

# Minutes

WP 3 CAPACITY BUILDING THROUGH STAFF TRAINING AND  
EQUIPMENT PURCHASE.

DEV.3.4.4. KNOW-HOW TRANSFER TO TEACHING STAFF RELATED TO THE  
ENVIRONMENTAL MANAGEMENT



**Development of Regional Joint Master Program in Maritime Environmental  
Protection and Management – MEP&M**

Project no. 619239-EPP-1-2020-1-ME-EPPKA2-CBHE-JP

**Amphitheater of the Faculty of Maritime Studies Kotor, UoM**

**DEV.3.4.4: KNOW-HOW TRANSFER TO TEACHING STAFF RELATED TO THE  
ENVIRONMENTAL MANAGEMENT**

**11 – 12 July 2022**

**Organized by: University of Montenegro**

**List of Participants**

11/07/2022

1. Aleksandar Joksimović, Institute of Marine Biology, Univ. of Montenegro
2. Alfredo Fernández Enríquez, University of Cádiz
3. Ana Pešić, Institute of Marine Biology, University of Montenegro
4. Aurora Bakaj, University of Vlora
5. Branka Pestorić, Institute of Marine Biology, University of Montenegro
6. Brunilda Coti, GMD
7. Christophe Mocquet, Université Côte d'Azur
8. Danilo Nikolić, University of Montenegro
9. Javier Izquierdo Antón, University of Cádiz
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12. Kristofor Lapa, University of Vlora
13. Ljilja Radunović, Eco Center DOLPHIN
14. Llambi Prendi, UAMD
15. Maja Škurić, University of Montenegro
16. Manuel Alejandro Merlo Torres, University of Cádiz
17. Marko Radović, EPA Montenegro
18. Milica Mandić, Institute of Marine Biology, University of Montenegro
19. Osman Metalla, UAMD
20. Radmila Gagić, University of Montenegro
21. Remedios Cabrera, University of Cádiz
22. Rosa Molina Gil, University of Cádiz
23. Suard Alizoti, University of Vlora
24. Tomor Harizi, GMD
25. Žarko Radulović, Eco Center DOLPHIN
26. Zdravko Ikica, Institute of Marine Biology, University of Montenegro



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**Agenda Day #1**

**Monday, July 11<sup>st</sup> 2022**

- 09:00 – 09:30** Registration of participants
- 09:30 – 09:45** **Official opening**
- 09:45 – 11:15** **Blue Bioeconomy: Fisheries** | Dra. Remedios Cabrera Castro (UCA-S)  
**Blue Bioeconomy: Aquaculture and blue biotechnology** | Dr. Manuel Alejandro Merlo Torres (UCA-S)  
**Discussion and questions**
- 11:15 – 11:30** Coffee break
- 11:30 – 13:00** **Coastal risks and vulnerability: Basis and strategies for protection and monitoring** | Rosa Molina Gil (UCA-S)  
**Discussion and questions**
- 13:00 – 14:00** LUNCH BREAK
- 14:00 – 15:30** **The ecosystem services – concepts and applications (part 1)** |Dr. Christophe Mocquet (UCA-F)
- 15:30 – 15:45** Coffee break discussion
- 15:45 – 17:15** **The ecosystem services – concepts and applications (part 2)** |Dr. Christophe Mocquet (UCA-F)  
**Discussion and questions**
- 17:15** Closure of the day



## Agenda Day #2

**Tuesday, July 12<sup>st</sup> 2022**

- 09:00 – 10:30**    **GIS applied to coastal and maritime environmental protection and management** | Dr. Alfredo Fernández Enríquez (UCA-S)  
**Discussion and questions**
- 10:30 – 10:45**    Coffee break
- 10:45 – 12:15**    **Environmental economics – how to combine environment and economy?** |  
Dr. Christophe Mocquet (UCA-F)  
**Discussion and questions**
- 12:15 – 13:00**    **Discussion and closure of the training sessions**
- 13:00 – 14:00**    LUNCH BREAK (PMB meeting starting at 14:00)

