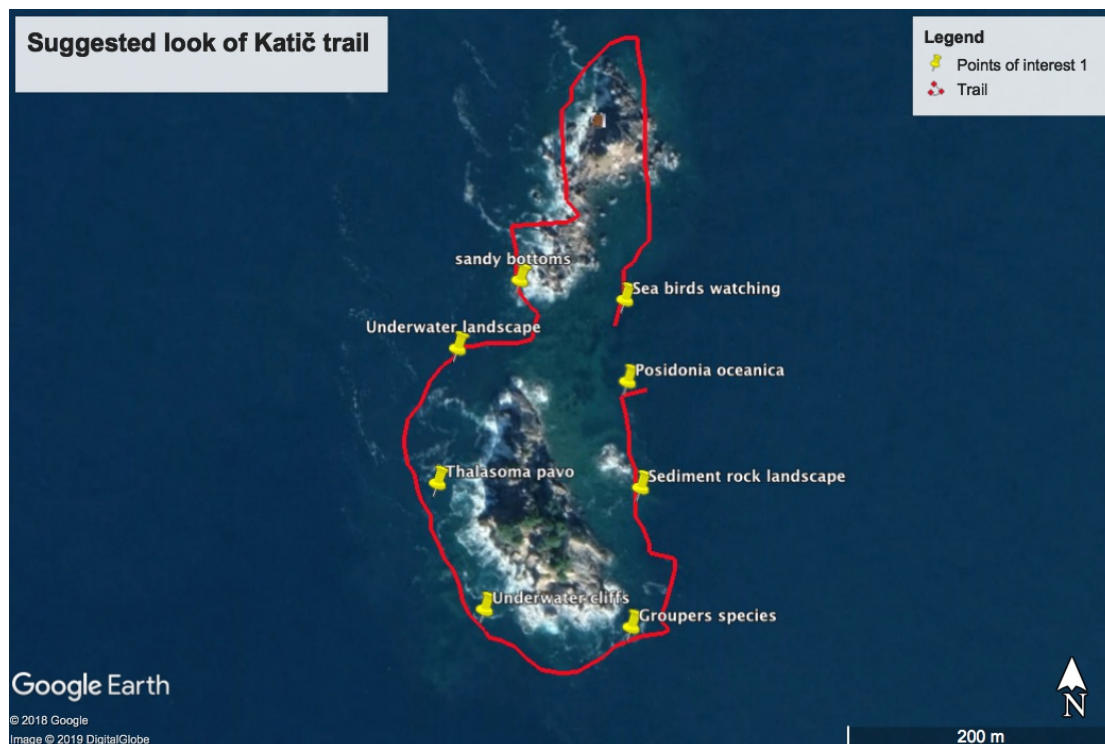
## GOVERNING SITE – Safety and taxation solutions

Management of underwater trail on Katič island is planned be delegated on governance to local diving club, or similar organization. They should be the one that will decide about all safety standards and management of each part related visitors activities in this area. Organization in charge for trail should be relevant to organize advertising, transports and all logistic related to equipment needed for visitors. The price of ticket should depend on offer in rental equipment (mask, tube, flippers, diving suits (shorties), underwater camera, raft, scooter, FM headset guides, etc.) Our suggestion is that ticket could not be less than 10 euros, but not more than 20 euros. Governing body of underwater trail should decide about price discounts that will be able for youngsters, students, or group visits. Also, part of incomes generated from tickets should be clearly defined in which percentage it goes to manager and maintaining of trail, and which part goes to MPA budget (or other institution related to natural resource use – as Public Enterprise for Coastal Zone Management).

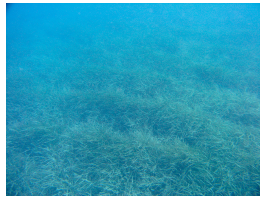
It is also important to have in mind that underwater trails are not lucrative business, and that they need support from various sides (such as sponsors, local touristic organisations, municipality budget or MPA stakeholders...), because their function is primarily educational, and in purpose for MPA promotion. So before any mechanism of permanent financing/generating incomes is established, all details related to financial costs and details of general project budget must be carefully examined.

## SUGGESTED PLAN OF U/W TRAIL AND PIONTS OF INTEREST

Suggested points of interest for this area came as sublimation of results from several surveys, and experience from other similar project.



1. *Posidonia oceanica*
2. Sediment rock landscape
3. Species of Groupers
4. Underwater cliffs
5. *Thalassoma pavo*
6. Underwater landscape between islets
7. Sandy bottoms habitat
8. Sea birds



1



2



3



4



5



6



7



8

All of proposed points of interest are closer than 100m to the islets, positioned at the depths of 3-10 metres, which makes them ideal for snorkeling. Suggested trail is designed to be used in a whole length around both islets, or in shorter version around just one of them – depending on the visitors demands.

The underwater trail should be installed for use during summer season, and almost all parts of it will be removed (uninstalled) in beginning of autumn season. All floating/standing elements of trail will be removed, conserved and taken into storage to wait for another season. The anchors will remain on the sea bottom for the re-use in the next season.

All other methodologies and approaches for underwater trail management should be related to mentioned MedPAN «Underwater Trails Handbook».

## CONCLUSIONS

Underwater trails are recommended as tool for education, raising awareness, and extended tourist offer for all of those interested for snorkeling in marine protected areas. They could be also source of financial revenues for MPA functioning. In any way, installation (and removal) elements won't endangered marine life or natural characteristic of whole area. Depending on permissions for installation and use, as well as a future MPA Katič project development and management, suggested technical solutions and management plan for underwater trails could be defined in more details.