Exploring ESMERALDA case studies Lesson learned and recommendations

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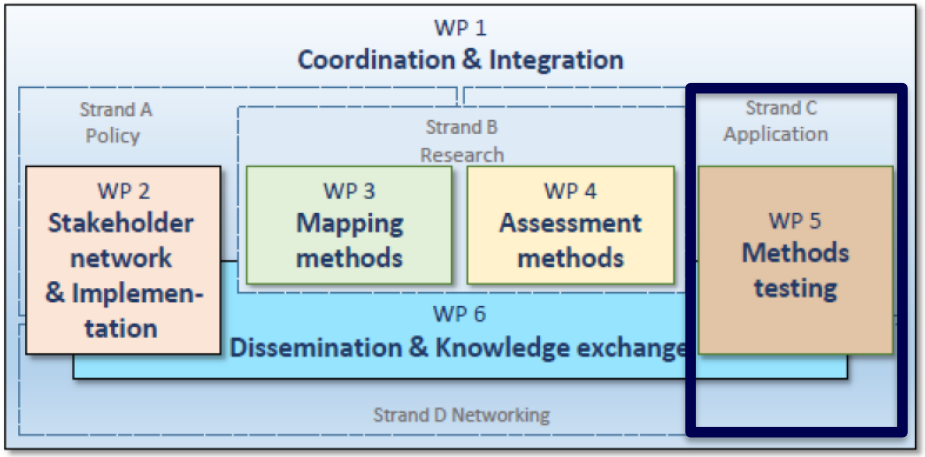
EU Horizon 2020 Coordination and support action

ESMERALDA STRAND C - APPLICATION – METHOD TESTING



Testing 1st version ESMERALDA methods

WS3 PRAGUE	WS4 AMSTERDAM	WS5 MADRID
Testing across EUROPE	Testing across THEMES	Testing across BIOMES & REGIONS

