



MPA4Change - Enhancing Marine Protected Areas as Nature Based Solutions for adaptation to climate change: from local actions to Mediterranean basin strategy.

Jačanje kapaciteta zaštićenih morskih područja kao rješenje za prilagodbu klimatskim promjenama

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V. ZNANSTVENO-STRUČNI SKUP

Klimatske promjene i očuvanje morskih ekosustava Jadranskog mora s međunarodnim sudjelovanjem



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Interreg
Euro-MED



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the European Union

<https://mpa4change.interreg-euro-med.eu/>

PROTECTING, RESTORING AND VALORISING NATURAL HERITAGE



Total: 999,436 €
Interreg Funds: 799,549 €

Photo by aerial-drone - stock.adobe.com

ENHANCING MARINE PROTECTED AREAS AS
NATURE BASED SOLUTIONS FOR ADAPTATION TO CLIMATE CHANGE:
from local actions to Mediterranean basin strategy



Partnership

- Spanish Research Council, Spain (CSIC/ICM).
- University of Vigo, Spain.
- National Research Council (CNR), Italy.
- DAN Europe Foundation, Malta.
- EUROPARC Federation, Spain.
- Consortium of management of Portofino Marine Protected Area, Italy.
- Public Institution Brijuni National Park, Croatia.
- University of Algarve, Portugal.
- AP Marine Environmental Consultancy Ltd, Cyprus.



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3 Areas of work

1. **Toolkits:** Promote and fine-tune consolidated tools on

- Climate Change Monitoring Tools and Protocols
- Citizen science protocols and Apps
- Vulnerability assessment Tool
- Adaptation and Mitigation Plan to Climate Change
- Participatory Approach Guidelines
- Communication Strategy

2. **Policy:** Support the Policy dialogue and coordinate with EU, Mediterranean and Global ICZM/MSP Strategies

3. **Roster of experts:** Support and fully operationalise the implementation



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Climate Change Monitoring Protocols



E-learning platforms



PROTOCOLS:

Garrabou J., Bensoussan N., Di Franco A., Boada J., Cebrian E., Santamaria J., Guala I., Grech D., Cerrano C., Pulido T., Jou M., Marambio M. & Azzurro E., 2022. Monitoring Climate-related responses in Mediterranean Marine Protected Areas and beyond: ELEVEN STANDARD PROTOCOLS. 74 pp. Edited by: Institute of Marine Sciences, Spanish Research Council ICM-CSIC, Passeig Marítim de la Barceloneta 37-49, 08003 Barcelona, Spain.

DOI: <https://doi.org/10.20350/digitalCSIC/14672>



Climate Change Monitoring Tools and Protocols



Webinar presentation

Designed universal Excel Sheets

ID	date	site	cell (code)	lat. N	long. E	replicate	depth	50x50cm	n. shoot/m2	meadow type	substrate	flowers/fruits	alive P. nobilis	dead P. nobilis	other seagrass	C. toxfolia	C. cylindraceo	notes	operators
1	13/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.167'	8° 23.711'	1	14.3	64	256	continue meadow	matte								pino & gino
2	13/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.167'	8° 23.711'	2	14			continue meadow									dino & nino
3	13/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.167'	8° 23.711'	3	14.1			continue meadow	sand/matte								dino & nino
4	15/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.187'	8° 23.734'	1	14.2			continue meadow	rocks								tino & rino
5	15/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.187'	8° 23.734'	2	14.2			continue meadow									dino & nino
6	15/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.187'	8° 23.734'	3	14.1			discontinue meadow									tino & rino
7	13/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.196'	8° 23.745'	1	14.8			continue meadow	matte								pino & gino
8	13/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.196'	8° 23.745'	2	15			continue meadow									pino & gino
9	13/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.196'	8° 23.745'	3	15			continue meadow									pino & gino
10	13/07/2018	funtana meiga	SI-MS-FM-15A	39° 53.196'	8° 23.745'	4	15			continue meadow									pino & gino
11	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.561'	8° 27.098'	1	15.1			continue meadow	matte			2					muclilage
12	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.561'	8° 27.098'	2	15			continue meadow									muclilage
13	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.561'	8° 27.098'	3	14.9			continue meadow									muclilage
14	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.589'	8° 27.065'	1	15			continue meadow	sand			4	Cymodocea nodosa				muclilage
15	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.589'	8° 27.065'	2	15.2			continue meadow									muclilage
16	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.589'	8° 27.065'	3	15.2			continue meadow									muclilage
17	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.598'	8° 27.087'	1	15.1			continue meadow	sand			1	Cymodocea nodosa				concrete blocks
18	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.598'	8° 27.087'	2	15			continue meadow									concrete blocks
19	16/07/2018	golfo-s. marco	SI-MS-GO-15A	39° 51.598'	8° 27.087'	3	15			continue meadow									concrete blocks

