



MONTENEGRO

MINISTRY OF SUSTAINABLE DEVELOPMENT  
AND TOURISM

# **Towards a sustainable and integrated management of marine and coastal environment in Montenegro**

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**2nd stakeholders' workshop of the project 'Harmonization and Networking for contaminant assessment in the Ionian and Adriatic Seas' - HarmoNIA**

**7 February 2019**

**Ms. Ivana Stojanovic, Ministry of Sustainable Development and Tourism**

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# Relevant strategic and action documents - MONTENEGRO

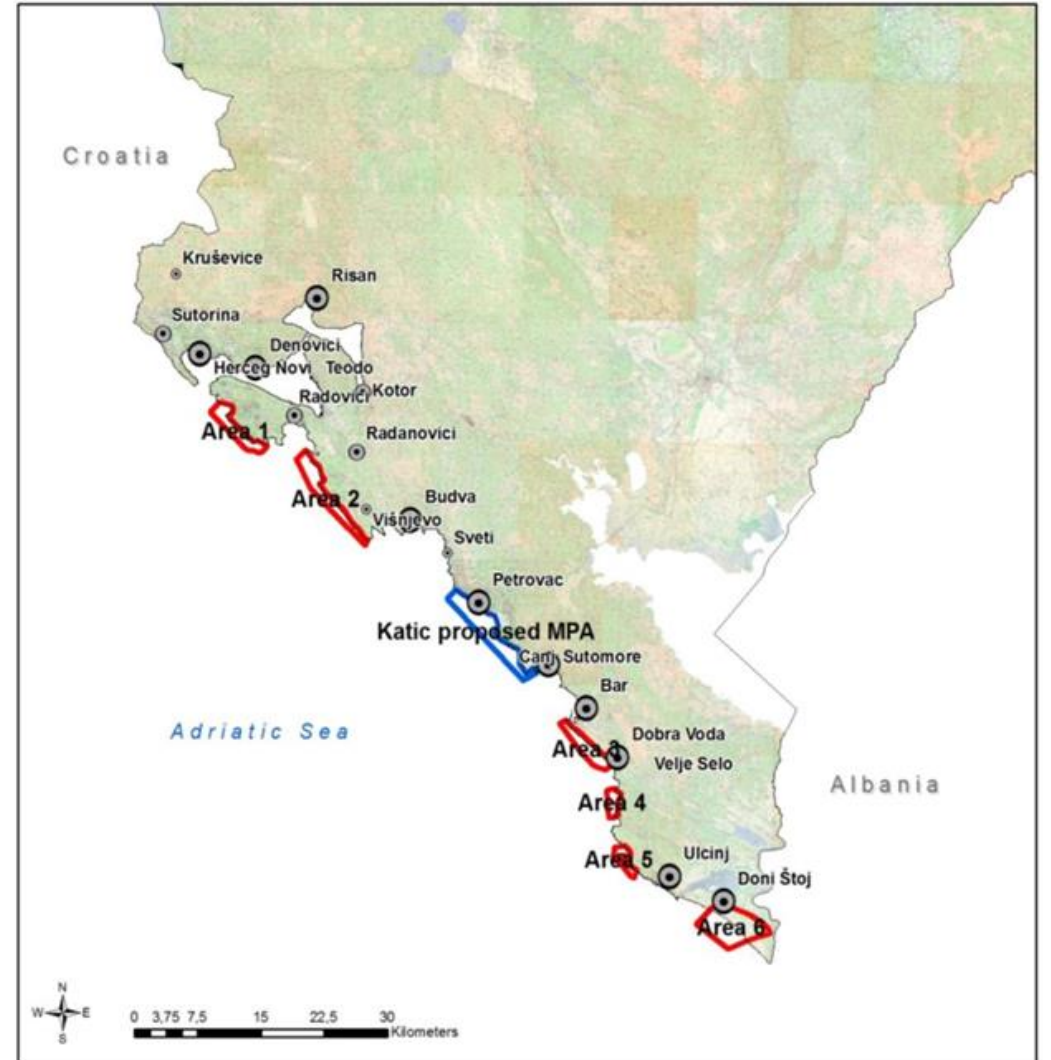
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- National Strategy for Sustainable Development until 2030 (2016)
- National Strategy for Integrated Coastal Zone Management until 2030 (2015)
- NEAS with AP 2016-2020
- Also:  
Negotiation Position for the Chapter 27

