Mediterranean Action Plan Coordinating Unit
Barcelona Convention Secretariat

UN environment

Sub-Regional Workshop on Stakeholders' Involvement in the Context of Marine Spatial Planning Implementation

Split, Croatia, 27 – 28 November 2018

Land - sea interaction methodology analysis- Dubrovnik Neretva County

DNISP

SUPREME

Programme co-funded by the EUROPEAN UNION

Methodology steps:

- Spatial domain definition
- Interaction recognition localization and description
- Definition of correlated law framework
- Recognition of responsible institutions

LOCALISING INTERACTIONS (Incorporating elements from Steps 1-3)					
LOCATION OF LSI*	COASTAL/MARINE ZONE*	DEFINITION OF GEOGRAPHICAL AREA	THE SPACE OF INTERACTION*	ON ENVIRONMENT	ON SOCIETY
Inside the Plan area	Coastal land	whole county	Surface	soil erosion, flooding, floating garbage influx	air, land and sea traffic disturbance, electric power outages, drinking water pollution
Inside the Plan area	Coastal land	whole county	Surface		sewage system disruption, urban areas flooding

RELEVANT POLICIES (Incorporating step 5)			RESPONSIBLE INSTITUTIONS (Incorporating Step 6)
LEGISLATION	PLANS	OTHER	
Aquaculture law	PPDNI, PPUO/G, UPU	National Strategic Plan for Aquaculture Development 2014-2020	Administrative department of economy and maritime affairs DNI, Dubrovnik University Institute for Marine and Coastal Research

TYPE OF ACTIVITIES SEA TO LAND	LOCALISING INTERACTIONS (Incorporating elements from Steps 1-3)					
	LOCATION OF LSI*	COASTAL/MARINE ZONE*	DEFINITION OF GEOGRAPHICAL AREA	THE SPACE OF INTERACTION*	ON ENVIRONMENT	ON SOCIETY
Ofshore Aquaculture (mariculture)	Inside the Plan area	Internal waters	Bay of Mali Ston	Surface Water column Bottom	Nitrogen and phosphorus emissions, food leftovers, eutrophication, garbage, unpleasant smells, posidonia degradation	Job openings, local communities development, tradition, tourism offer enrichment
			Other aquaculture areas: Galičnjak (Mljet), Blace osinj (Slivno), Bezdija bay (Orebić)	Surface Water column Bottom	Nitrogen and phosphorus emissions, food leftovers, eutrophication, garbage, unpleasant smells, posidonia degradation	Job openings, local communities development, tradition, tourism offer enrichment
Fishing	Inside the Plan area	Inland waters Internal waters Territorial sea	Outer fishing sea - fishing zone D, and part C Inland fishing sea - part of the fishing zone G	Surface Water column Bottom	Impact on biodiversity and benthos habitats, endangered fish habitats, ghost nets, overfishing	Job openings, tradition, tourism offer enrichment

Spatial domain

Geographically, the scope of analysis is directly related to the planning domain. Hence, regional planning level of Dubrovnik-Neretva county area was chosen.