64
number of shoots per quadrats (50 x 50 cm)

64 x 4 = 256
number of shoots m²

TAVOLARA LAB
Monitoring of *Posidonia oceanica*

Date _____ Cell n. _____
Operators _____ GPS _____ N _____ E _____

Quadrats	1	2	3	4	5	6	7	8	9
Depth (at the base of shoots)									
Number of shoots per quadrat (50x50 cm)									
Flora									
Species									
Strata									
Strata									

Continue meadow [] Discontinue small channels [] Discontinue large channels []

Posidonia nobilis [] *Caulerpa cylindracea* [] *Caulerpa toxfolia* []

0-1: Absent
2-5: An isolated specimen
6-10: Some scattered
11-50: A dense area
51-100: Many dense areas

A plastic board with pencil (possibly pre-organised in data fields)

Additional information (around the sampling station)

Flowers / fruits	
Status of <i>Posidonia nobilis</i> (dead or alive)	
Other seagrasses (e.g. <i>Cymodocea nodosa</i>)	
Other alien species (e.g. <i>Asparagopsis taxiformis</i> , <i>A. armata</i>)	
Mucilaginous aggregates	
Presence of potential pressures (e.g. mooring systems, concrete blocks, anchors, chains, ropes, trash)	
Presence of clear signs of damage of the meadow (e.g. detached shoots, detached plates of meris, scars due to trawling anchoring)	
Notes	



Designed diving slates

Requested SKILLS

Diving capability
Accuracy
Knowing how to count, at least, up to 300!!
no specialized scientists but training and intercalibration process are needed

WHO might be interested

MPA managers
Marine conservation and environment administrations
Scientists and practitioners