## Summary of the training

**Topic 1:** Blue Bioeconomy: Fisheries (Part 1), Aquaculture and blue biotechnology (Part 2)

**Presentation link:**

**Trainer:** Dr. Remedios Cabrera Castro and Dr. Manuel Alejandro Merlo Torres

### Summary and objective:

The topic “Blue Bioeconomy: Fisheries” was developed by Dr. Remedios Cabrera Castro, from University of Cadiz (Spain), with the main aim to point out that marine living resources are renewable, as this characteristic is essential, together with good management, to maintain the different fisheries over time. Also, to emphasise that fisheries have to be seen as a complex fishing system with a multitude of interactions, to know the history, the most important milestones, as well as the state of the fisheries. The main impacts associated with fishing activities was also explained and the proposal of sustainable alternatives to solve them. To know the real scope of artisanal fisheries and highlight their strengths as a sustainable activity and highlight small-scale artisanal fisheries as a key to the development of coastal communities and villages.

The topic “Blue bioeconomy: Aquaculture and blue biotechnology” was developed by Dr. Manuel Alejandro Merlo Torres, from University of Cádiz (Spain), with the main aim to highlight the aquaculture as an essential engine for the consolidation of the blue economy in the countries. Also to know the history, status and the different extant aquaculture systems. To detect which are the main impacts associated to the aquaculture activity and propose sustainable alternatives to solve them, know the scope of blue biotechnology for the development of the blue economy, and to highlight biotechnology as a key discipline to reach a sustainable aquaculture.

### Contents taught:

- 1) Fisheries:
  - a) Why fisheries?
  - b) History, systems and current status.
  - c) Fisheries impacts.
  - d) Sustainable fisheries.
  - e) Fisheries in 2030 Agenda and the Sustainable Development Goals.
- 2) Aquaculture:
  - a) Why aquaculture?
  - b) History, systems and current status.



- c) Negative aquaculture impacts.
  - d) Sustainable aquaculture.
  - e) Aquaculture in 2030 Agenda and the Sustainable Development Goals (SDGs).
  - f) Suggested teaching methods.
- 2) Blue biotechnology:
- a) Biotechnology colors.
  - b) Why blue biotechnology?
  - c) Some examples.
  - d) Blue biotechnology and sustainable aquaculture.
  - e) Blue biotechnology in 2030 Agenda and the Sustainable Development Goals (SDGs).
  - f) Suggested teaching methods.

### **Discussion and questions:**

In the first part of the topic, a question was asked about the data source used. The data comes from the information published by the FAO and from the crossing of data and information between colleagues from the FAO and other centers. Also, a brief discussion about the globally relevant contribution of small-scale artisanal fisheries and the importance for so many coastal and island countries was made.

In the second part of the topic, about the technologies and facilities shown in the presentation, a question about the viability of them for all countries. This kind of technologies and facilities are expensive and complex technologies and it takes a lot of money to improve the facilities. In addition, not all countries use the blue biotechnology for the same purpose, in Spain it is focused on aquaculture.

Another question posed was the application of novel biotechnological advances, such as the CRISPR-CAS gene editing for aquaculture improvement. Although, now is the focus of several research in the aquaculture field, the establishment of such technique in improvement programs is nowadays far, taking into account that is a young technique and there is still too deep about it, even for the application in humans.

It was also discussed the use of biodiesel produced by microalgae as money source. This option is possible and possibly already done, since it is the companies that invest in blue biotechnology and decide.

Photo of the training:





**Topic 2:** Coastal risks and vulnerability: Basics and strategies for protection and monitoring

**Presentation link:**

**Trainer:** Dr. Rosa Molina Gil

**Summary and objective:**

The topic “Coastal risks and vulnerability: Basics and strategies for protection and monitoring” was developed by Dr. Rosa Molina Gil, from University of Cadiz (Spain), with the main aim to expose the basis of coastal risk and vulnerability assessment.