Dubrovnik-Neretva County

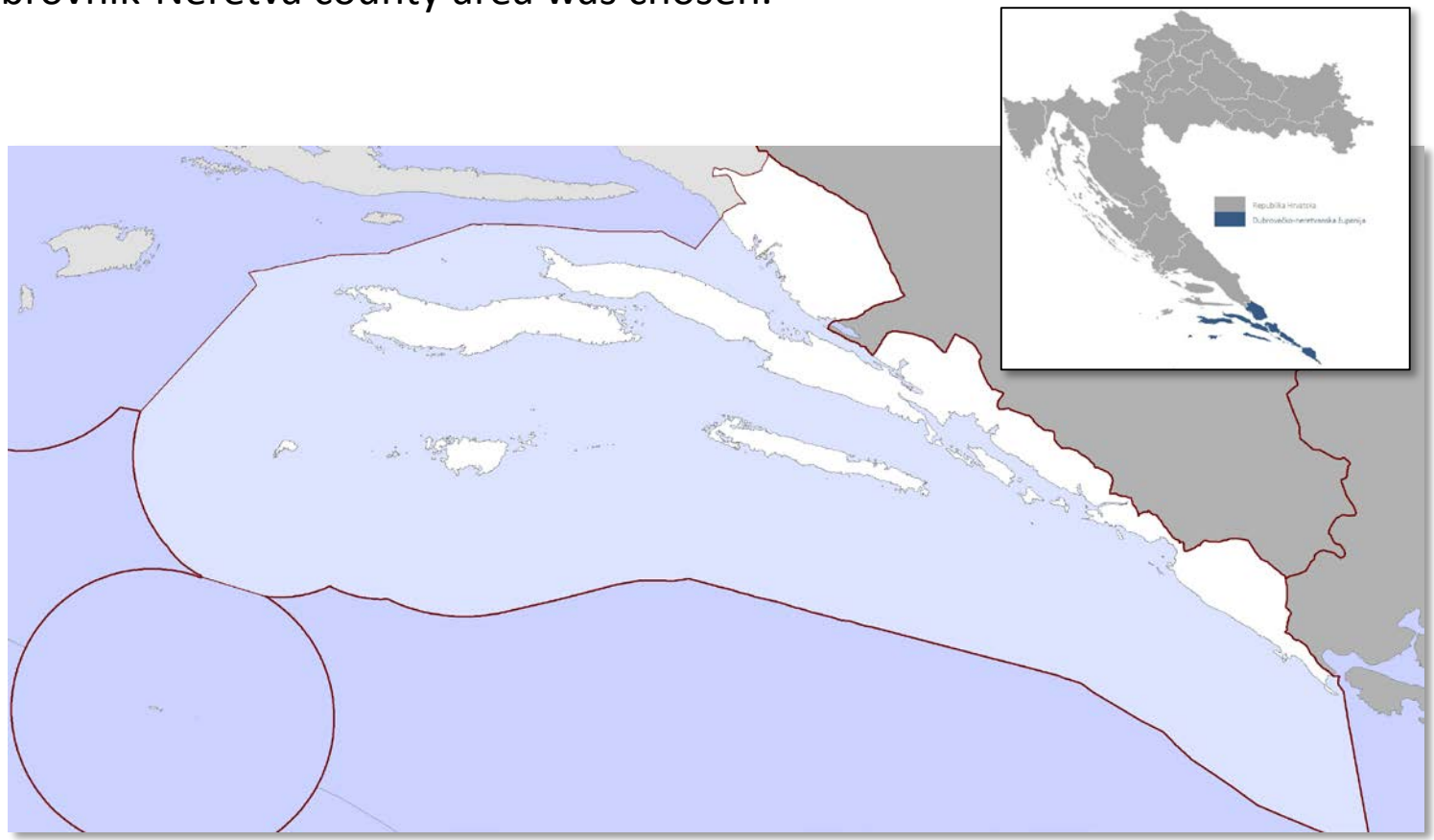
Area: 1782,49 km2 (19%)

Sea area: 7489,88 km2 (81%)

