



# MARINE SPATIAL PLANNING CONCIERGE

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March 25, 2015

# PRESSURES

## MARINE ENVIRONMENTS





**ecosystem**



**activities  
(stressors)**



**values  
(benefits)**



**implementation  
(management  
&  
monitoring)**



# MSP THROUGH AN ES LENSE



2010  
Current

1

## HUMAN USES

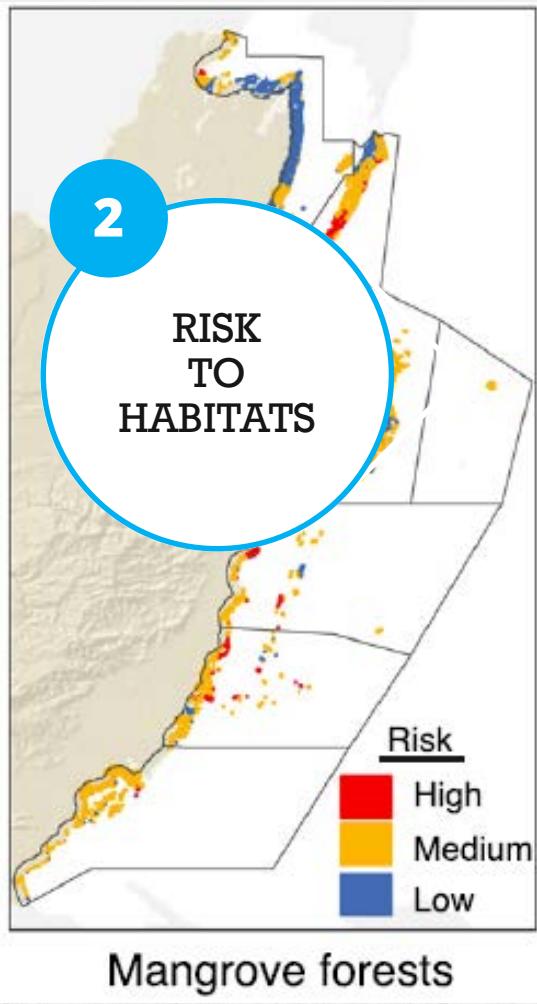


### Zones of Human Use

- 1. Agricultural run-off
- 2. Aquaculture
- 3. Coastal development
- 4. Dredging
- 5. Fishing
- 6. Oil exploration
- 7. Marine recreation
- 8. Marine transportation
- 9. Conservation

