



# atlas

UNDERSTANDING DEEP ATLANTIC ECOSYSTEMS



## WP5 Valuing Ecosystem Services

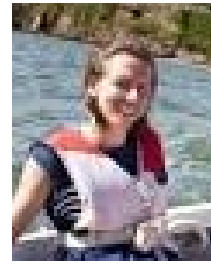
Atlas project review February Brussels 2018

WP Leader: Claire W. Armstrong, UiT The Arctic University of Norway



# Partners involved

- UTR, NUIG, Iodine, IMAR-UAz
- HWU, MSS, NIOZ, UCD, IEO, DFO, UNCW



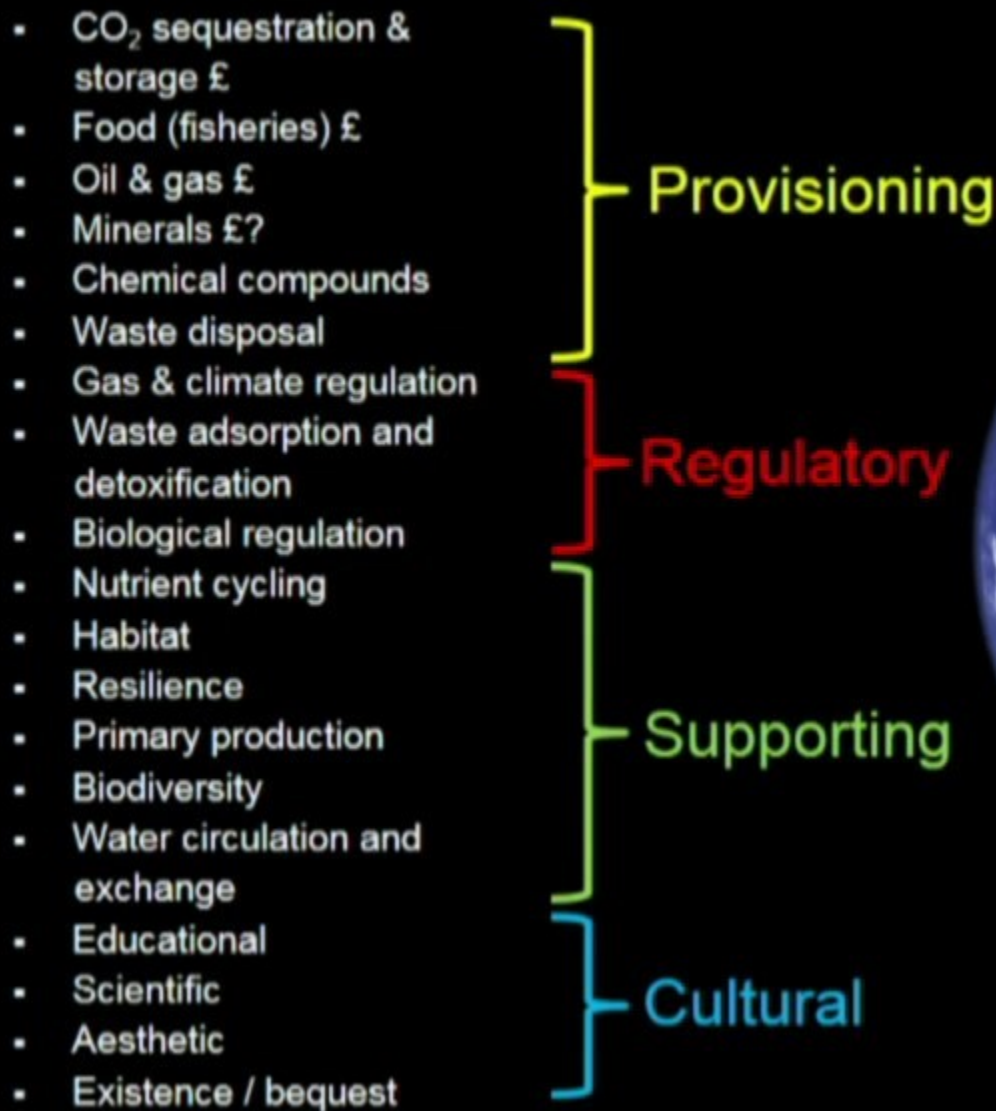
# Deliverables

Number	Deliverable Title and Description	Month
D5.1	Comprehensive inventory of existing and potential ecosystem services in Atlantic areas	M18
D5.2	Expert assessment of ecosystem services risks and pressures in case study areas	M18
D5.3	Report on ocean monetary values connected to Atlantic case study areas	M24
D5.4	Analysis of validity, legitimacy and acceptability of valuation methods	M36
D5.5	Report on willingness to pay for conservation in four Atlantic countries	M42
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# Goods and services provided by the deep ocean