Population: 122.568

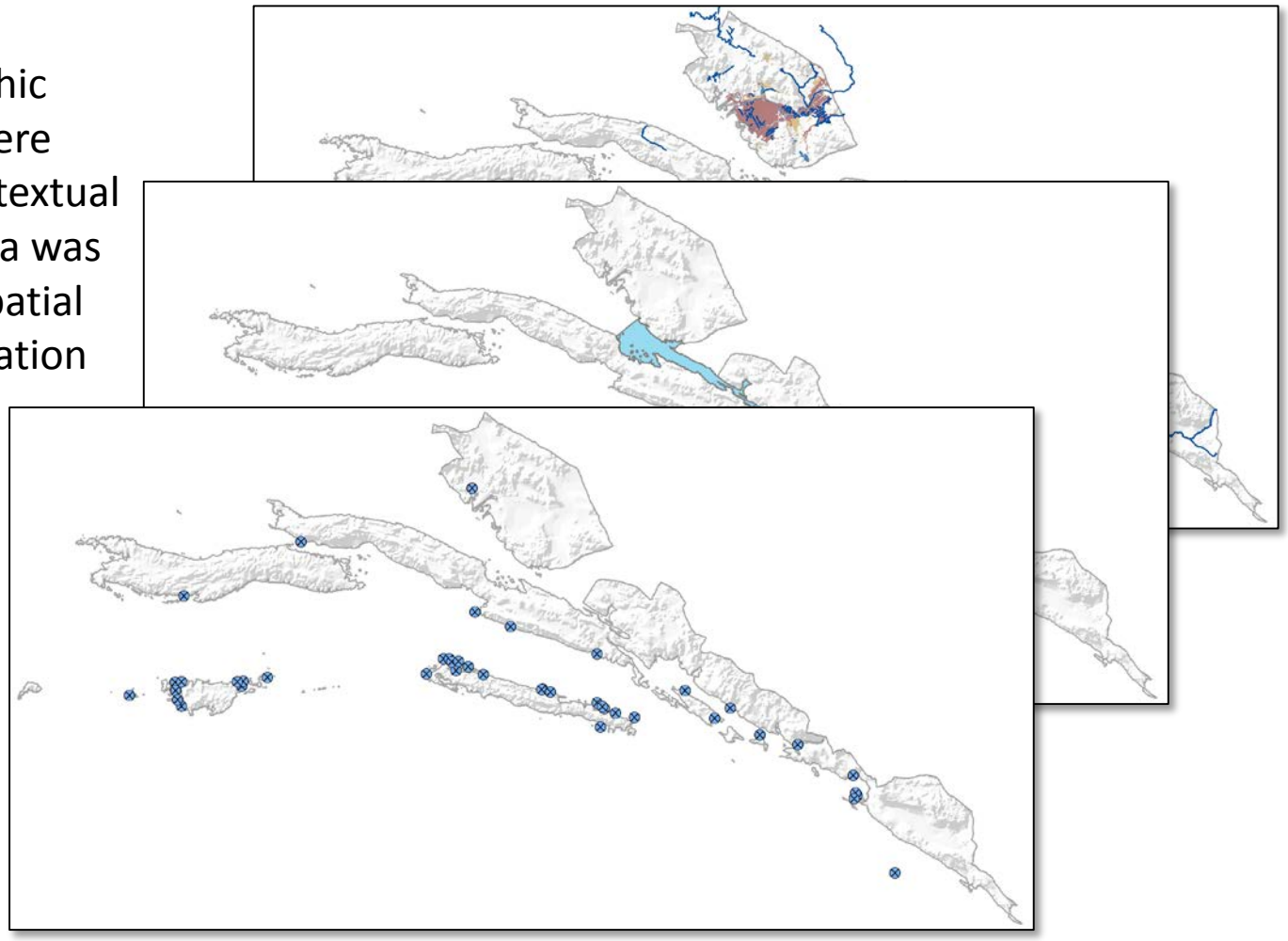
Population density: 68,99 st/km2

Settlement: 235



Cartographic data

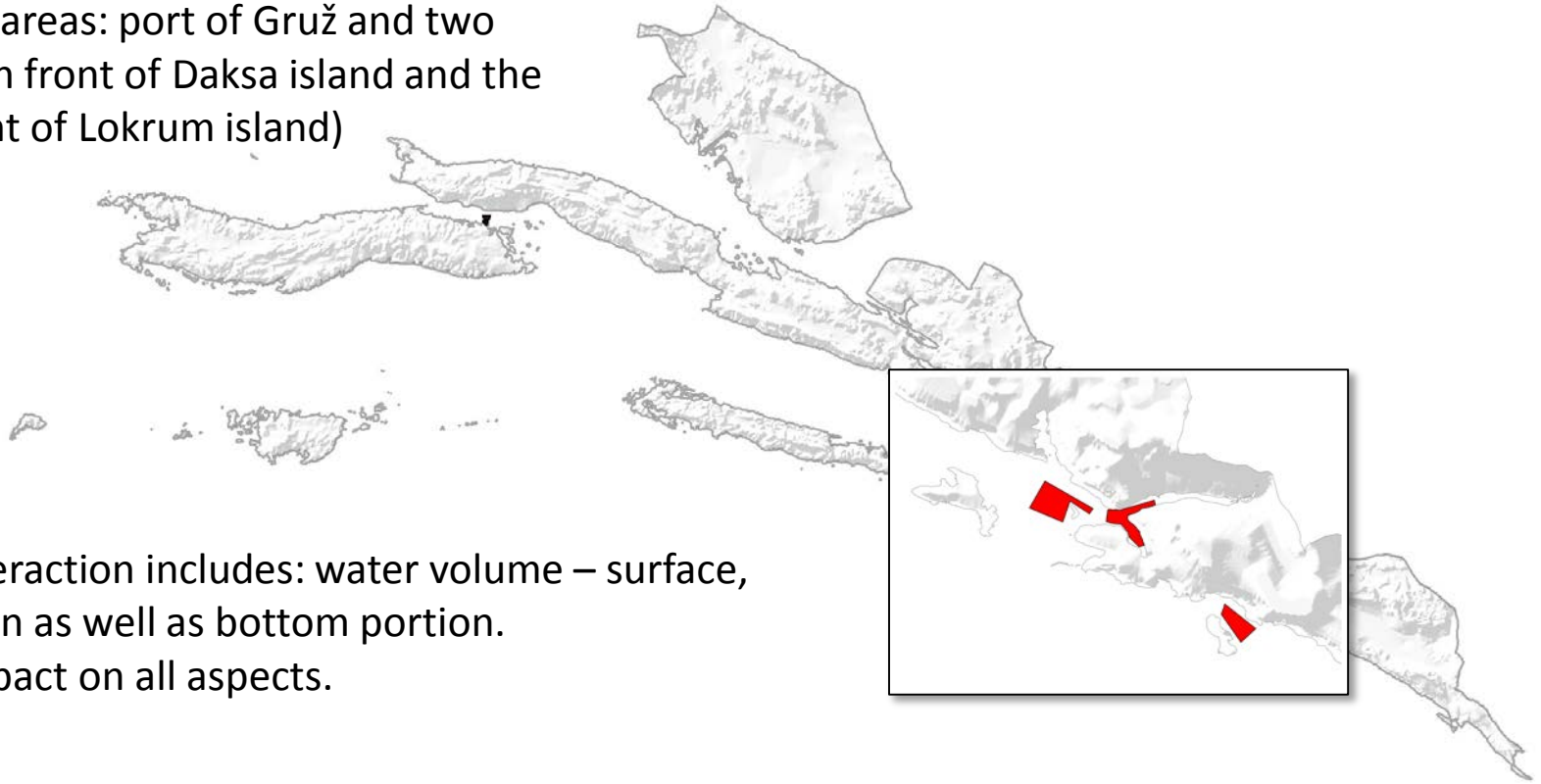
Using GIS tools, geographic scopes of interactions were analyzed side by side to textual analysis. Most of the data was provided from County spatial plan, currently in preparation process.



Examples – Uses and activities – sea to land

Cruising

- Sea to land interaction
- Localization areas: port of Gruž and two anchoring (in front of Daksa island and the other in front of Lokrum island)



- Space of interaction includes: water volume – surface, water column as well as bottom portion.
- Negative impact on all aspects.

Examples – Uses and activities – sea to land

Cruising

Negative impact on environment:

- degrading air an water quality
- increasing noise pollution,
- greenhouse gases levels,
- allochtone species introduction risk by blasts waters,
- increasing volume of solid and liquid waste to manage ,
- increasing risk of damaging Posidonia habitats by anchoring

Negative influence on society:

- paralysis of traffic and normal city life
- overall touristic experience

Negative impact of economy

- on marine traffic – possible conflict with other marine traffic stakeholders
- on coastal and marine tourism - environment degradation , market share competition

Examples – Uses and activities – sea to land

Aquaculture (mariculture)

- Sea to land interaction
- Localization: port of mali Ston
- Space of interaction includes: surface, water column, bottom area

- Negative impact on environment and economy segments
- Positive impacts on society

Examples – Uses and activities – sea to land

Negative impacts on the environment:

- oily stain and floating garbage on surface
- increased concentration of nitrogen and phosphorous compounds
- generally, eutrophication in water column
- hypoxia and anoxia events occurrence in benthos zone.