2

## RISK TO HABITATS

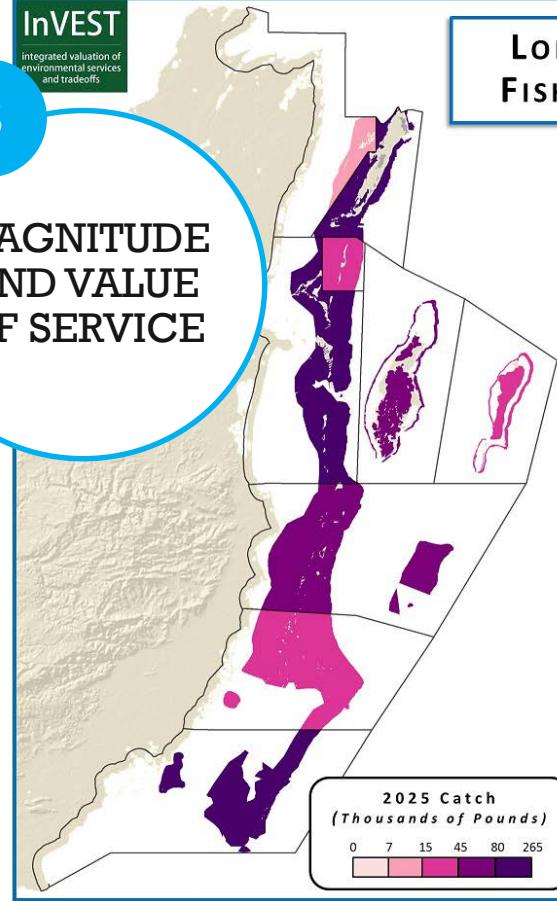


## Mangrove forests

InVEST  
integrated valuation of environmental services and tradeoffs

3

## MAGNITUDE AND VALUE OF SERVICE



LOBSTER FISHERIES

# DECISIONS & TRADE-OFFS



Erosion



Nursery habitat



Recreation



Aesthetics

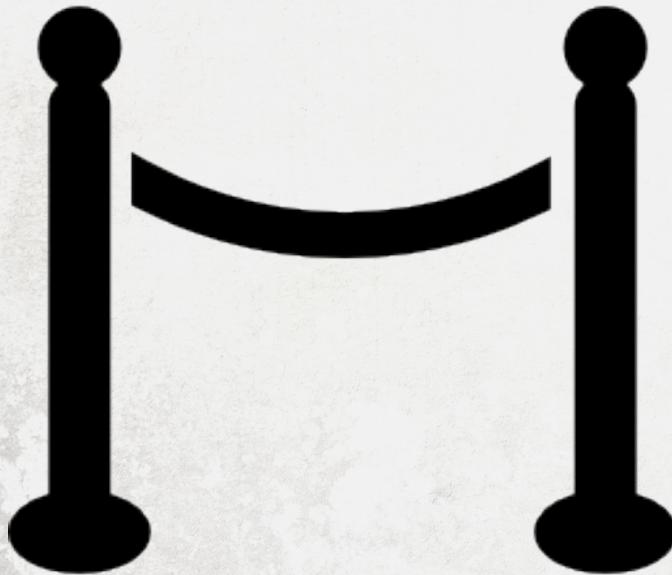


Fisheries



# MSP BARRIERS

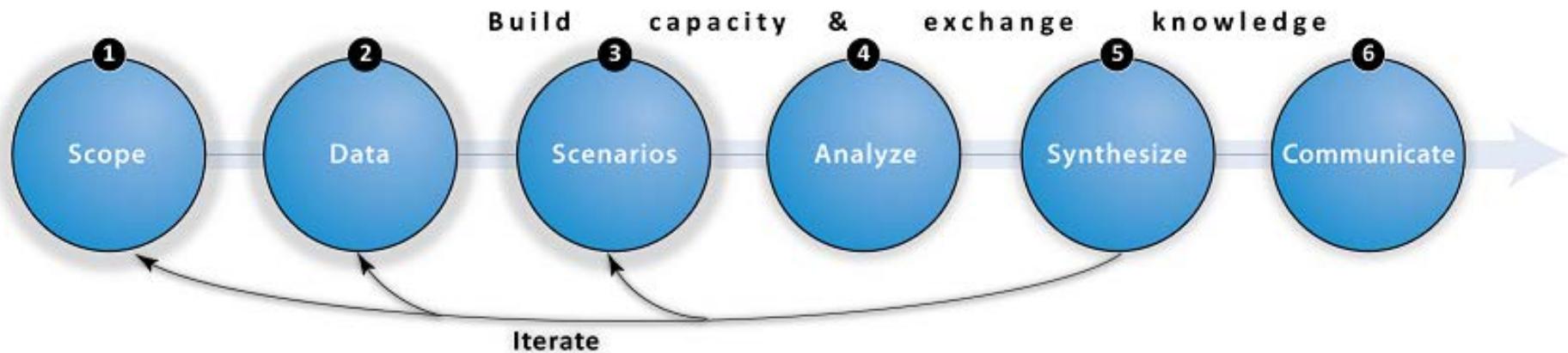
## USING ES INFORMATION



## Barriers to uptake

- Baseline data are lacking
- Planners lack technical skills
- Complicated legal and political landscapes
- Lack of support for comprehensive planning

# MSP CONCIERGE



Rosenthal et al. 2014, IJBSESM

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FAQ

Answers to frequently asked questions



Links

Suggested reading and online links



Use-Cases

Examples from NatCap case studies around the world



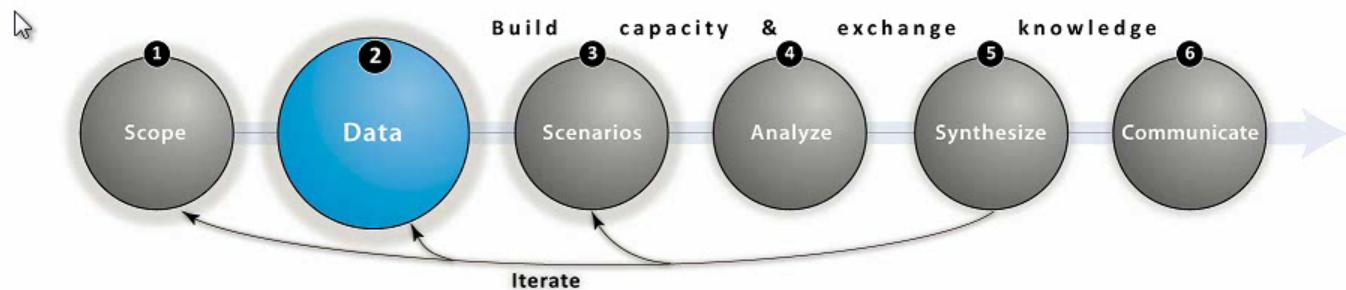
# MSP



## Step 2: Data (Compile Information)

### Overview

MSP typically relies on both spatial and non-spatial data characterizing the coastal and marine space. Data requirements may include biophysical and oceanographic information, such as elevation, maps of human activities and socio-economic characteristics in the coastal zone, and data on the distribution and quality of coastal-marine habitats. When valuation is a part of the assessment, economic data is also needed, which can include market prices, property values, and discount rates.