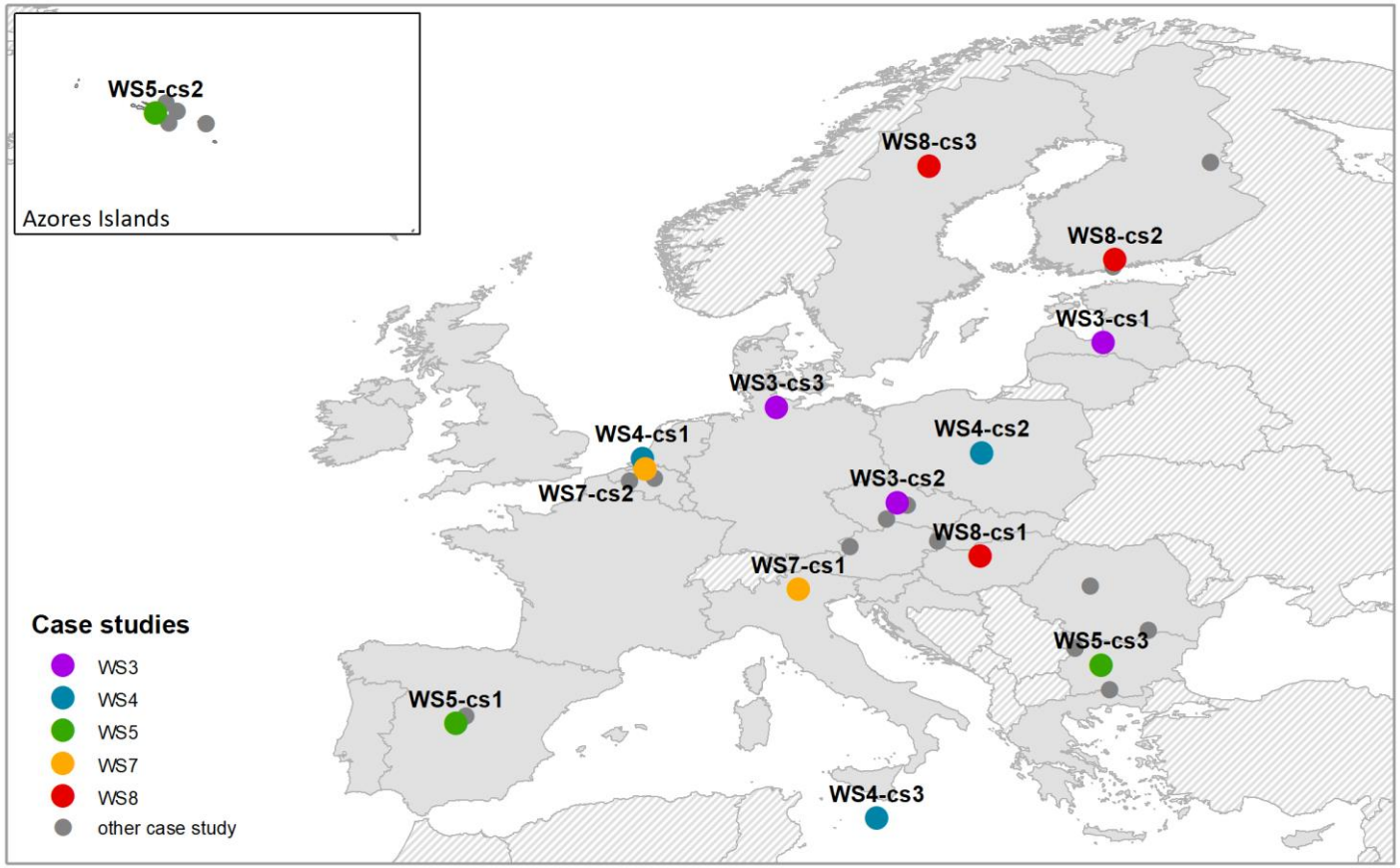
Testing FINAL version ESMERALDA methods

WS6 PLOVDIV	WS7 TRENTO	WS8 EGER
Mid-term project meeting Feedback	Testing in policy & decision-making	Testing in policy & decision-making (Businesses & Citizens)

Selection of Case Studies

- ✓ Stage in ES mapping and assessment
- ✓ Geographic regions
- ✓ Biomes in EU
- ✓ Spatial scale
- ✓ Themes

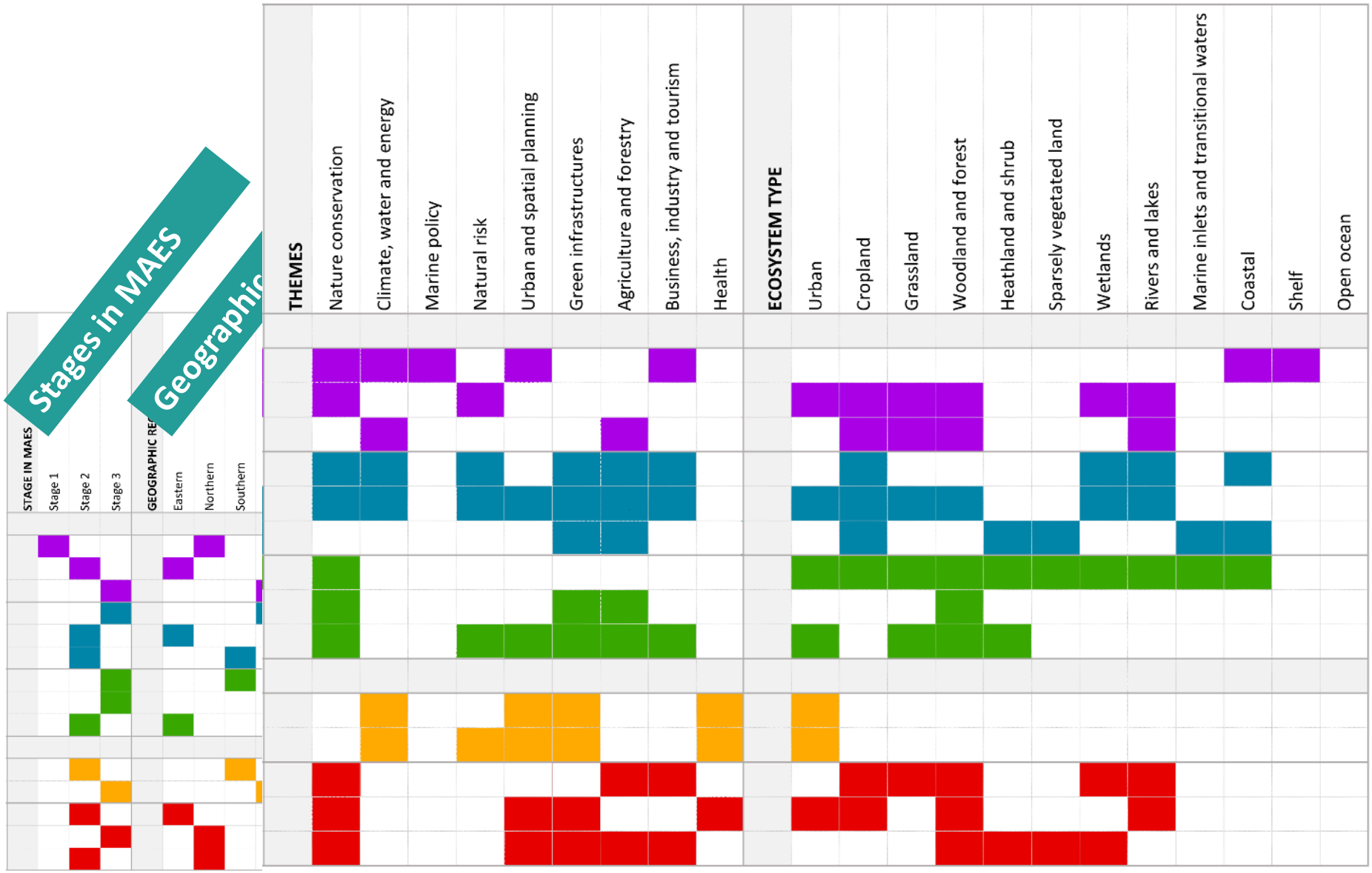
(see Deliverable 5.1)