In part 1, definitions and bases on coastal risks and vulnerability were described: differences in terminology, i.e. hazard and risk, vulnerability, disaster and catastrophe; risk study methods, i.e. prediction, prevention and mitigation strategies; and the main risks affecting coastal areas, i.e. erosion and flooding processes due to storms, hurricanes, Sea Level Rise (SLR), etc. The main problems and processes associated with climate change that constitute a risk were also presented.

In part 2, Coastal Vulnerability Index (CVI) and mitigation strategies against coastal erosion were discussed: main parameters and characteristics were presented, and a brief summary of recent studies, their advantages and disadvantages.

**Contents taught:**

1. Coastal Risks:
  - 1.1. Definitions.
  - 1.2. Risk study methods.
  - 1.3. Erosion and flooding.
  - 1.4. Problems and processes associated to climate change.
2. Vulnerability:
  - 2.1. Coastal Vulnerability Index.
  - 2.2. Mitigation strategies against coastal erosion.

**Discussion and questions:**

The first question was about the inclusion of economic data in coastal risk estimation. Economic data is not generally used in this step of the risk study, but in the estimation of coastal vulnerability, where a sub-index is introduced specifically for socio-economic data within the calculation of the Coastal Vulnerability Index (CVI).

The second question was about why Sea Level Rise (SLR) was negative in a spot of the Baltic Sea and how it is calculated. SLR are influenced by many factors and the

Baltic Sea is a particular case. The reason is unclear: the main factor is the glacial isostasy adjustment (GIA) due to its proximity to the poles causing this difference in values with respect to the rest of Europe. The calculation of the values of sea level rise is very complex, in which numerous corrections must be added, such as the subsidence of the land, the GIA or the influence of the poles.

**Photo of the training:**



**Topic 3:** The ecosystem services – concepts and applications

**Presentation link:**

**Trainer:** Dr. Christophe Mocquet

**Summary and objective:**

The topic “The ecosystem services – concepts and applications” was developed by Dr. Christophe Mocquet, from University Cote d’Azur (France), with the aim to talk about the ecosystems services as a tool for coastal management. The main objective was to expose the basic concepts about ecosystem services, focusing on the economic part, and exposing some applications.

**Contents taught:**

In the first part:

- Basis of the ecosystems services: the value and aspects of the environment, and the environment as a resource.
- The four groups in which ecosystem services are classified according to the type of benefit they provide: supporting, provisioning, regulating and cultural.

In the second part:

The example of the coral reef as an ecosystem service. Introduction and biologic aspects of coral reef.

**Discussion and questions:**

About important problems with invasive species, are they included as pest and disease in the group of ‘Regulating’ benefits from nature? – It needs to be studied case-by-case, identifying which are the species that compete and see which species should be protected to compete against the invasive species.

It was also discussed about posidonia sea grass as protective element of the coast: some people (it was exposed a specific case) does not understand the importance of posidonia, dunes, and other elements of the coast, as they only focused in fishery and tourism.

Another question discussed, derived from the previous one, was what can we do to convince people that they must protect the environment. About a specific case in Mexico concerning hotels, a company proposed a parametric system to calculate benefits taking into account the protection of the coast. The problem is that companies understand it and for this education is essential.

**Photo of the training:**



**Topic 4:** GIS applied to coastal and maritime environmental protection and management

**Presentation link:**

**Trainer:** Dr. Alfredo Fernández Enríquez

**Summary and objective:**

The topic “GIS applied to coastal and maritime environmental protection and management” was developed by Dr. Alfredo Fernández Enríquez, from University of Cádiz (Spain), with the aim to talk about different aspects of interest presented by GIS applied to MSP, detailing which tools are used in each of the state-of-the-art chosen examples, and some examples of his own teaching practice. The main objective was the access to licensed software (ArcGIS Pro) and open source software (QGIS) and the Open Geospatial Consortium (OGC) standards and highlight the relevance of open source software and the necessity of a structured learning by doing approach, prior to connection to advanced WebGIS services and licensed software.