Highlighted Requested skills and audience

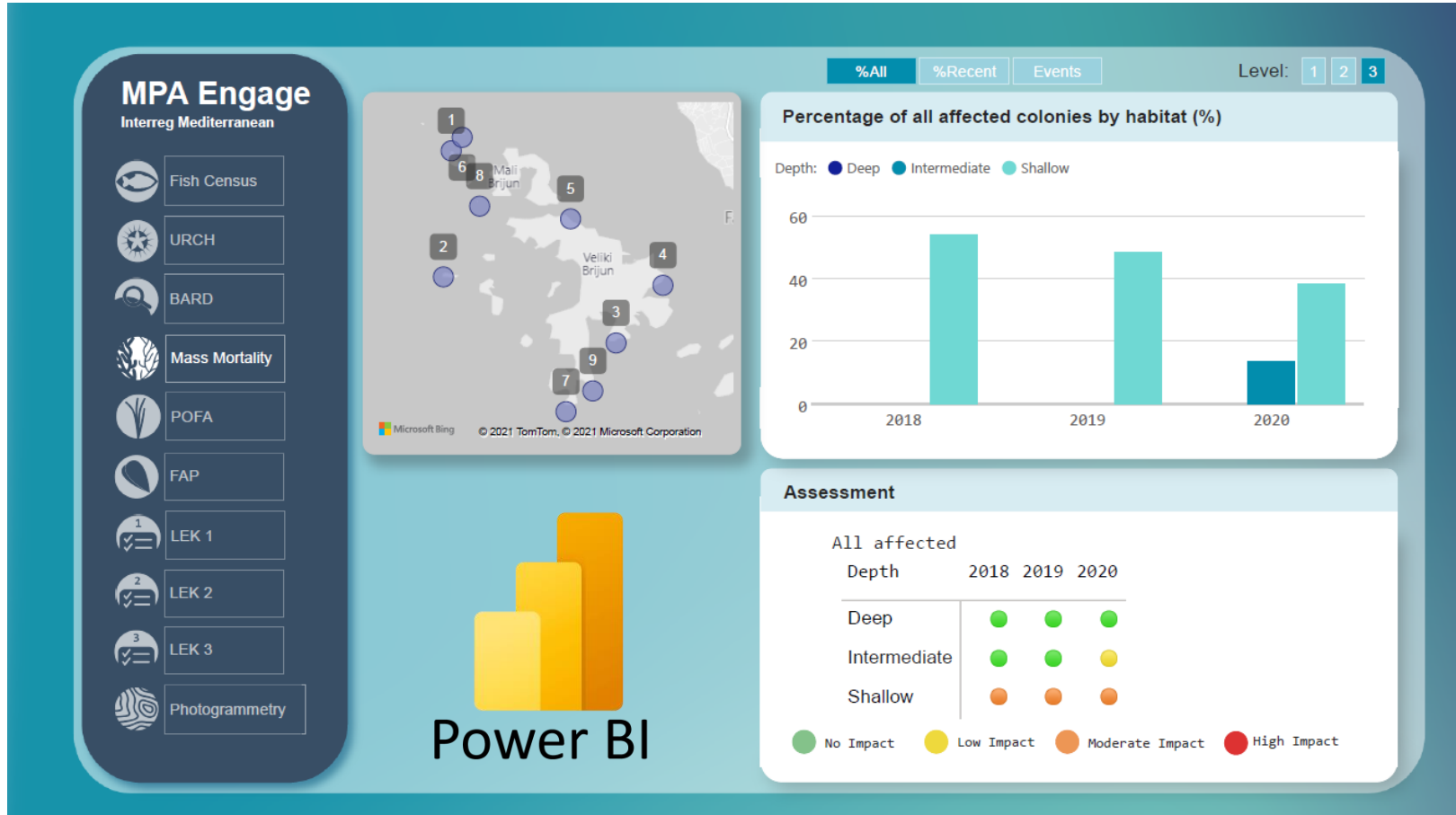


Climate Change Monitoring Tools

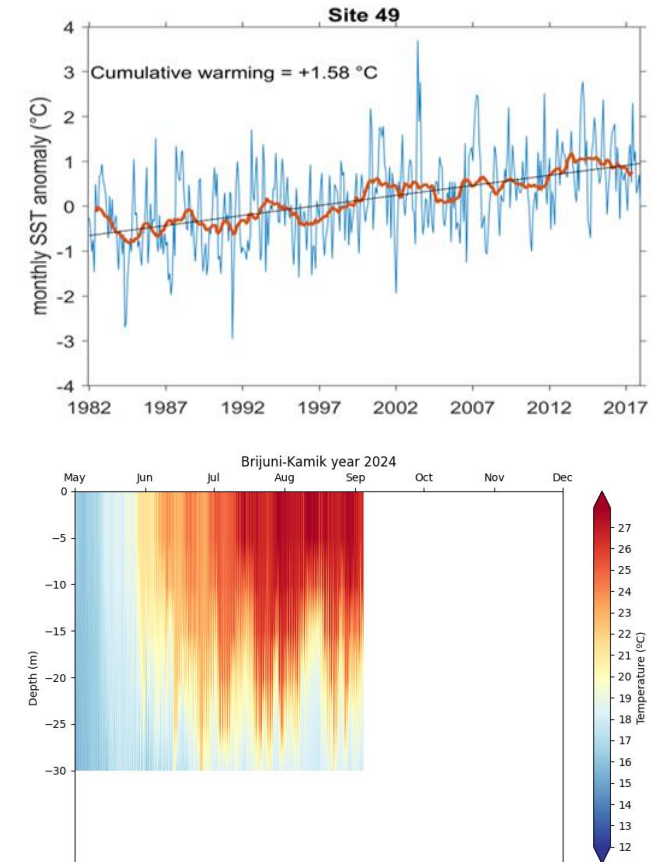


REAL TIME GRAPHS AND FIGURES
READY TO USE BY AN MPA MANAGER

1. Power BI softver designed to read the predefined Excel Sheets



2. Existing platforms for the database



Climate Change Monitoring Tools and Protocols



PERFORMED AND IMPLEMENTED IN BRIJUNI NATIONAL PARK

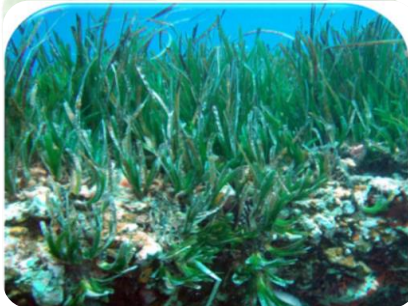


Photo Credit: Petar Kružić, Silvia Kipson, Sunce Association, Andrea Blašković, Pileus, okoljske rešitve, Iztok Miklavčič s.p.