Positive effects on society

- workplaces opening
- growth and development of rural communities
- traditional farming preservation
- tourist offer enrichment

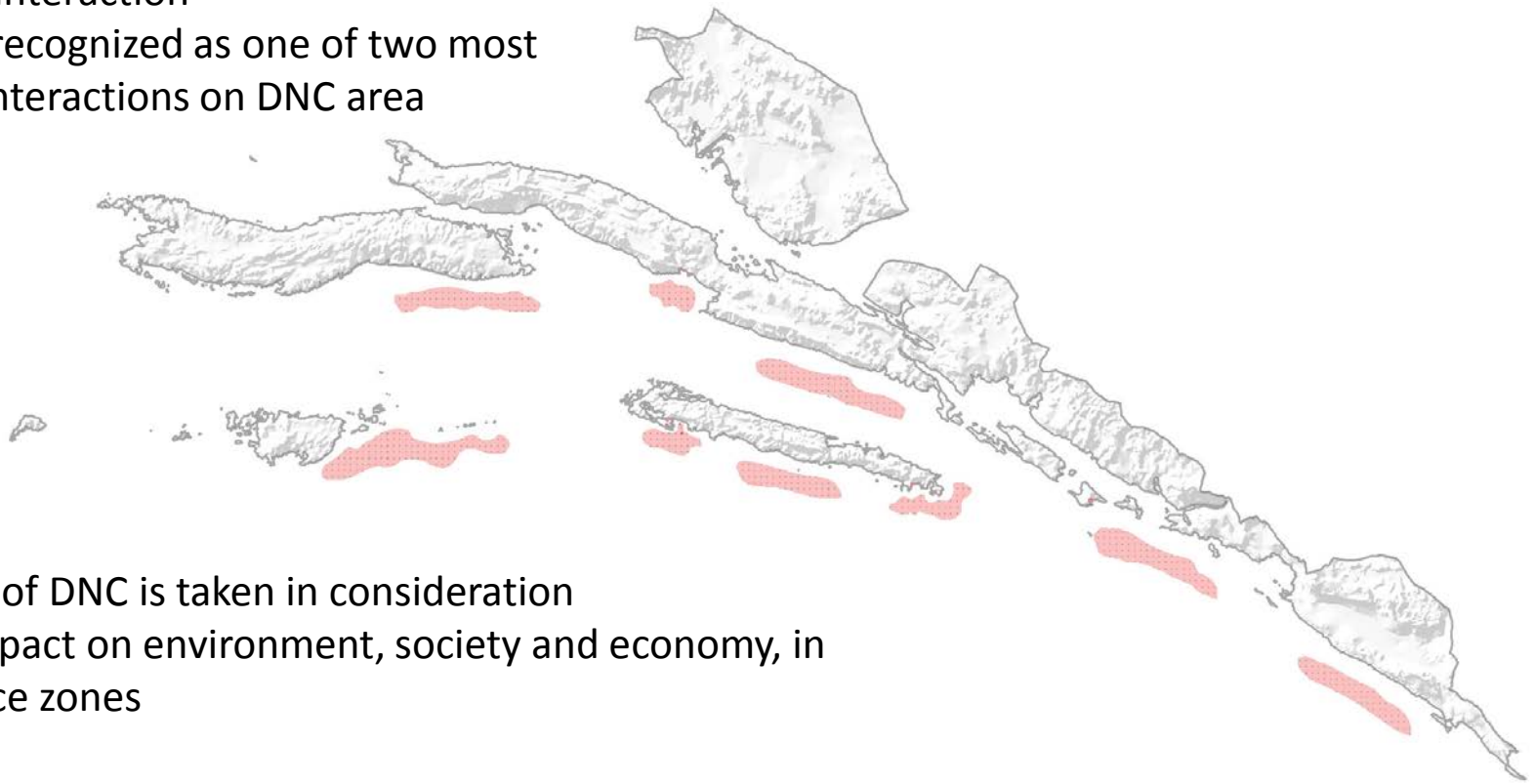
The most significant negative impacts include:

- competition for space related to fishery , marine traffic and coastal tourism
- degradation and habitat damage in protected areas
- collision of species farmed in aquaculture itself (sea bream and oysters)

Examples – Natural processes – sea to land

Storms

- Sea to land interaction
- Storms are recognized as one of two most significant interactions on DNC area