**Contents taught:**

1. GIS application cases available in the European MSP platform.
2. WebGIS tools. (web map services, web feature services, and web coverage services).
3. Specific GIS utilities applied to the marine and coastal environment.
4. Biophysical: Species (Focal species and Seabird abundance and distribution, Population structure, Community composition, Genetic diversity).
5. Biophysical: Habitats (Fish nursery areas, Suitable environmental conditions for species, Distribution of three key phytobenthic species, Coastal lagoons and large shallow inlets & bays, Habitat heterogeneity indicator).
6. Geophysical (Interpolation of depth and elevation, Archipelago zonation.
7. Socio economical Pressure (Shoreline exploitation, Human influence on coastal lagoons and large shallow inlets and bays, Communication infrastructure, Effects of recreational boating and fishing on sensitive habitats, Marine noise disturbance from vessels, Potential dredging sites in shallow coastal areas, Shoreline erosion induced by navigational activities).



8. Socio economical (Effects of marine management activities on fishing, Economic value of marine areas exemplified for recreational activities).
9. Governance/Stakeholder interaction (interaction between authorities and stakeholders, Compliance with management plans).
10. Geoplatforms providing information and ready to use web tools (maritime use conflicts, cumulative effects assessments and marine ecosystems services threat assessment).
11. Interreg DST-MPA platform, Spatial Decision Support Systems (SDSS) for Blue Economy in Marine Protected Areas.
12. Open Source Geospatial foundation (OSGEO).
13. Open Source software (QGIS).
14. Practical exercises with QGIS (loading information, data sources, georeferencing, digitizing, geoprocessing, map algebra, Analytical Hierarchical Process...).
15. ArcGIS Pro (geostatistical interpolation, model builder and Fuzzy logic).

### Discussion and questions:

A brief discussion about the access to licensed software (ArcGIS Pro) and open source software (QGIS) and Open Geospatial Consortium (OGC) standards took place.

In the case of ArcGIS, it is a paid license, but there is other open access software. The platforms, in general, are usually all freely accessible.

### Photo of the training:





**MEP&M**  
Development of Regional Joint Master Program in  
Maritime Environmental Protection and Management

Co-funded by the  
Erasmus+ Programme  
of the European Union





**Topic 5:** Environmental economics – hot to combine environment and economy?

**Presentation link:**

**Trainer:** Dr. Christophe Mocquet

**Summary and objective:**

The topic “Environmental economics – hot to combine environment and economy?” was developed by Dr. Christophe Mocquet, from University Cote d’Azur (France), with the aim to talk about what is the best strategy to convince/help managers make decisions. The main objective was to expose the difficulties to value the different services of ecosystems.

**Contents taught:**

In the first part:

Example of coral reef as ecosystem service:

- Benefits and difficulties of their economic valuation
- Examples of different services supported as biotechnology for medicine and tourism and recreation as cultural service

Comparison of the types of services according to the economic importance.

In the second part:

- Natural threats affecting ecosystem services.
- Other examples of ecosystem services: Mediterranean posidonia.

**Discussion and questions:**

The discussion was about how is ecosystem services regulated. It depends on where we are: each country has a specific regulation, as especial offices that regulates protected areas and develop the strategies.

There also are group of people and start-ups that develop their own business models, for example about local development, wives of fishermen who work in the fishery but are not officially registered.











Another topic discussed was the possibility of allow protected areas to be exploited economically. It needs to be regulated, allowing and proposing alternatives that allow their exploitation and protection.

**Photo of the training:**








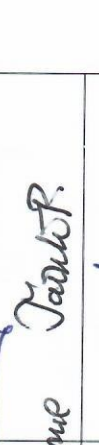


### Attendance List – Training at the University of Montenegro (DEV3.4.4), 11/07/2022

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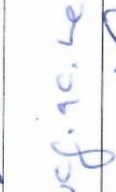






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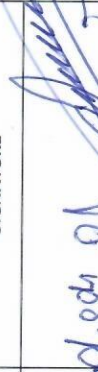

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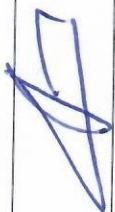

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