International instruments: Barcelona Convention and its Protocols, CBD Convention and Aichi Goals

- LBS and ICZM Protocol
- IMAP/EcAp

# CAMP Montenegro (2011-2014)



# National Monitoring Programme of Marine Ecosystem

2014-2016

## From MEDPOL IV towards IMAP

- In period 2008-2011 National Monitoring Programme was built on MEDPOL IV,
- After that it was gradually improved towards harmonization with IMAP and MSFD requirements:  
increased number of monitoring stations: 12 for eutrophication, 10 for contaminants in sediment and 7 for contaminants in biota

2017-2018

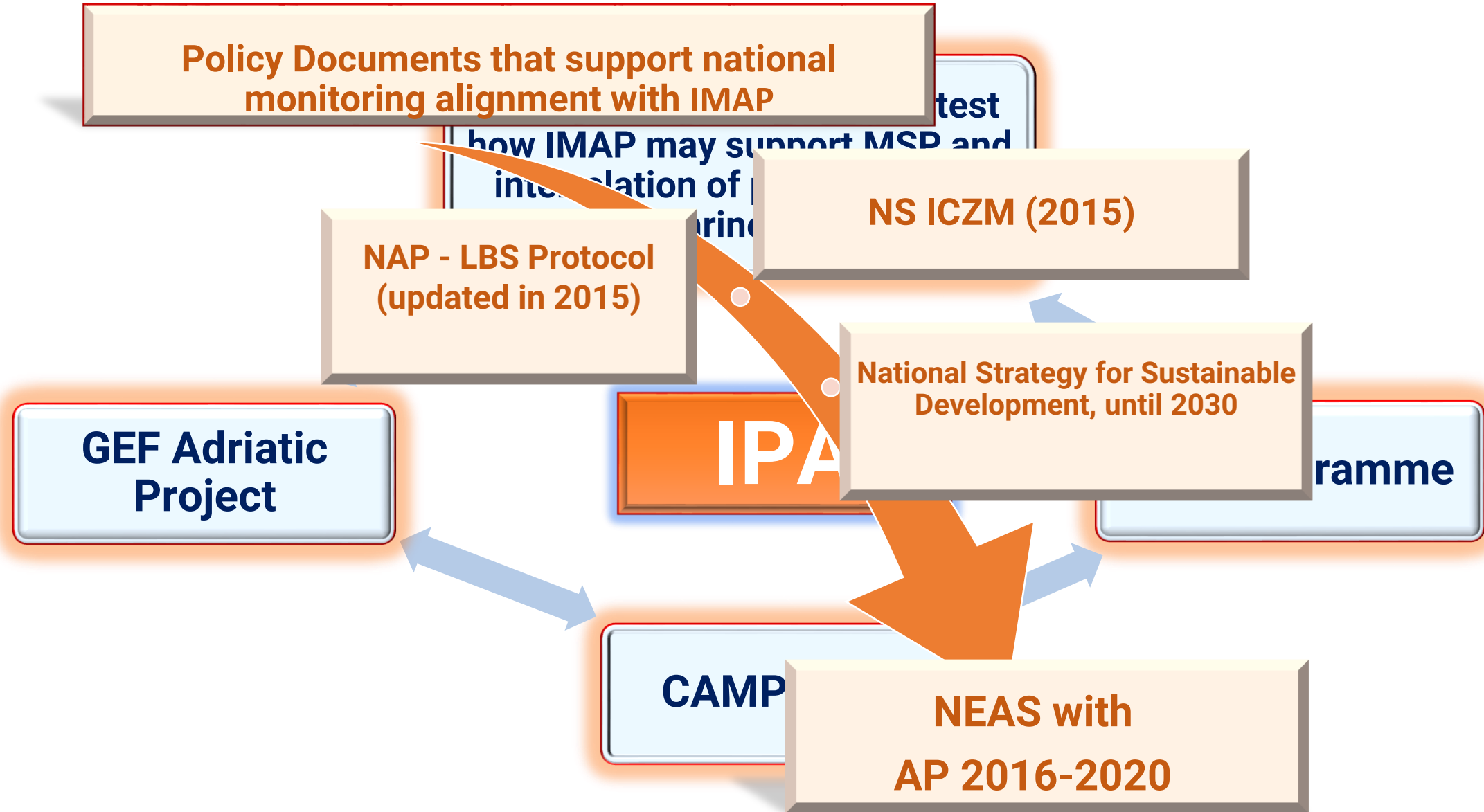
## Further progress towards harmonization with IMAP and MSFD requirements:

- Increased number of monitoring stations and their locations: 12 monitoring stations for contaminants in sediment, new areas determined for monitoring of biodiversity parameters;
- New parameters related to habitat distributional range (extent and distribution), condition of the habitat's typical species and communities, plankton

2019-2021

- Alignment with IMAP will be completed through
- GEF Adriatic Project;
- Harmonization with MSFD will be provided through IPA pre-accession assistance to Montenegro

# Important regionally and sub-regionally available instruments to support transition towards IMA



# Initial phase towards harmonization with IMAP and MSFD

## EcAp Objective/MSFD descriptor: E01/D1 Biodiversity

Monitoring areas	Assessment methodology and parameters	IMAP Indicators/ MSFD Criteria	Monitoring frequency	NOTE
Bay of Tivat-Herceg Novi (Zelenika and Žanjice)	<p><b>Distribution:</b></p> <p>Posidonia habitats Corals Photophilic algae Pelagic habitats Caves</p>	Habitat distributional range (extent and distribution)	seasonal	Continual monitoring was not in place before
<p><b>Makroalgae:</b> Tivatsko- Hercegovski Bay(Zelenika and Žanjice), Cape Arza, Mamula Bay to Cape Mačka, Katič (wider area), Cape Komina to Cape Stari Ulcinj</p> <p><b>Posidonia:</b> Tivatsko- Hercegovski Bay (Zelenika and Žanjice), Lustica (Mamula Bay to Cape Mačka), Katič (wider area), Cape Komina to Cape Stari Ulcinj</p> <p><b>Corals:</b> To be determined relevant locations</p>	<p><b>Species monitored in selected habitats</b></p> <p><b>Makroalgae:</b> parameters used in the CARLIT method</p> <p><b>Posidonia:</b> Parameters used in POMI9 and modified POMI method</p> <p><b>Coral habitats:</b> Species composition and abundance</p>	Condition of the habitat's typical species and communities	seasonal	Continual monitoring was not in place before
5 transects: Dobrota, Bay of Tivat-Herceg Novi , Luštica (Mamula Bay to Cape Mačka), Katič (wider area), Cape Komina do rta Stari Ulcinj	<p><b>Plankton:</b></p> <p>Relative abundance and/or biomass of <b>phytoplanktonic and zooplanktonic communities</b></p> <p>Composition <b>phytoplanktonic and zooplanktonic communities</b></p> <p>Biodiversity indexes (species abundance Shannon - Winer index, Pielou (J) index, Margalef index (d), Menhinick (D))</p>	Habitat condition plankton	4 times per year - seasonal (February, April, July, October)	Continual monitoring was not in place before

# Initial phase towards harmonization with IMAP and MSFD

## EcAp Objective/MSFD descriptor: E02/D2 Non-indigenous species

Monitoring areas	Assessment methods and Parameters	IMAP Indicators /MSFD Criteria	NOTE
<p>Species are being investigated/analyzed in the areas already identified of relevance for monitoring (within existing monitoring programme and related projects), relying also on risk based approach.</p> <p><b>Monitoring areas:</b> shellfish and fish farms, sports, marinas, shipyards.</p> <p><b>Species:</b> Caulerpa racemosa, Wormersleyella setacea et al identified during the investigation process.</p>	<p>Depending on the target species and location.</p> <p><b>Taxonomic identification in affected areaa, dynamics and intake and spreading mechanism, will be ensured at least.</b></p>	<p><b>Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species,</b> particularly invasive, non-indigenous species, notably in areas in risk (in relation to the main vectors and pathways of spreading of such species)</p>	<p><b>Continual monitoring was not in place before</b></p>