- Whole area of DNC is taken in consideration
- Negative impact on environment, society and economy, in water surface zones

Examples – Natural processes – sea to land

Negative effect on environment:
- soil erosion
- flooding

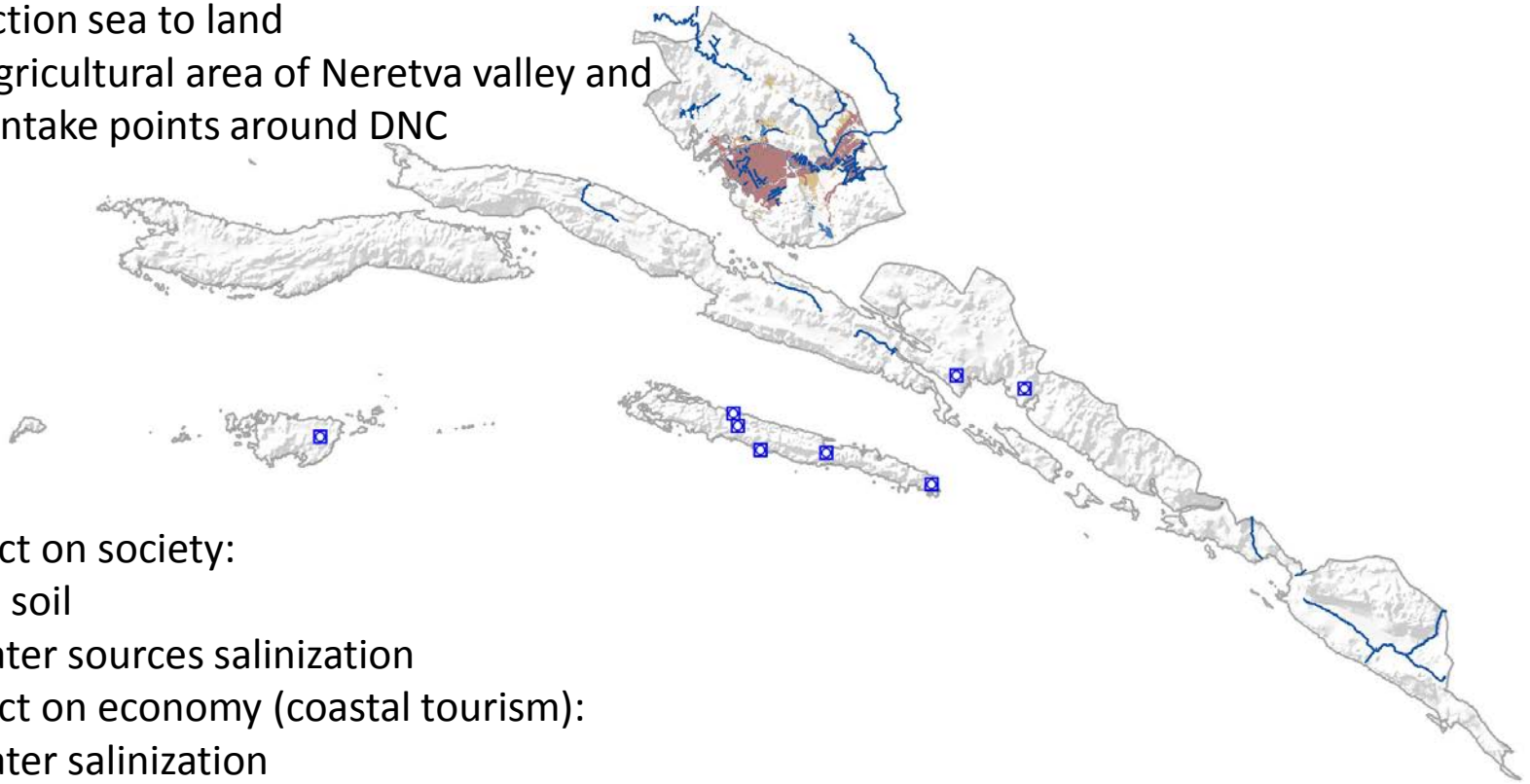
Negative effect on society:
- air, land and sea traffic disturbance
- electric power outages
- drinking water pollution