31 case studies

14 used in ESMERALDA testing Workshops

ESMERALDA CASE STUDIES - OVERVIEW



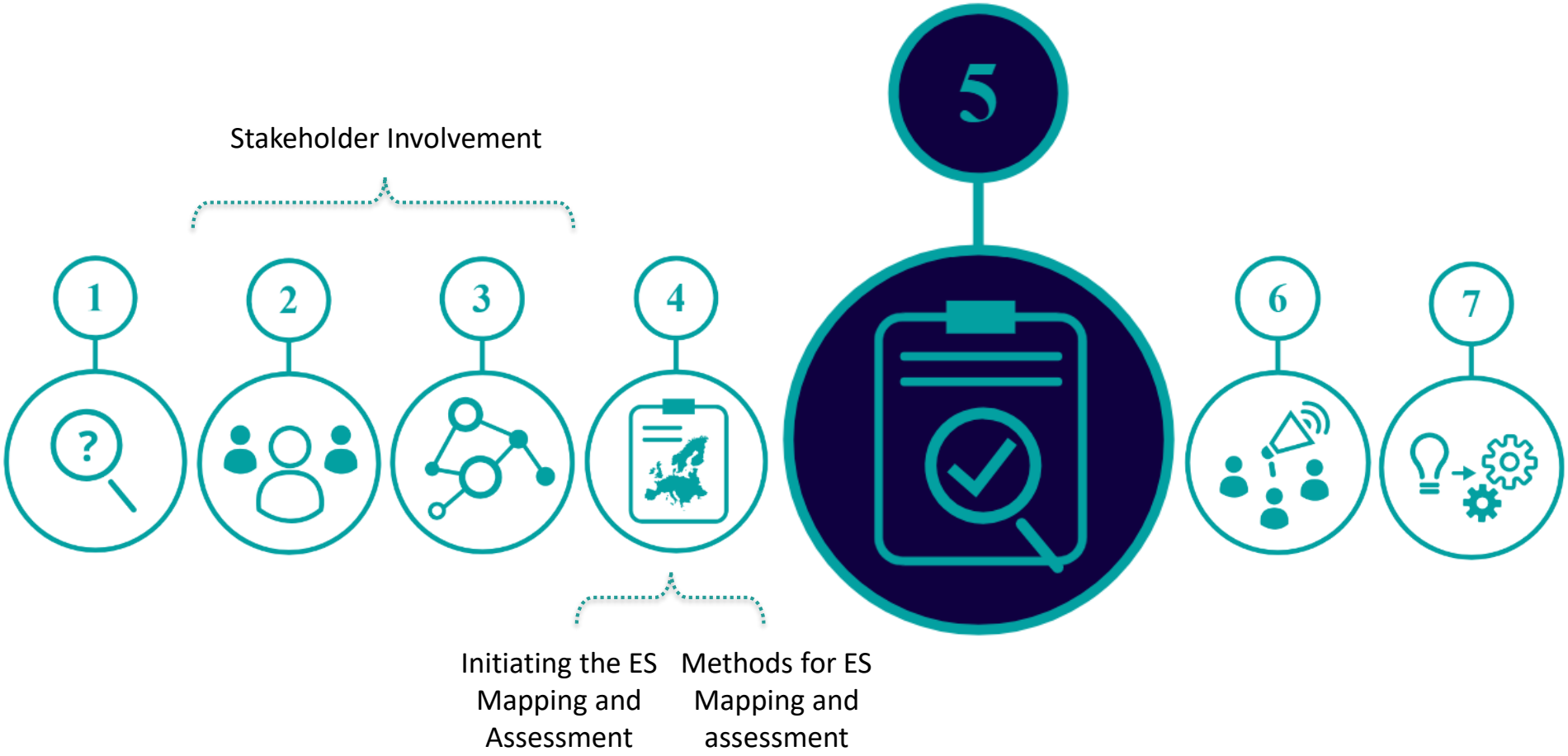
ESMERALDA CASE STUDIES - OVERVIEW

COUNTRY	CASE STUDY	SCALE	EXTENT	BIOMES	STAGE
BELGIUM	Mapping green infrastructures and their ES in Antwerp	L	205 Km²	4	Stage 3
BULGARIA	Mapping and assessment of ES in Central Balkan area Bulgaria at multiple scales	SN - L	2,999 Km²	4 – 8 - 12	Stage 2
CZECH REPUBLIC	Pilot National Assessment of ES	N	28,000 Km²	4 - 5	Stage 2
FINLAND	Green infrastructure and urban planning in the City of Järvenpää	L	40 Km²	4 – 6 - 11	Stage 3
GERMANY	Mapping ES dynamics in an agricultural landscape	L - SN	60 Km²	4 - 5	Stage 3
HUNGARY	ES mapping and assessment for developing pro-biodiversity businesses in the Bükk National Park	L	432 Km²	4	Stage 2
ITALY	ES mapping and assessment for urban planning in Trento	L	156 Km²	4 – 5 – 12	Stage 2
LATVIA	Mapping marine ES in Latvia	N	78,866 Km²	4	Stage 1
MALTA	Assessing and mapping ES in the mosaic landscapes of the Maltese Islands	N - SN	316 km²	12	Stage 2
NETHERLANDS	ES-based coastal defence	L	810 Km²	4	Stage 3
POLAND	ES in Polish urban areas	SN - L	39,000 Km²	4 - 5	Stage 2
PORTUGAL, AZORES	BALA - Biodiversity of Arthropods from the Laurisilva of Azores, Portugal	SN	400 Km²	4 – 12	Stage 3
SPAIN	Spanish National Ecosystem Assessment	N	505,990 Km²	4 - 12	Stage 3
SWEDEN	ES mapping and assessment in the Vindelälven-Juhtatdahka river valley, northern Sweden	SN	13,300 Km²	4 – 6 - 11	Stage 2

ESMERALDA CASE STUDIES - OVERVIEW

In-Depth Analysis - Esmeralda Maes Explorer

14 ESMERALDA CASE STUDIES
of MAES Application

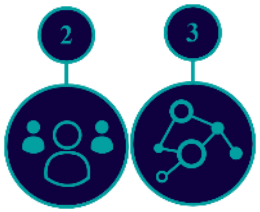


QUESTIONS AND THEMES

EU-relevant Policy Domains