# Initial phase towards harmonization with IMAP and MSFD

## EcAp Objective/MSFD descriptor: E05/D5 Eutrophication

Areas in which monitoring stations are defined	Parameters	MSFD Criteria /EcAp Indicators	Frequency of sampling	NOTE
<ul style="list-style-type: none"> <li>Ulcinj</li> <li>Bar</li> <li>Budva</li> <li>Kotor</li> <li>Dobrota IBM</li> <li>Sveta Nedelja</li> <li>Mamula</li> <li>Herceg Novi</li> <li>Igalo</li> <li>Tivat</li> <li>Risan</li> <li>Bojana</li> </ul>	Water temperature, pH, transparency, salinity, orthophosphate, total phosphorus, total nitrogen, silicate, soluble oxygen, oxygen saturation, nitrates, nitrites, ammonia, chlorophyll-a, TRIX index, total coliforms bacteria, total fecal bacteria, enterococci and E. coli, qualitative and quantitative analysis of phytoplankton and zooplankton groups and species in water column	<p><b>Concentration of key nutrients in water column;</b></p> <p><b>Chlorophyll-a concentration in water column;</b></p> <p>Water transparency;</p> <p>Dissolved oxygen, i.e. changes due to increased organic matter decomposition and size of the area; TRIX index</p>	Once per month during year	<b>Included in present monitoring</b>
<ul style="list-style-type: none"> <li>Ulcinj</li> <li>Bar</li> <li>Sutomore</li> <li>Petrovac</li> <li>Sveti Stefan</li> <li>Budva</li> <li>Herceg Novi</li> <li>Tivat</li> <li>Risan</li> <li>Kotor</li> </ul>	Water temperature, pH, electrical conductivity, dissolved substances, O <sub>2</sub> , % of saturation, BPK <sub>5</sub> , NO <sub>2</sub> , NO <sub>3</sub> , NH <sub>4</sub> , o-PO <sub>4</sub> , MPAS, phenols, microbiology (tot. E. Coli, tot. fecal bacteria, aerobic mez. bac)	Relation with monitoring direct nutrient enrichment from the main sewage collectors	Twice per year	<b>Included in present monitoring</b>



# Initial phase towards harmonization with IMAP and MSFD

## EcAp Objective/MSFD descriptor: E09/D8 Contaminants

Monitoring Stations	Parameters	Frequency of sampling	MSFD Criteria /EcAp Indicators	NOTE
Port of Bar	<b>S</b> <b>e</b> <b>d</b> <b>i</b> <b>m</b> <b>e</b> <b>n</b> <b>t</b> <ul style="list-style-type: none"> <li>Heavy Metals (Fe, Mn, Cd, Hg,Cu, Ni, Pb, Zn, Cr, As, Sn - TBT i TM), POPs (Aldrin, dieldrin, endrin, DDD, DDE, Heptahlor, HCB, Toxafen, Mirex, PCBs, dioksini i furani), Lindan (<math>\alpha,\beta,\gamma</math>-HCH), Aldrin, Endrin, Hepatochlor, Endosulfan, organochlorine pesticides, PAHs, and chlorobenzene and chlorphenols, mineral oils of petroleum origin</li> <li>+sea water quality</li> </ul>	Twice per year: August and October	Concentration of contaminants in sea water, sediment and biota	<b>Monitored</b>
Port of Budva				
Port of Herceg Novi				
Shipyard Bijela				
Port of Tivat				
Port of Risan				
Port of Kotor				
Luštica				
Dobra Luka				
Bay of Bar				
Ada Bojana				
Former Overhaul Institute in Tivat	<b>B</b> <b>i</b> <b>o</b> <b>t</b> <b>a</b> <p><b>Shellfish:</b> ecotoxicological test of pesticides in seashells (DDD, DDE, DDT, Lindan (gama-HCH) i Aroclor), ecotoxicological test on heavy metals in seashells (mercury, lead, tin, cadmium, copper, lead and zinc)</p> <p><b>Fish:</b></p> <ul style="list-style-type: none"> <li>ecotoxicological test of pesticides in fish (DDD, DDE, DDT, Lindan (gama-HCH) i Aroclor), ecotoxicological test on heavy metals in fish (mercury, lead, tin, cadmium, copper, lead and zink)</li> <li>+sea water quality</li> </ul>			<b>Monitored</b>
Port of Herceg Novi				
ShipyardBijela				
Port of Risan				
Port of Kotor				
Port of Tivat				
Port of Bar				
Ada Bojana				