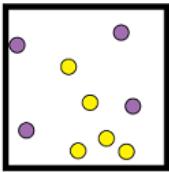
### Goals

- Gather coarse spatial information that can be refined and improved through iterative analysis and knowledge exchange
- Compile and curate a "working" database to use as inputs to MSP decision-support tools
- Develop a comprehensive MSP database to share with the community at the conclusion of the project

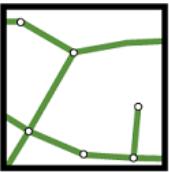
### Tips

## Vector Examples

Points



Lines



Polygons



## HELPER TOOLS

A	B	C	D	E	F	G	H	I	J	K	L	M
Wind Energy	Wave Energy	Recreation	HRA	Finfish Aqua	Blue Carbon	Coastal Vulnerability (T0)	Coastal Protection (T1)	Scenic Quality	InVEST (v3.0.1) Data Inventory	Key: R = required biophysical O = optional biophysical V = optional valuation		
1												
2	Models				Data requirements				Type	Table name	Sources	
3	O	R		R	O	O	Habitat/species map			vector map		
4	O			R			Land use/land cover (LULC)			raster map		
5				R	R	R	DEM (topography)			raster map	Global: World Wildlife Fund (90m)- <a href="http://www.worldwildlife.org">http://www.worldwildlife.org</a>	
6				O	R		DEM (bathymetry)			raster map		
7	R			R	O		wind field			raster map		
8	R			R	R		wave field				Wave Watch III (global provided in model)	
9	R	R					device operation				Wave Watch III (global provided in model)	
10					O		tides				some device information provided in model	
11				O			shoreline type/backshore characteristics				location data given in user guide	
12				O	O		benthic biogenic habitats				global datasets available, given in user guide	
13		R					human use activities			vector map		
14	O			O	O	R	location and type of infrastructure placed in nearshore					

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Use-Cases

Examples from NatCap case studies around the world



## ② Frequently Asked Questions (FAQ)

### Q: How do I get started developing scenarios for MSP?

A: Scenario development is dependent on location, partners, and objectives. Refer to our list of scenarios development tools for ways to get started. For example, our Belize use-case (described below) used a habitat risk assessment tool combined with stakeholder engagement to draft and refine three alternative future scenarios.

### Q: Can Marxan with Zones be used with InVEST models?

A: Marxan produces zoning configurations for the purpose of achieving multiple planning objectives. InVEST can use zoning maps produced by Marxan (e.g., optimal locations for different sectoral uses) to assess outcomes for people based on the future changes to ecosystem structure and function. NatCap has used various scenario tools as a means to create inputs for InVEST models. For example, the **SLAMM model** (Sea Level Affecting Marshes Model) was applied in the US Gulf of Mexico to produce maps showing where salt marshes migrate under different sea level rise scenarios for the year 2100.

### Q: When are my scenarios final?

A: After preliminary analyses, scenarios can be iteratively refined to better reflect plausible alternative futures. Throughout the scenario development process, continue consulting stakeholders and local experts to ensure that your scenarios are plausible and will help your team produce information that can answer your specific research questions.

## 🔗 Links

- Arkema, Katie K., et al. "Assessing habitat risk from human activities to inform coastal and marine spatial planning: a demonstration in Belize." *Environmental Research Letters* 9.11 (2014): 114016. doi:10.1088/1748-9326/9/11/114016
- **Tradeoff!** - A series of simple games developed by the Natural Capital Project that challenges participants to consider the consequences of development on environment and how these actions will impact the benefits ecosystems provide to people
- **Scenario Primer** - A quick guide that introduces scenarios and how they can be used with InVEST. It also provides guidance on what makes an effective scenario, suggests goals and methods for developing scenarios, and illustrates how to convert scenarios into maps in InVEST.
- **Scenario Guidance and Case Studies** - A detailed resource for practitioners who want to assess ecosystem services under alternative scenarios. Drawing on case experiences, it provides guidance on scenario types and methods, engaging stakeholders, and creating scenario

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# HELPER TOOLS

## DATA PROCESSING AND VISUALIZATION DASHBOARDS



- **Visualize InVEST outputs** on a fully interactive, Google Earth-style map
- **Explore spatial patterns** (e.g., ecosystem service hotspots)
- **Compare scenarios** and highlight changes over time
- **Diagnose issues** and refine InVEST model inputs