ESMERALDA Case Studies	Nature conservation	Climate, water and energy	Marine & maritime policy	Natural risk	Urban & Spatial planning	Green infrastructures	Agriculture and forestry	Business, industry & tourism	Health
Belgium		■		■	■	■			■
Bulgaria	■			■	■	■	■	■	
Czech Republic	■			■					
Finland	■				■	■			■
Germany		■					■		
Hungary	■						■	■	
Italy		■			■	■			■
Latvia	■	■	■		■			■	
Malta						■	■		
Netherlands	■	■		■		■	■	■	
Poland	■	■		■	■	■	■	■	
Portugal, Azores	■					■	■		
Spain	■								
Sweden	■				■	■	■	■	

STAKEHOLDERS INVOLEMENT



ESMERALDA Case Studies	INVOLVED STAKEHOLDERS				LEVEL OF INVOLVEMENT				
	Competent authorities	Other experts	Business	General Public	Inform	Consult	Involve	Collaborate / Partnership	Empower
Belgium	X	X							
Bulgaria	X	X							
Czech Republic	X								
Finland	X	X		X					
Germany	X			X					
Hungary									
Italy	X	X							
Latvia	X	X	X	X					
Malta	X	X							
Netherlands									
Poland	X								
Portugal, Azores	X	X	X						
Spain	X	X	X	X					
Sweden	X	X	X						

Mapping & Assessment Process – Initializing

4

Ecosystem types

ESMERALDA Case Studies	A	B	C	D	E	F	G	H	I	L	M
Belgium	■		■	■			■				
Bulgaria	■	■	■	■	■	■		■			
Czech Republic	■	■	■	■	■	■	■	■			
Finland	■	■	■	■		■		■			
Germany		■	■	■				■			
Hungary			■	■							
Italy	■										
Latvia									■	■	■
Malta	■	■	■	■	■	■	■			■	
Netherlands		■					■	■	■	■	
Poland	■	■	■	■		■	■	■			
Portugal, Azores		■	■	■	■	■					
Spain	■	■	■	■	■	■	■	■	■	■	
Sweden			■	■	■	■	■	■	■	■	

A. Urban; **B.** Cropland; **C.** Grassland;
D. Woodland & forest; **E.** Heathland and shrub;
F. Sparsely vegetated land; **G.** Wetlands;
H. Rivers and lakes; **I.** Marine inlets and transitional waters; **L.** Coastal; **M.** Shelf

Ecosystem conditions

Assessment Yes/No
■
■
■
■
■
■
■
■
■
■

Selection of Ecosystem Services

Scientist-driven	Stakeholders' driven
■	■
■	
■	
■	■
■	
■	
■	■
■	
■	
■	
■	
■	
■	
■	■