Negative impacts on economy are:
- fishery - fishing operations disruption
- aquaculture - equipment damage
- marine traffic - operation disruption, increased danger
- energy - production and distribution disruption, power lines damage
- coastal tourism - pebble and sand beaches wash away, equipment and infrastructure damage, floating garbage influx, reduced guest stay length
- marine tourism -increased danger, disrupted sailing
- protected areas (forest and littoral habitats damaging, floating garbage influx)

Examples – Natural processes – sea to land

Saline intrusion

Natural interaction sea to land
Localization: agricultural area of Neretva valley and several water intake points around DNC



Negative impact on society:

- agricultural soil
- drinking water sources salinization

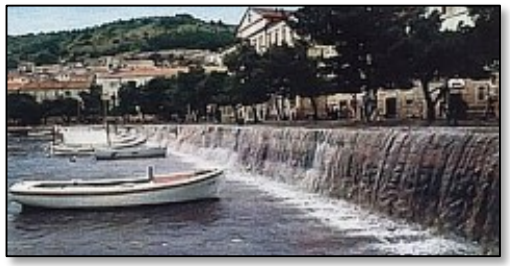
Negative impact on economy (coastal tourism):

- drinking water salinization

Examples – Natural processes – sea to land

Seiche

- Natural interaction which is characteristical for Adriatic sea
- Type of natural, sea to land interaction, impacting water surface localized in two areas: town of Vela Luka and Mali Ston bay



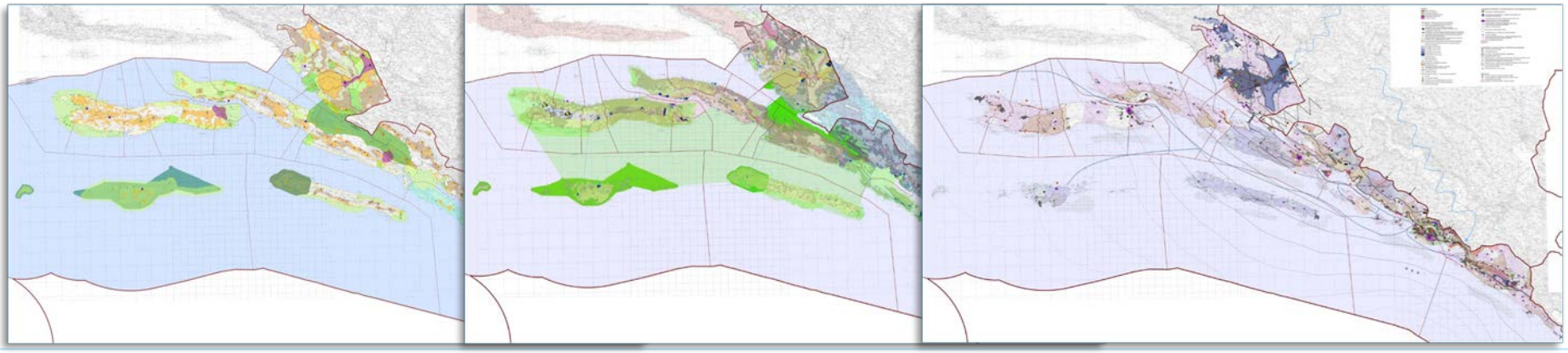
- Negative impact on society: infrastructure and equipment impact wave damage and flooding, and on coastal tourism - equipment damage