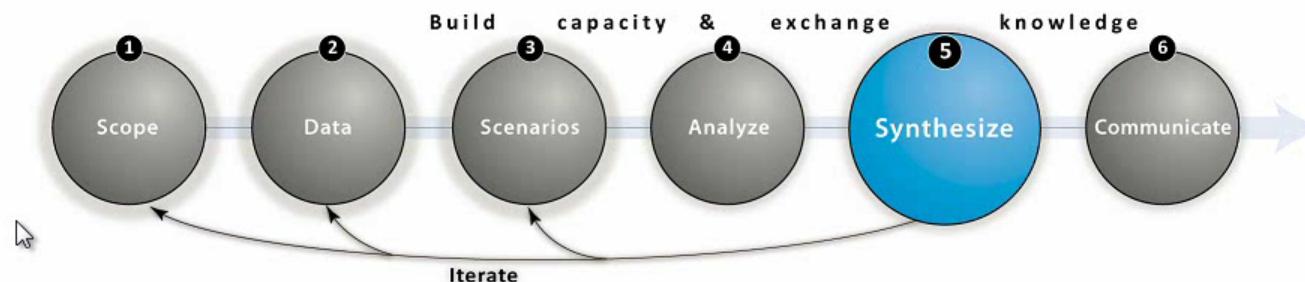
# MSP

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## Step 5: Synthesize

### Overview

Outputs produced by decision-support tools are not always in a format for immediate use. The "Synthesize" step serves to make sense of raw model outputs so that the most pertinent information can be included in the decision-making process. Synthesis helps visualize and compare different ecosystem service outcomes in space by highlighting synergies and trade-offs. This step typically requires substantial "post-processing" of model outputs. Examples of post-processing include normalizing outputs across multiple ecosystem services or objectives, conversion to local monetary units, or producing maps showing percent change from an established baseline (e.g., current scenario).



### Goals

- Refine raw outputs produced during the [Analyze](#) step
- Identify key metrics and information to be included in the communicate and apply phase ([Communicate](#) step)

### Tips

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[Author](#)

[Chart Type](#)

[Title](#)



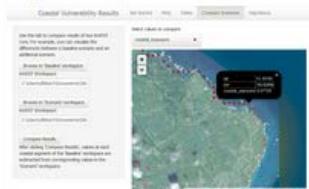
[Graph 3](#)

[Map 3](#)

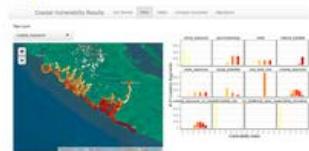
**Fig1 natcap**



**Fig2 natcap**



**Fig3 me**



**Fig5 you**



**Fig6 you**

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## The MSP Concierge Team



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Development of this website was made possible through support from the **Gordon and Betty Moore Foundation**.

# LOOKING AHEAD

## Common barriers to using ES info in MSP...

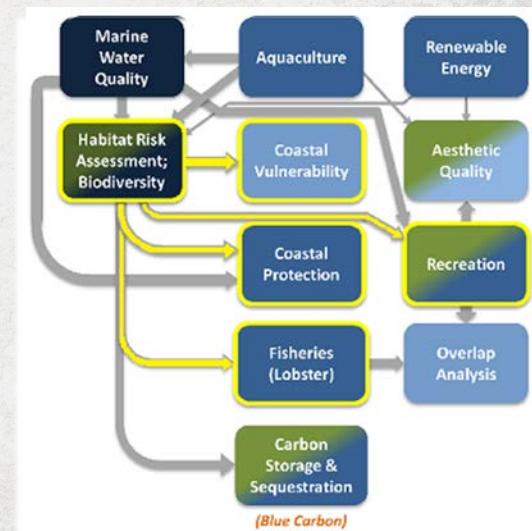
Data, science, decision-support technology and governance

### How can we overcome these barriers?

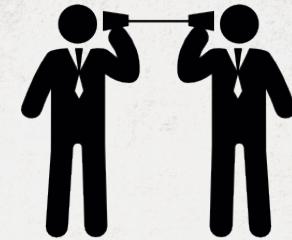
- Tailored guidance
- Links to useful references, databases and tools
- Helper tools for data processing and results
- Coming soon: Decision trees and questionnaires



- ❖ Scoping
- ❖ Available information and technical capacity
- ❖ Model choice and suggested linkages



# FINAL THOUGHTS



- Why is this not “**just another web site**” ?
  - Addresses common needs and FAQs from our users, partners and others interested in an MSP approach/ tools
  - Tailored to a particular decision context and audience
- An experiment for offering a different kind of user guidance
  - More interactive
  - A potential model for other kinds of decisions?