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Citizen science protocols and Apps

Citizen Science

3.1. Citizen Science Protocols



3.2. Joint Citizen Science Plan

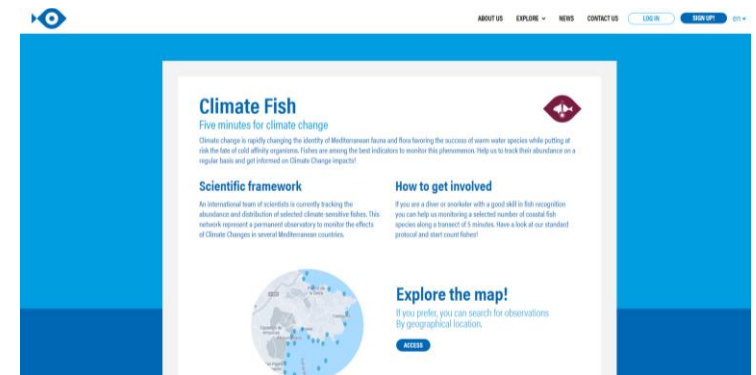
3.3. The "BRO" Program

3.4. e-learning materials



Citizen Science platforms:

- CLIMATE FISH
- OBSERVADORES DEL MAR



Visual census of fish



Divers



Sea urchins



Biology student association



Visual census of fish



Biology Students



Photo Credit: Andrea Blašković



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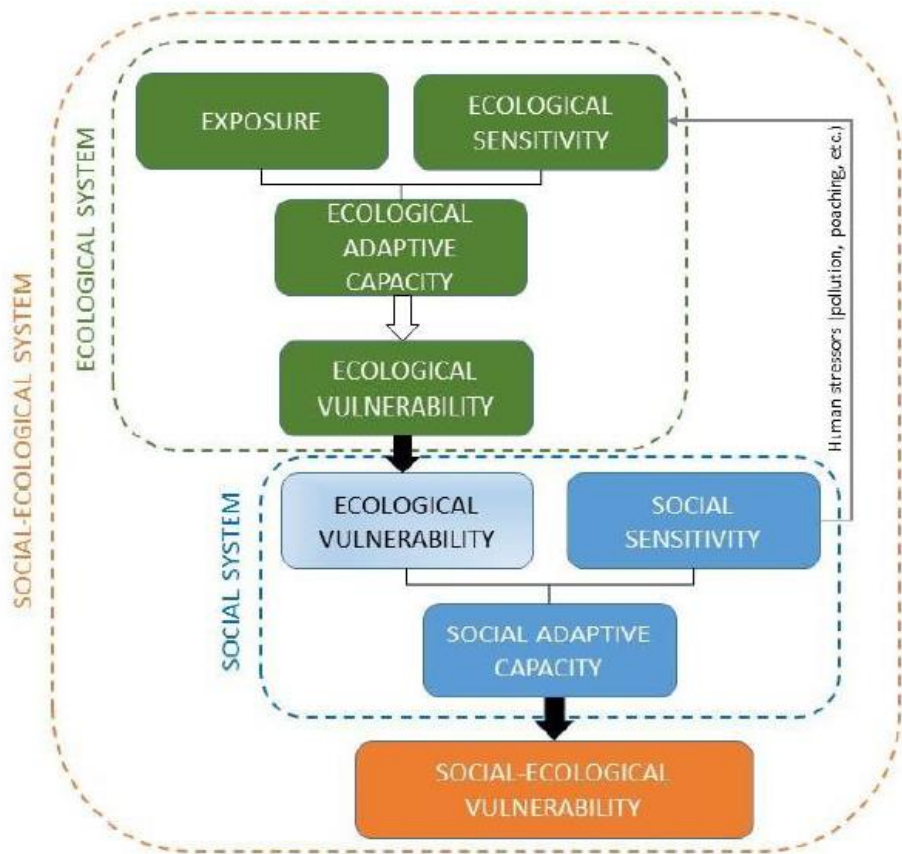