# Initial phase towards harmonization with IMAP and MSFD

## EcAp Objective/MSFD descriptor: E09/D8 Contaminants

Sampling locations	Parameters	Frequency of sampling	Indicators	NOTE
Dobrota	<b>Sensitive areas</b> <ul style="list-style-type: none"> <li>Toxicology as previously listed</li> <li>Water temperature, pH, transparency, salinity, orthophosphate, total phosphorus, total nitrogen, silicate, soluble oxygen, oxygen saturation, nitrates, nitrites, ammonia, chlorophyll-a, total coliforms bacteria, total fecal bacteria, enterococci and E. coli, qualitative and quantitative analysis of phytoplankton and zooplankton groups and species, +sediment</li> </ul>	Once per month during year	Levels of pollution effects on the ecosystem components (seawater, sediment and biota), with regards to the selected biological processes and taxonomic groups where a cause/effect relationship has been established	Included in present monitoring
Orahovac				
Sveta Nedjelja		<b>S e n d i m</b>		
Bijela Shipyard				
Luštica				
Dobra Luka				
Bay of Bar				
Ada Bojana				
Former Overhaul Institute in Tivat	<b>HOT SPOTS:</b> <ul style="list-style-type: none"> <li>TM (Fe, Mn, Cd, Hg,Cu, Ni, Pb, Zn, Cr, As, Sn - TBT i TMT), POPs (Aldrin, dieldrin, endrin, DDD, DDE, Heptahlor, HCB, Toxafen, Mirex, PCBs, dioksini i furani), Lindan (<math>\alpha,\beta,\gamma</math>-HCH), Aldrin, Endrin, Hepatochlor, Endosulfan, organochlorine pesticides, PAHs, and chlorobenzene and chlorphenols, mineral oils of petroleum origin, + sea water quality</li> </ul>			

# Initial phase towards harmonization with IMAP and MSFD

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## PRICIPLES OF INTEGRATION

IMAP, through Decision IG.22/7\* lays down the principles for an integrated monitoring, which will, **for the first time**, monitor biodiversity and NIS, pollution and marine litter, coast and hidrography in an integrated manner.

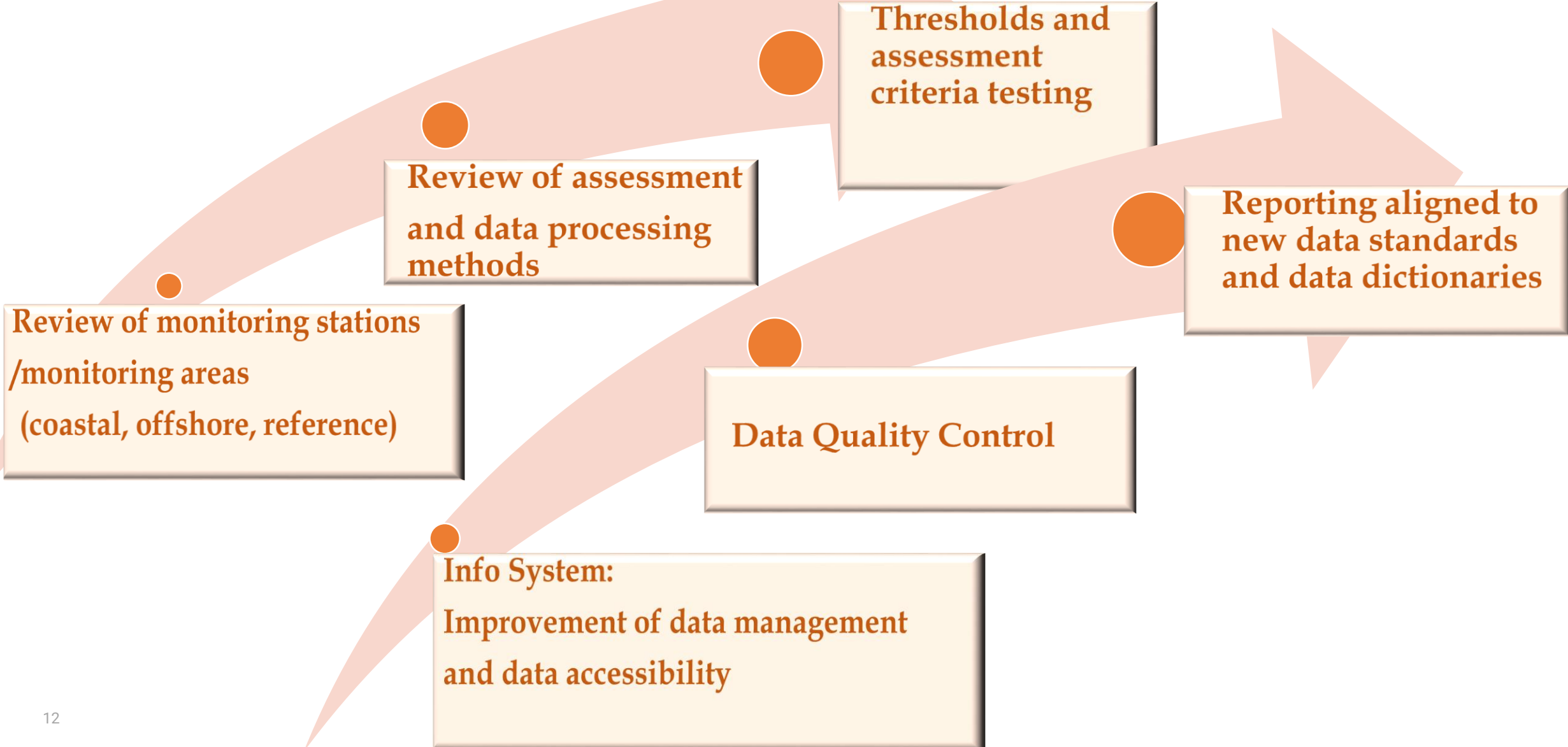
In order to rationalize the costs, an integration of all national monitoring programs should be accomplished.