# CASE STUDIES

## BLUE GROWTH ACTIVITIES

	LoVe	North and West of Shetland	Rockall	Mingulay Reef Complex	Porcupine Seabight	Bay of Biscay	Gulf of Cadiz	Azores	Davis Strait	Flemish Cap	US Atlantic Bight
<b>Current Activities</b>	*Fisheries *Tourism *Offshore Wind *Scientific Observatory	*Cables *Fisheries *Oil and gas *Tourism	*Fisheries	*Fisheries *Cables *Tourism	Oil and gas exploitation	Biotechnology *Shipping	*Fisheries *Recreational Aquaculture *Tourism	*Fisheries *Shipping *Cables *Tourism *Scientific research	*Fisheries *Oil and gas *Tourism *Indigenous fisheries	*Fisheries *Oil and gas *Shipping *Cables	*Fisheries *Recreational fisheries *Cables *Tourism *Shipping *Research
<b>Blue Growth Potential</b>											
Minerals	✓						✓	✓			✓
Renewable Energy	✓		(✓)	(✓)			✓	✓			
Aquaculture	✓			✓			✓	✓			
Tourism	✓			✓	(✓)		✓	✓	✓		✓
Biotechnology	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Oil and Gas	✓	✓	✓						✓	✓	✓
Shipping	✓	✓	✓	✓				✓	✓	✓	✓
Cables		✓		✓						✓	✓
New Fisheries Resources		✓	✓	✓	✓	✓		✓	✓	✓	✓
Scientific Reference Sites	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

CURRENT

POTENTIAL

# Deliverables



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## Effect of human activities on ecosystem services in the North Atlantic (risk assessment)

- ⇒ Positive/negative?
- ⇒ Severity of the effect
- ⇒ Likelihood of the effect

**Please fill in if you have not yet!**  
**And big thanks to those who have!**

### Identifying Ecosystem Services and associate risks in the North Atlantic – ATLAS Delphi Survey Round 2

Now that you have read the results from the Round 1 of the ATLAS Delphi survey, we would now like you to complete the risk assessment matrix for a second time.

The different human activity/impacts are to be assessed using the two measures below:

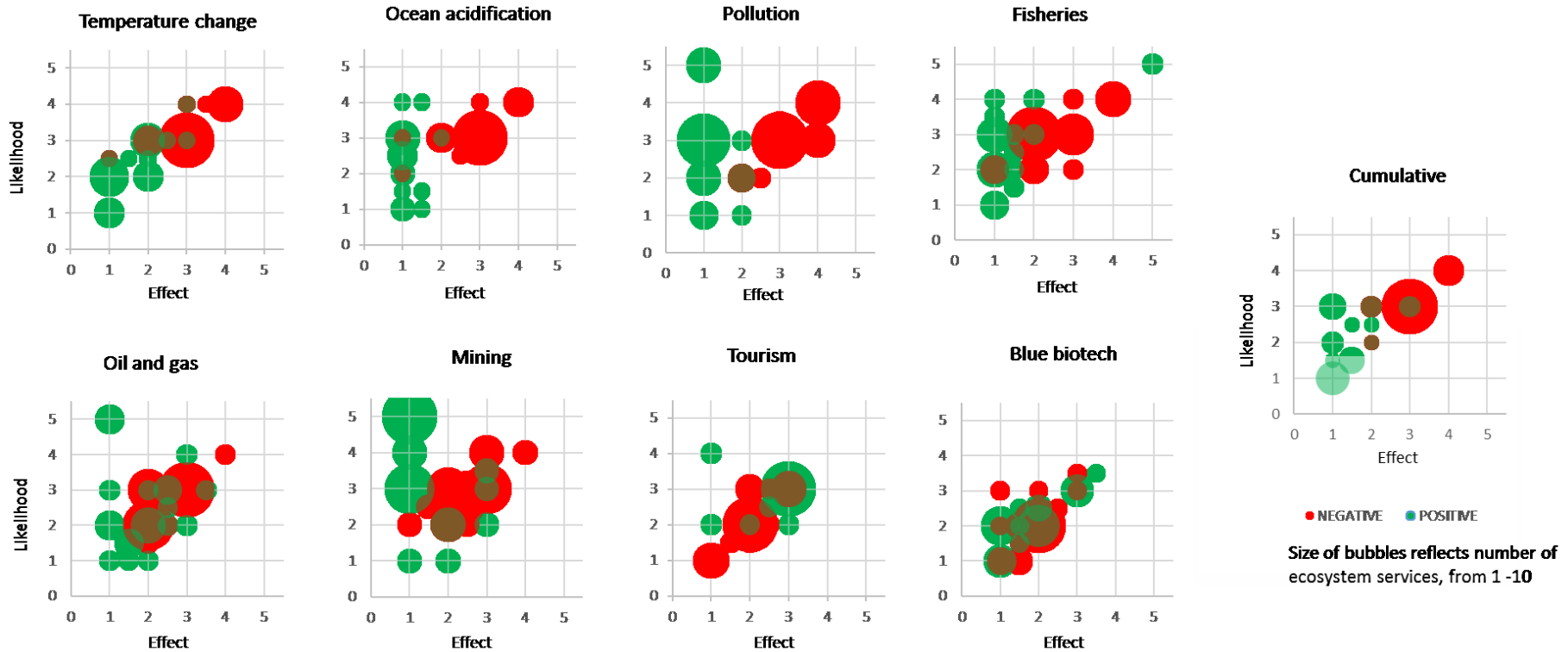
1. Identify whether each activity / impact will have a positive or negative effect on the different ecosystem service. If you think there may be both positive and negative effects, then you can put this in separate columns. If not leave the column blank. If not applicable click "N/A" and move to the next service
2. Then rank both the effect and the likelihood of the effect occurring on a scale of 1 to 5.