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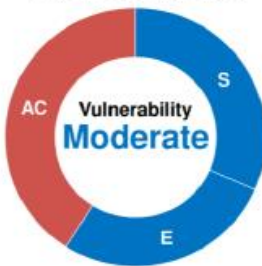
Vulnerability assessment Tool

Metodology:



Results for Brijuni National Park:

Brijuni RCP2.6 2050



Brijuni RCP4.5 2050



Brijuni RCP8.5 2050



Brijuni RCP2.6 2100



Brijuni RCP4.5 2100



Brijuni RCP8.5 2100



Category

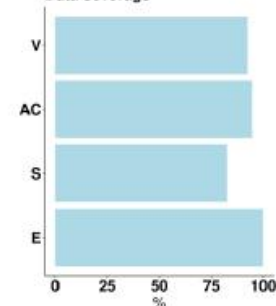
- Low (percentile < 20)
- Moderate (percentile 20 - 40)
- High (percentile 40 - 60)
- Very high (percentile 60 - 80)
- Extreme (percentile > 80)

E=Exposure

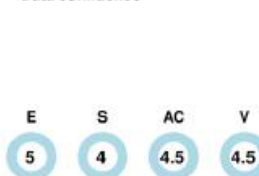
S= Ecological Sensitivity

AC= Ecological Adaptive Capacity

Data coverage



Data confidence



E-learning materials:



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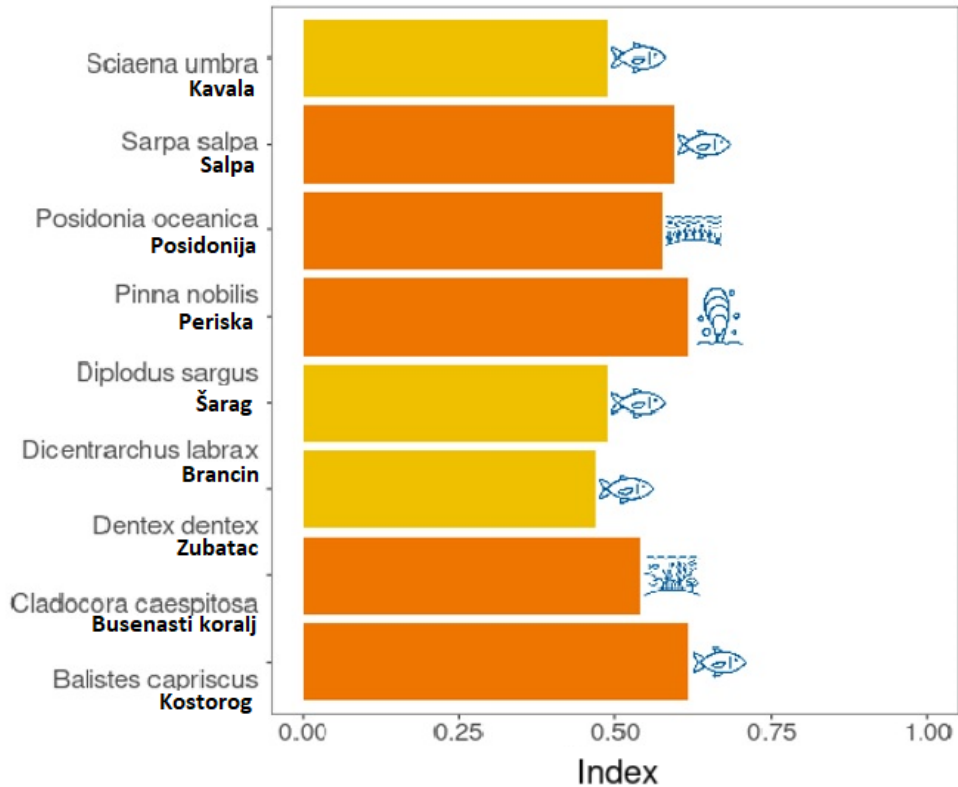