Cooperation with other regional and international bodies will be key for the succesfull implementation of IMAP

### **The IMAP requirements focus on:**

- ✚ The prevailing anthropogenic pressures and their impacts
- ✚ Parameters that are indicative of the state of the environment
- ✚ The progress towards the good environmental status

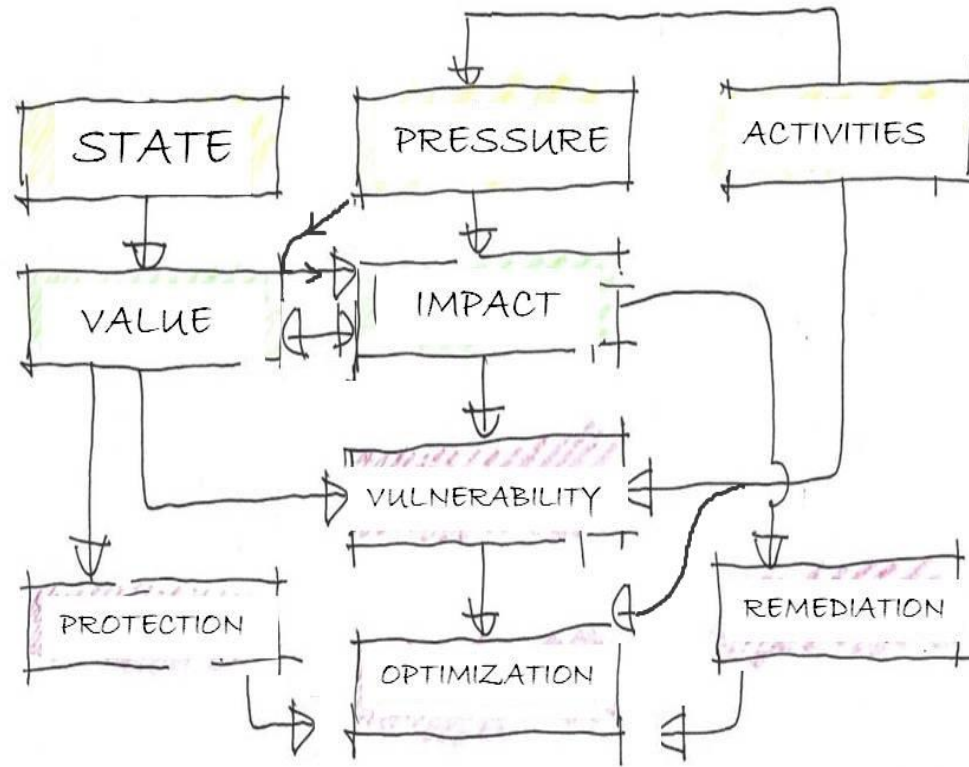
# GEF Adriatic, IPA : New elements towards harmonization with IMAP and MSFD