On the following tables you will be asked to complete this for eight ecosystem services and also for the cumulative / synergistic impact of all human aspects on the ecosystem services.

#### Impact of Temperature Change on the following ecosystem services

	Positive Effect	Likelihood of Positive Effect	Negative Effect	Likelihood of Negative Effect
Fish / shellfish (Provisioning service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Oysters / shellfish (Provisioning service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Minerals (Provisioning service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Chemicals / pharmaceuticals (Provisioning service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Waste disposal sites (Provisioning service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Raw materials (Provisioning service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Climate regulation (Regulating service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Waste absorption / detoxification (Regulating service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Carbon sequestration / absorption (Regulating service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Biological control (Regulating service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Recreation / tourism (Cultural service)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

# Risk assessment for different ecosystem services

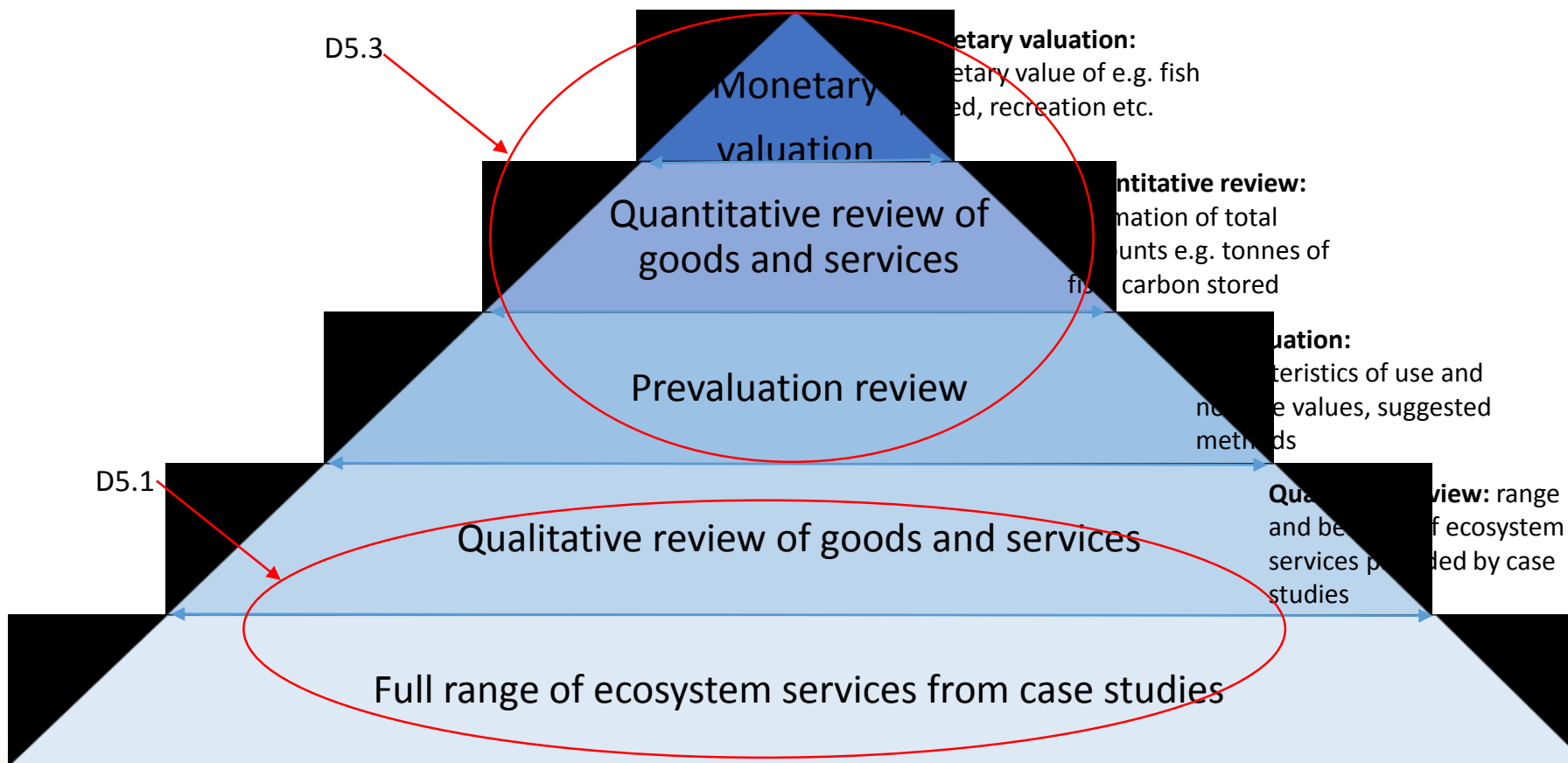


Likelihood, positive (green) and negative (red) effect of different human impacts (medians from Final Delphi round)

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# Valuing ecosystem services