Vulnerability assessment Tool

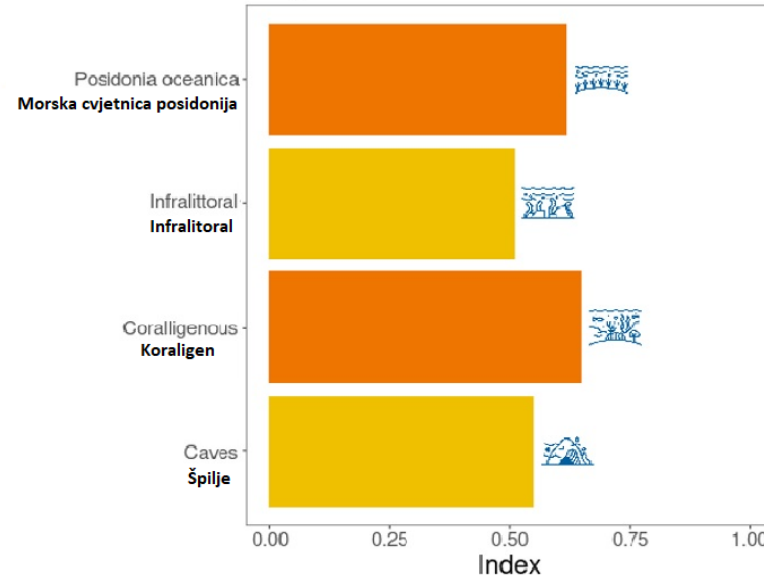
ONLINE TOOL: <https://futureoceanslab.org/vulnerability-tool/>

Results for Brijuni National Park:

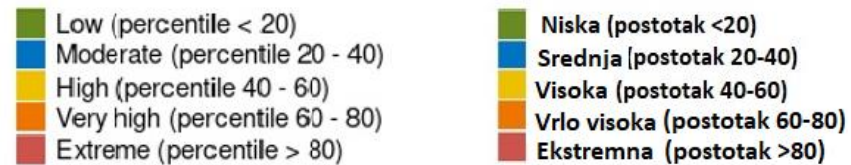
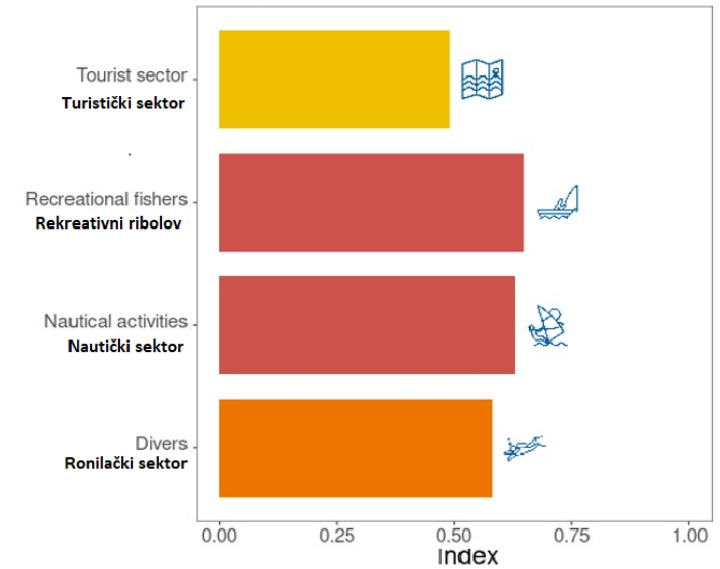
Brijuni RCP4.5 2100



Brijuni RCP4.5 2100



Brijuni RCP4.5 2100



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Participatory Approach and Adaptation and Mitigation Plan to Climate Change