Mapping & Assessment Process – Applied Methods

4

COUNTRY	ES	APPLIED METHOD		ALTERNATIVE METHOD	
Belgium	Filtration/sequestration/storage/accumulation by ecosystems (2.1.2.1)	Spatial proxy method (expert scoring)			
	Physical use of land- /seascapes in different environmental settings (3.1.1.2)	Spatial proxy method (expert scoring)			
Bulgaria	Surface water for drinking (1.1.2.1)	Process-based models (SWAT)			
	Aesthetics (3.1.2.5)	Photo Elicitation Surveys			
Czechia	Surface water for drinking (1.1.2.1)	Value (benefit) transfer		Netfactore income	
	Global climate regulation by reduction of greenhouse gas concentrations (2.3.5.1)	Integrated modeling frameworks (InVEST)		Value (benefit) transfer	
	Entertainment (3.1.2.4)	Integrated modeling frameworks (ESTIMAP)		Hedonic pricing method	
Finland	Educational (3.1.2.2)	Participatory GIS			
	Integration of GI and infill development	Integrated modelling framework (Spatial Multi-Criteria Decision Analysis)			
Germany	Plant-based [energy] resources (1.3.1.1)	Spatial proxy methods		Replacement cost	
	Buffering and attenuation of mass flows (2.2.1.2)	Integrated modeling frameworks (GISCAME)		Bayesian Belief Network	
	Educational (3.1.2.2)	Narrative assessment			
Hungary	Animals reared to provide nutrition, fibres and other materials (CICES 1.1.3.1 & 1.1.3.2)	Rule-Based Matrix			
	Touristic attractiveness of nature (CICES classes 3.1.1.1, 3.1.1.2 and 3.1.2.4 according to version 5.1)	Rule-Based Matrix			
Italy	Micro and regional climate regulation (2.3.5.2)	Process-based models			
	Physical use of land- /seascapes in different environmental settings (3.1.1.2)	Integrated modeling frameworks (ESTIMAP recreation model)			
Latvia	Wild plants, algae and their outputs (1.1.1.3)	Spatial proxy methods			
	Maintaining nursery populations and habitats (2.3.1.2)	Spatial proxy methods (Spreadsheet method)		State and Transition model	
	Experiential interactions + Physical use of landscapes /seascapes in different environmental settings (3.1.1.1+3.1.1.2)	Integrated modeling frameworks (Multi-criteria ES assessment model)		Integrated modeling frameworks (InVEST)	
Malta	Reared animals and their outputs (1.1.1.2)	Preference Assessment		Spatial proxy methods (Spreadsheet method)	
	Pollination and seed dispersal (2.3.1.1)	Spatial proxy methods + Field data			
Netherlands	Flood protection (2.2.2.2)			Process based modelling (KINEROS flood modelling)	
	Experiential use of plants, animals and land- /seascapes in different environmental settings (3.1.1.1)			Recreation based on green typology	
Poland	Filtration/sequestration/ storage/accumulation by ecosystems (2.1.2.1)	Spatial proxy methods		Replacement cost (marginal abatement costs)	
	Physical use of land / seascapes in different environmental settings (3.1.1.2)	Spatial proxy methods		Choice modelling	
Portugal, Azores	Pollination and seed dispersal (2.3.1.1)	Macro-ecological models			
	Maintaining nursery populations and habitats (2.3.1.2)	Macro-ecological models			
Spain	Cultivated crop (1.1.1.1)	Market-based methods			
	Surface water for drinking (1.1.2.1)	Integrated modeling frameworks (InVEST)			
Sweden	Reared animals and their outputs (CICES classes 1.1.1.2)	Participatory GIS			
	Experiential (physical) use of plants, animals and landscapes (CICES classes 3.1.1.1 and 3.1.1.2)	Integrated modelling framework (Integrated monitoring data GAM-modelling framework)			

Ecosystem Services discussed in the **ESMERALDA WSs**

Mapping & Assessment Process – Applied Methods

4

COUNTRY	ES	APPLIED METHOD	
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	Physical use of land- /seascapes in different environmental settings (3.1.1.2)	Spatial proxy method (expert scoring)	