# Initial steps towards interrelation between state of env. and pressures through MSP based on IMAP- the basis Boka Kotorska Bay project

To design and test a methodology for:

- Assessment of **present state (value index)** of mar. ecosystem;
- Vulnerability assessment of different ecosystem elements to **pressures** – impact index (temporal distribution- present pressures and future pressures, and spatial distribution);
- Development of specific methodological matrices to support the above;
- Management measures: optimization, remediation;



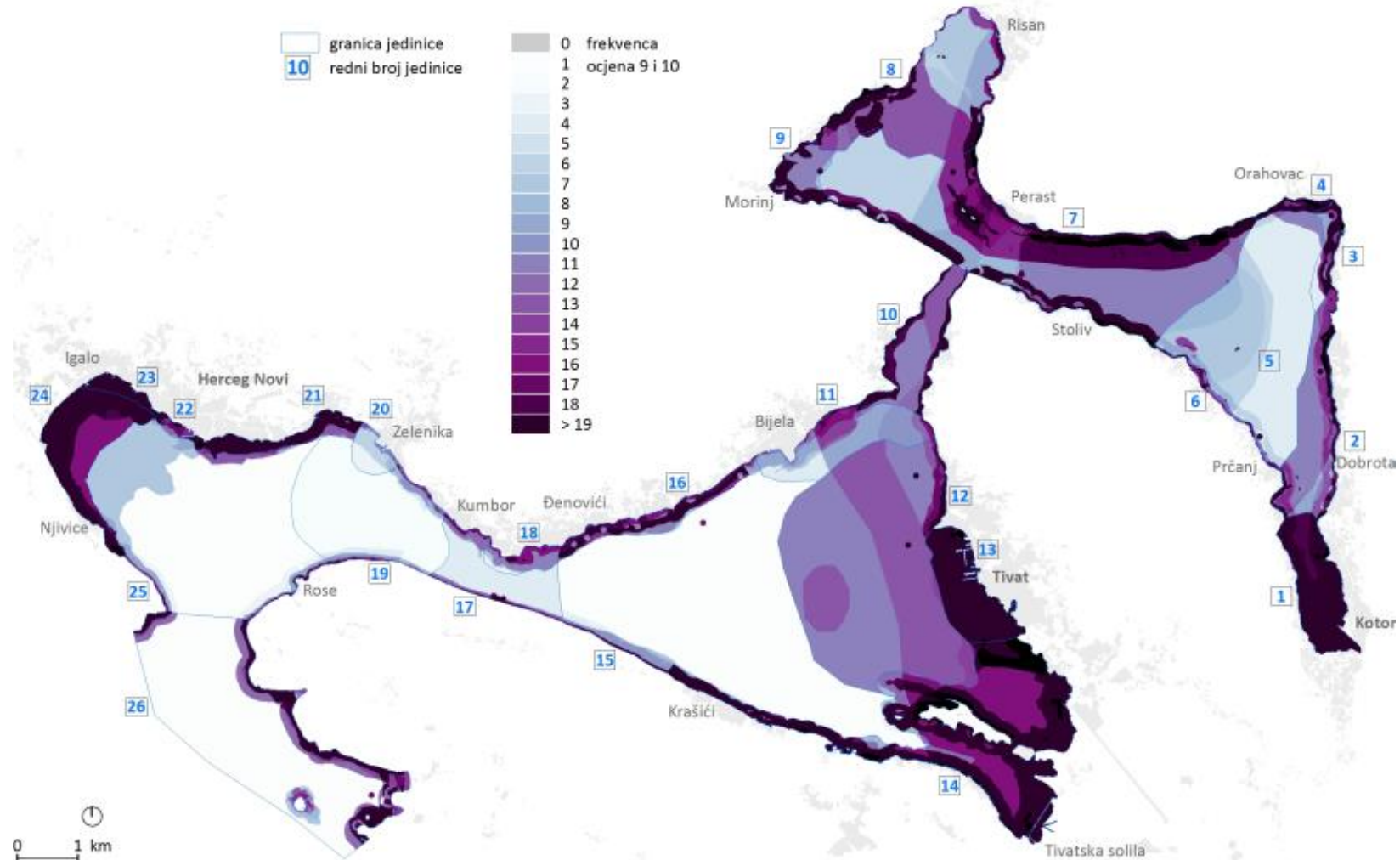
**PAP/RAC and Ministry of Sustainable Development and Tourism**