Adaptation & Mitigation

4.1. Guidelines to Develop Climate Change Adaptation & Mitigation Plan

4.2. Joint Plan for Climate Change Adaptation

4.3. Reports from the 7 pilot MPAs



4.4. e-learning materials



E-learning materials:

Participatory Approach

5.1. Guidelines for Applying a Quintuple Helix Participatory Approach

5.2. Synthesis on Deploying the Quintuple Helix Participatory Approach

5.3. Reports from the 7 pilot MPAs

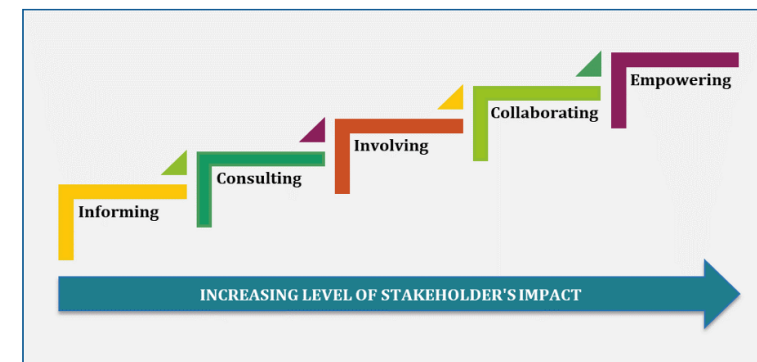


Figure 2-1. The participation ladder: the different "steps" in the ladder describe the level of involvement of participants (Roniotes et al., 2015).



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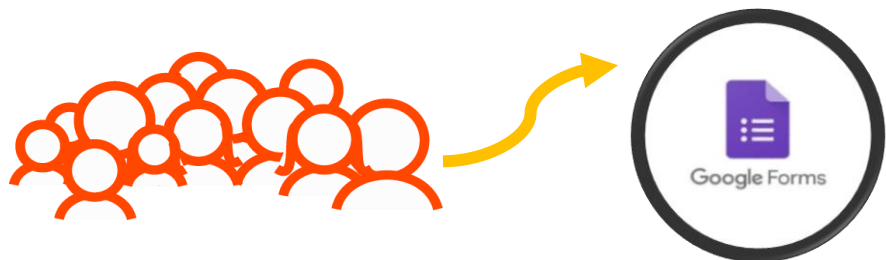
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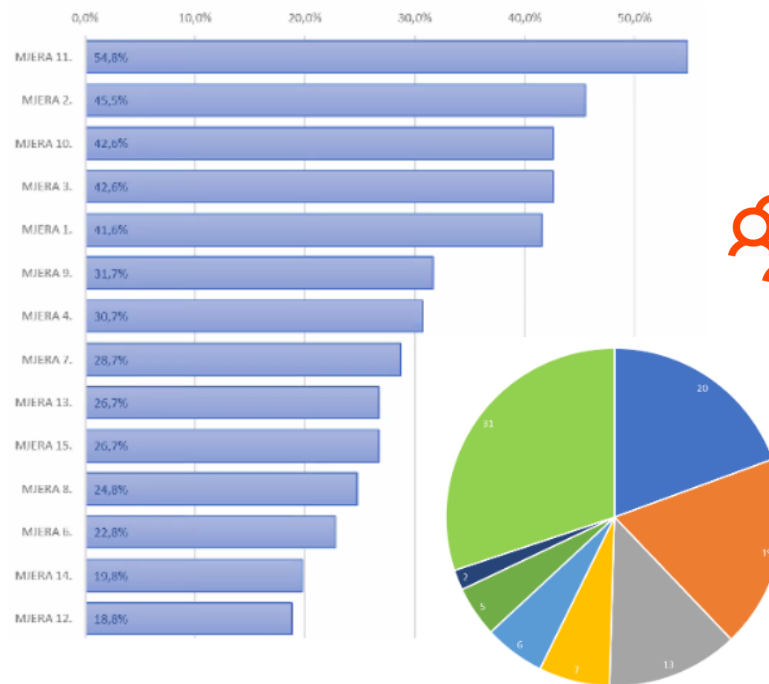
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Participatory Approach and Adaptation and Mitigation Plan in Brijuni National Park