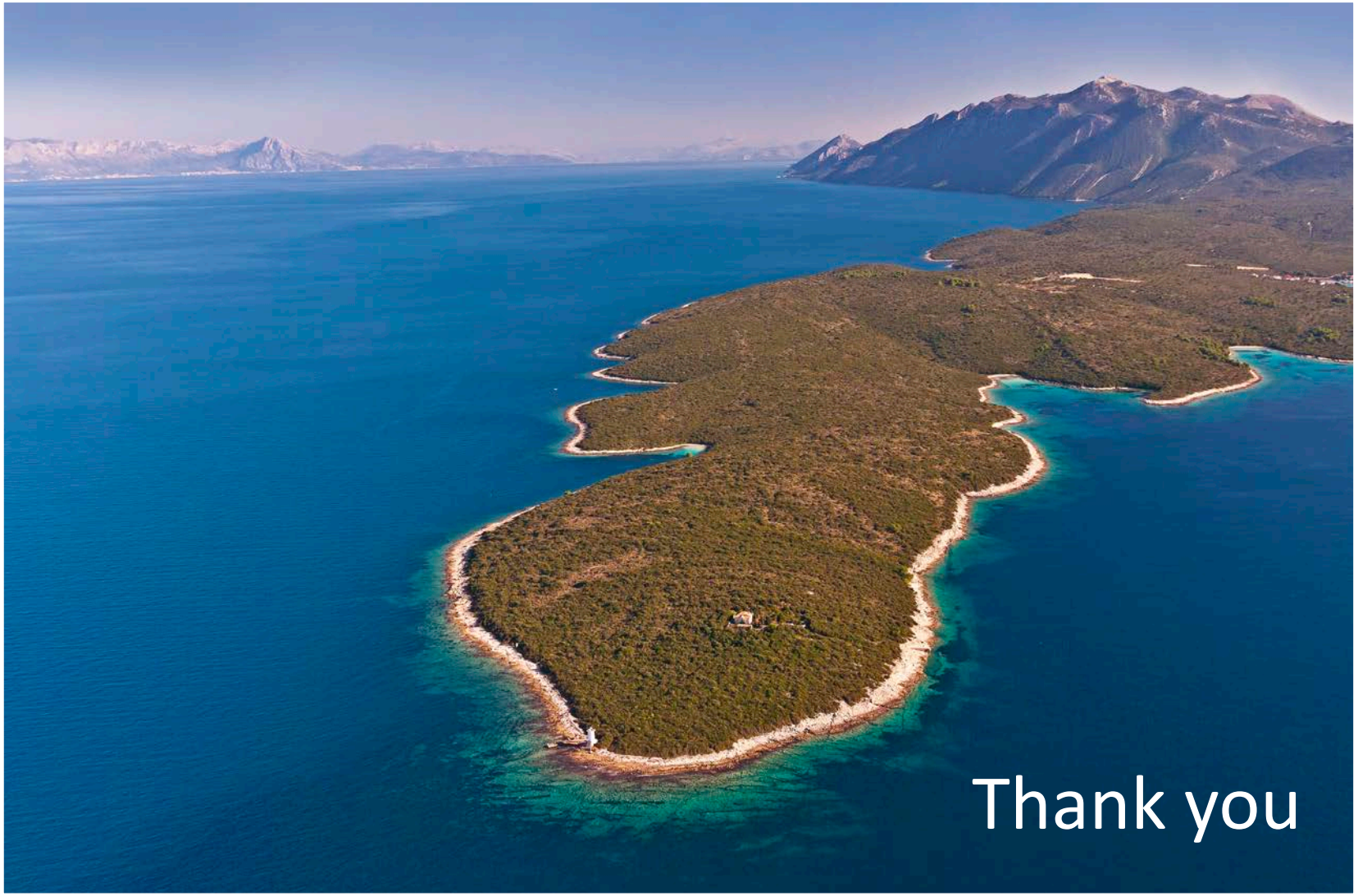
Methodology analisys

- Unambiguously localization for all types of interactions is not possible (i.e. influences of storms).
- Specific interactions can be localized on one or more places.
- Proposed field “The space of interaction” should include soil surface and underground area. (i.e. saline intrusion)
- Separation of particular interaction themes is not necessary because of similar characteristics.

Conclusions

- Analysis of land and sea area interactions provided current representation of all pressures. The result of such analysis can serve as a basis for further planning of coastal as well as marine areas. Also, it can facilitate integration of specific measures in the plan. Similar analysis method was used during the preparation phase of regional plan for DNC. It is recommended that these kind of analysis should be used during the initial phases of Plan development.
- Results of this kind of analysis could provide guidelines for development of the specific economic branches, i.e. the future planning of tourism zones should be restricted in areas with increased development impacts and shifted to adequate branch for the specific area.
- National level centralized database could facilitate process of spatial planning and analysis of all possible interactions.




Thank you