METHOD CARD: PROCESS-BASED MODEL Applied to: Micro and regional climate regulation (2.3.5.2)	
CASE STUDY	Trento
SCALE	Local
TYPE	Biophysical
TIER	2/3
DESCRIPTION	
The method is specifically tailored for the assessment of the cooling capacity and cooling effect of urban green infrastructure, in the European context. It estimates the two main functions involved in cooling, namely shading and evapotranspiration, depending on the structural features of urban green infrastructure components (i.e., soil cover, percentage of canopy cover, and dimension of the area). Based on an analysis of the three structural features, each green infrastructure component can be classified into one of the 50 combinations identified by the model. For each combination, the cooling capacity is expressed by a score from 0 to 100. The scores can then be classified into 5 classes, from A to E, which correspond to a range of temperature differences between the analysed area and the surrounding, depending on the climatic zone (i.e. Atlantic, Continental, and Mediterranean). Finally, the cooling effect perceived in the surroundings is modelled by applying different omnidirectional spatial decay functions depending on the dimension and the shape of the green infrastructure component. For a detailed illustration of the method and the scoring tables refer to Zardo et al. (2017).	
1. DATA REQUIREMENT	
Qualitative	• Climatic zone, i.e. Atlantic, Continental, or Mediterranean
Quantitative	• Soil cover map classified into 5 categories (i.e. water, grass, heterogeneous, bare soil, sealed) and dimension of each area of homogenous soil cover. • Percentage of canopy coverage area (e.g. based on aerial or satellite images).
2. RESOURCES REQUIREMENT	
Time	• Running the model on a city can take a few days, data preparation may be more demanding
Cost	• The analysis can be run with free GIS software, related paper is open access.
Expertise	• Good GIS skills needed.
Tools & equipment	• GIS software to run the model.
3. LINKS AND DEPENDENCY ON OTHER METHODS	
Biophysical	•
Socio-cultural	• Analysis of the different categories of beneficiaries and levels of demand (e.g. vulnerability to heat stress). • Accessibility analysis.
Economic	• Replacement cost methods (e.g. savings in artificial cooling) • Avoided cost (e.g. health benefits in terms of reduced hospital admissions)
4 COLLABORATION LEVEL	
Researchers own field	•
Researchers other fields	•
Non-academic stakeholders	•
5. SPATIAL SCALE OF APPLICATION[1]	
Local	• Appropriate, the method was specifically developed for urban contexts (in Europe).
Regional	• Not applicable.
National	• Not applicable.
Pan European	• Not applicable.
6. EXAMPLES OF POLICY QUESTION	
	• How does green urban infrastructures affect the local microclimate? • Which parts of the city benefit most from the cooling effect of urban GI? • How to design new areas that maximize the related cooling effect?

Method Application Cards

- ✓ Description
- ✓ Data
- ✓ Resource requirements
- ✓ Links & dependency on other methods
- ✓ Collaboration level
- ✓ Spatial scale of application
- ✓ Example of policy questions

6

Targeted audience

ESMERALDA Case Studies	Scientific publication	Competent Authorities	General Public
Belgium		■	■
Bulgaria	■	■	
Czech Republic	■	■	
Finland	■	■	■
Germany	■		
Hungary		■	■
Italy	■	■	
Latvia	■	■	
Malta	■	■	
Netherlands	■	■	■
Poland		■	■
Portugal, Azores	■	■	
Spain	■	■	■
Sweden		■	■