Identification of relevant Climate Change measures:



Voting process:

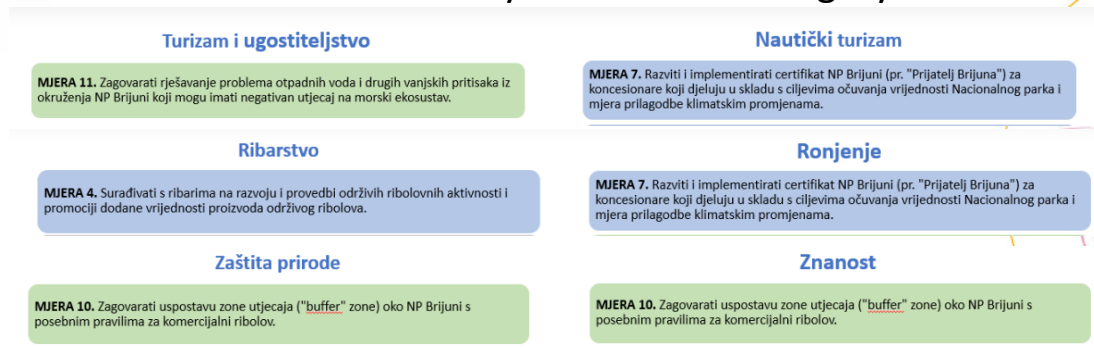


Stakeholders involved:



- Turizam i ugostiteljstvo
- Zaštita prirode
- Znanost
- Ribarstvo
- Ronjenje
- Nautički turizam
- Lokalna i regionalna samouprava
- Drugo

Most voted measure by stakeholder category:



Communication Strategy



[6.3. Boiling Mediterranean: Marine Protected Areas facing climate change - illustrated facts and ideas](#)

[6.4. Webinar Series](#)

[6.5. Cartoon on Climate Change](#)

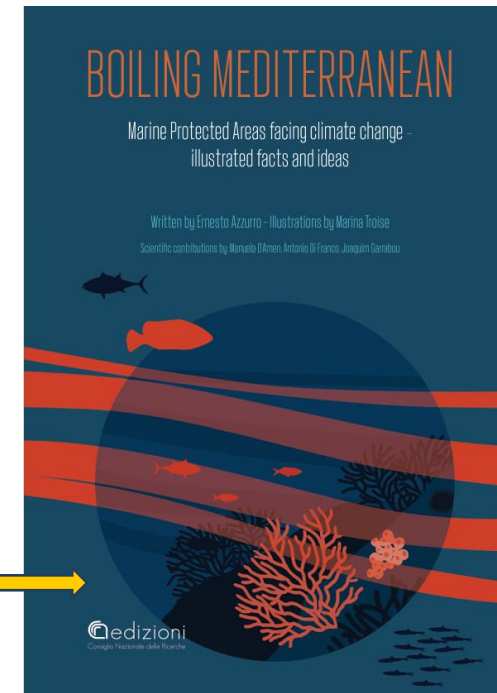
[6.6. MED Together: 60-second videos to re-connect with the sea](#)

[6.7. Deliverables Database](#)

E-learning materials:



Cartoon on Climate Change:



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Policy

Aim

1. **Adaptation to Climate Change** is **included** in MPAs **Management Plans** by 2030.
2. **Adaptation to Climate Change** is **incorporated** into **existing and future marine policies** across the Mediterranean region.

“100 MPAs x 30 Challenge”

By **2030**, **100 Mediterranean MPAs** have implemented **Climate Change adaptation (and Restoration) plans**.

Roster of experts



Created in order to keep capitalizing the project even after the closure but mainly to help MPAs in the implementation of the tools.



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Thank you for your attention.

<https://mpa4change.interreg-euro-med.eu/>



BRIJUNI
Nacionalni park
National Park



AREA MARINA PROTETTA

portofino

CIM
Centro de Investigación Mariña
Universida de Vigo



CNR
IRBIM
ISTITUTO PER LE
RISORSE BIOLOGICHE
E LE BIOTECNOLOGIE
MARINE



EUROPARC
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AP MARINE
Environmental Consultancy Ltd



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