# The methodology



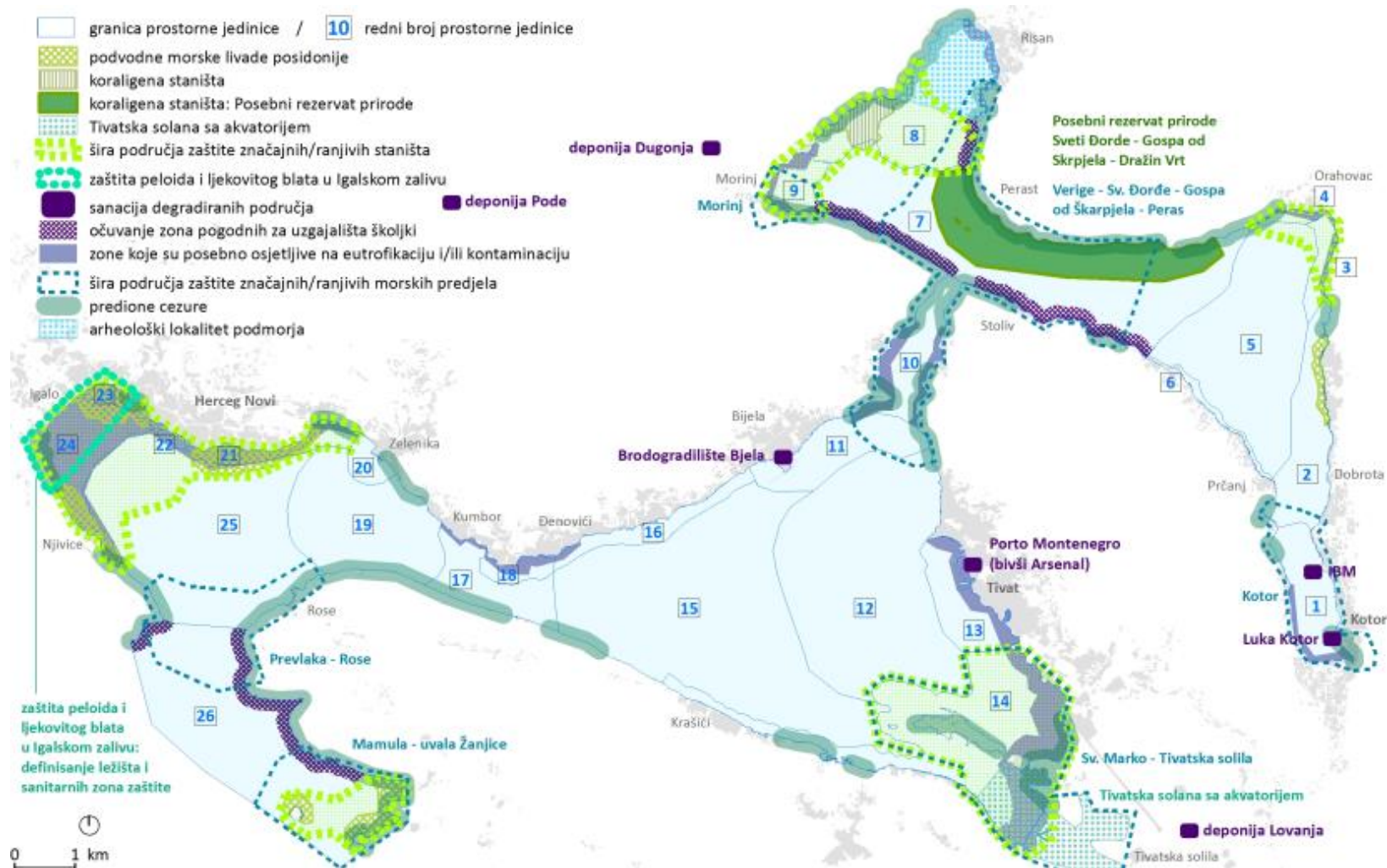
# 03 Assessing Vulnerability:

Integrated vulnerability of all environmental components and activities





# Planning (env.) recommendations





# Thank you



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