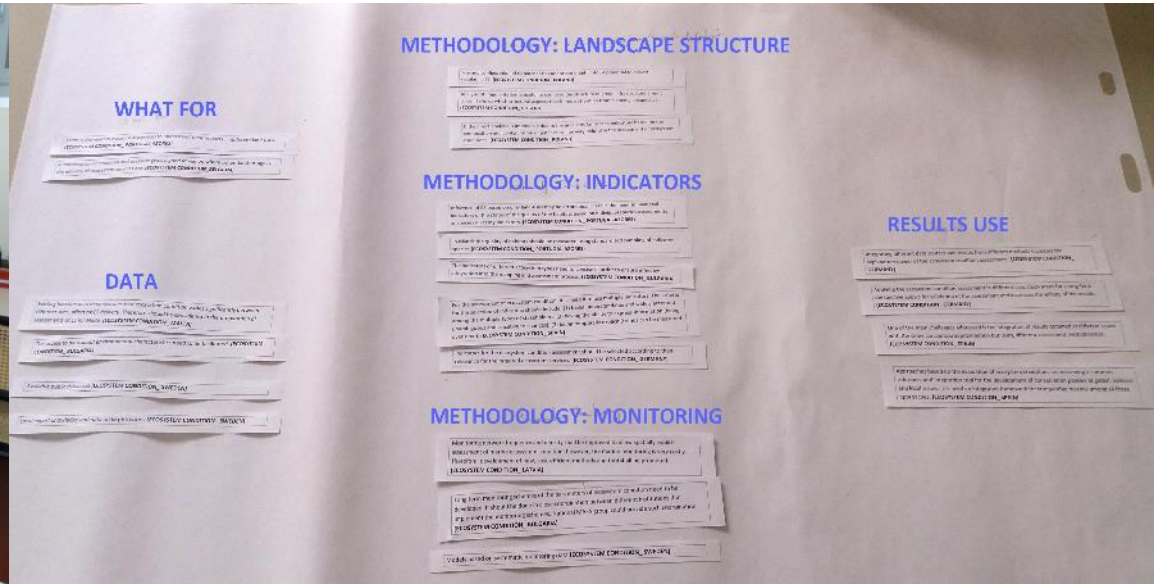
Implementation

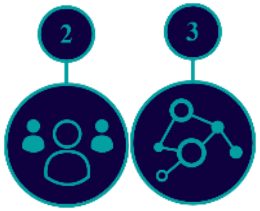
7

Increasing level of Impact

ESMERALDA Case Studies	People aware of, understand and discuss ES	Stakeholders focus on ES and articulate different positions	Alternative choices based on ES mapping and assessment	Plans & policies considers ES mapping and assessment	New policy and finance mechanism established
Belgium	■	■	■	■	■
Bulgaria		■	■		■
Czech Republic				■	
Finland	■	■		■	
Germany					
Hungary					
Italy	■	■	■	■	
Latvia			■	■	
Malta					
Netherlands					
Poland				■	
Portugal, Azores		■		■	
Spain			■	■	
Sweden			■	■	

Lesson learned and recommendations



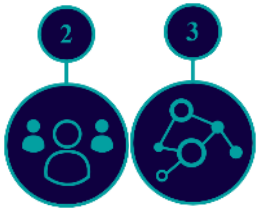


HOW TO INVOLVE

WHO TO INVOLVE

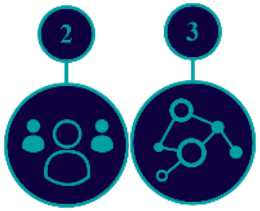
WHEN TO INVOLVE

FOR WHAT



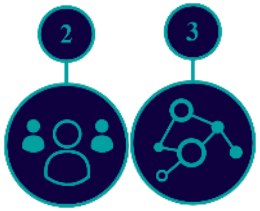
WHO TO INVOLVE

- Cooperating with **competent authorities** can:
  - facilitate acquisition of necessary data,
  - time saving for the recognition of available data & acquisition,
  - empowering the significance of action,
  - strengthening the **potential for future cooperation**



WHEN TO INVOLVE

- Start at the very beginning of the process
- Communication/co-creation asks a big effort: plan sufficient time for explaining the concept of ES, MAES approach and objectives for all levels of involvement
- Partnerships need to be built up gradually, and take into consideration new needs and requirements
- Define a communication strategy from the beginning in parallel with research to create a dialogue between researchers, decision makers and the general public



HOW TO INVOLVE

- Regular meeting to maintain the dialogue throughout the process
- Early and comprehensive information to increase willingness to cooperate
- Try to establish a **permanent network** of stakeholders by e.g. organizing targeted discussion groups, social media
- Develop external communication tools tailored to the needs of different target audiences or stakeholders
- Highlight potential use and impacts of MAES results
- Highlight relevance with respect to national and regional policy on ES and other environmental frameworks

MAPPING & ASSESSMENT PROCESS – INITIALIZING

4

Identification of Ecosystem types

- ✓ Criteria for classification
- ✓ Criteria for enhancing relevance
- ✓ Methodological aspects
- ✓ Data: Quality/Themes & Scale/Resolutions Description

MAPPING & ASSESSMENT PROCESS – INITIALIZING

4

Identification of Ecosystem types

- ✓ Criteria for classification
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- ✓ Methodological aspects
- ✓ Data: Quality/Themes & Scale/Resolutions Description

Assessment of Ecosystem Conditions

- ✓ What for?
- ✓ Data
- ✓ Methodology: landscape structure, indicators, and monitoring
- ✓ Use of results

MAPPING & ASSESSMENT PROCESS – INITIALIZING

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Identification of Ecosystem types

- ✓ Criteria for classification
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Assessment of Ecosystem Conditions

- ✓ What for?
- ✓ Data
- ✓ Methodology: landscape structure, indicators, and monitoring
- ✓ Use of results

Selection of Ecosystem Services

- ✓ Stakeholder involvement in ES selection
- ✓ How to select: general methodology
- ✓ How to select: data & monitoring
- ✓ How to select: context-specific

MAPPING & ASSESSMENT PROCESS – APPLIED METHODS

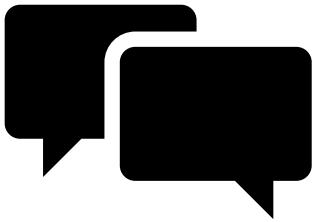
4

SOCIO-CULTURAL METHODS	ECONOMIC METHODS	BIOPHYSICAL METHODS
Deliverable 3.1	Deliverable 3.2	Deliverable 3.3

- ESMERALDA Method Explorer

TAILORING YOUR MESSAGE

STAKEHOLDER INVOLVEMENT



CAPACITY BUILDING

ADDED VALUE

CHALLENGES

6

TAILORING YOUR MESSAGE

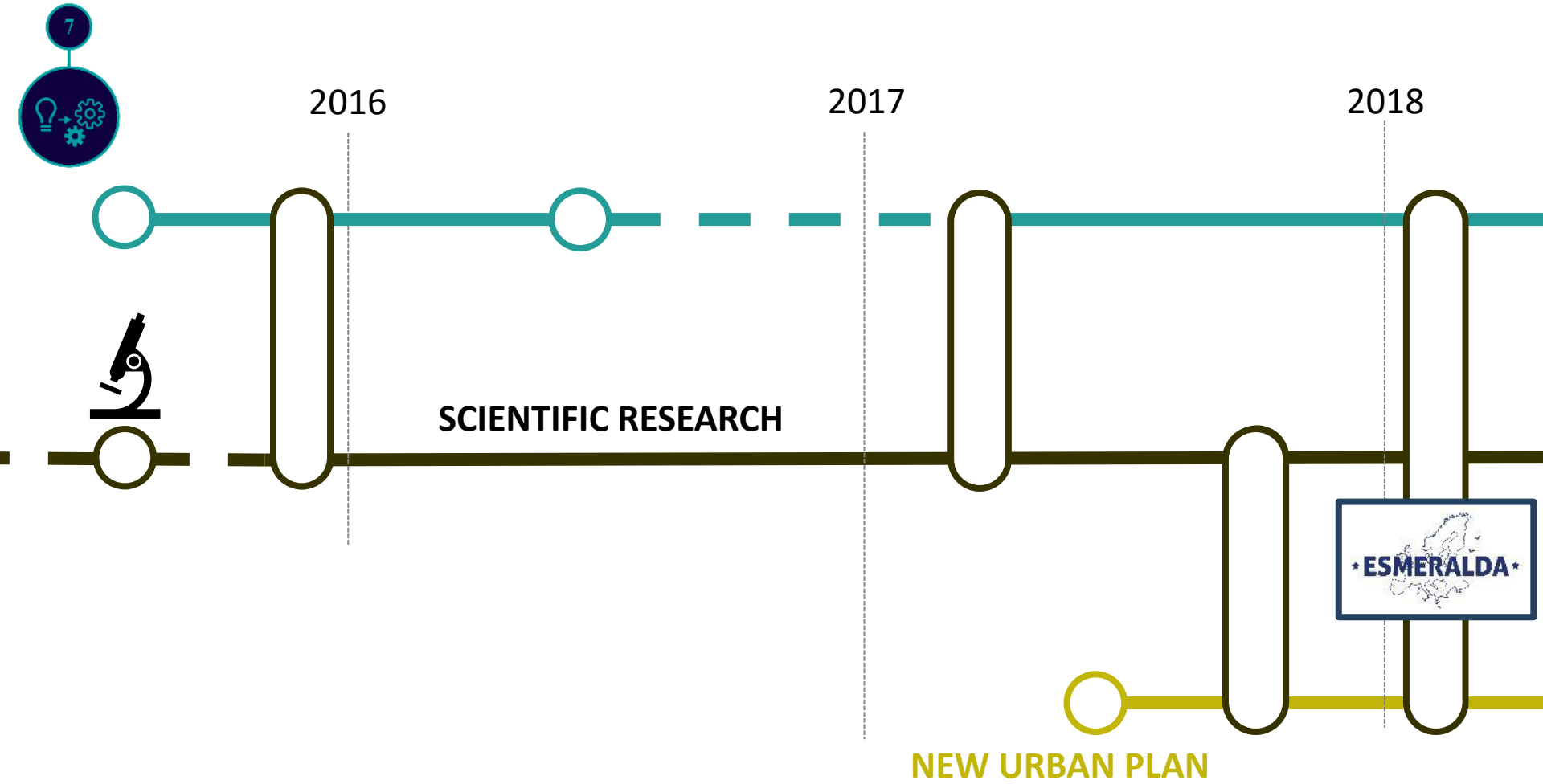
- Develop external communication tools tailored to the needs of different target audiences including innovative formats and channels for the dissemination in different social spheres, e.g. the media, school communities, NGOs and social movements
- D&C to the general public should be informative and at the same time attractive and easily understandable
- Organize **feedback workshop** with practitioners and stakeholders

6

CAPACITY BUILDING

- Building of know-how
- Need of training technicians and civil servants – a tailored program, with **different levels of complexity**, for different stakeholders, aiming to build institutional capacity
- Stakeholders are often aware of environmental issues in spatial planning, however they rarely use ES approach
- You need ‘champions’ within the administration, neighborhood who are defending and promoting the use of the tool

IMPLEMENTATION



Tailoring results, Networking, Mainstreaming, Demo & Pilots

Special Thanks

Case Study Coordinators & Supporting Experts!