## Case Study Request

- Spatial Boundaries for case study areas
  - How best to focus our data collection?
  - Details on area coverage to collect the best available services data
    - ICES/NAFO rectangle?
    - County boundaries (LoVe observatory)?
    - SAC (Mingulay)
- Available data?
  - Fisheries, aquaculture, tourism, carbon storage ...
  - Please forward any **qualitative** or **quantitative** data for your area to [naomi.foley@nuigalway.ie](mailto:naomi.foley@nuigalway.ie) (or share with WP5 members at the GA)

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# Q method

- Definition of the “concourse”
- Development of “Q-set” of typical statements
- Selection of respondents: not random, objective is to represent breadth of opinion and cover full range of views
- Interviews: respondents sort the statements
- Factor analysis to derive groupings of typical viewpoints
- Interpretation of the results.

Least agree					Most agree				
(Statement scores)									
-4	-3	-2	-1	0	1	2	3	4	
(2)	(3)	(4)	(5)	(6)	(5)	(4)	(3)	(2)	
(Number of statements per score)									

# Q study : example statements

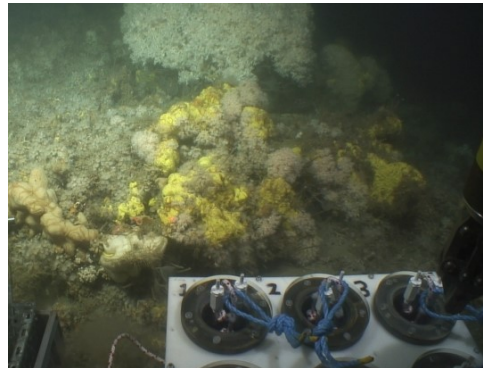
- “It is both possible and desirable to come to rational decisions regarding the environment without translating its values to money terms”
- “Economic arguments lead decision makers to ignore impacts not expressed in monetary terms”
- “Most decision-makers give little or no attention to arguments based on emotional and spiritual values of biodiversity”
- “Failure to incorporate information on the value of ecosystem services in decision making will lead to reductions in human welfare and loss of biodiversity”



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## Choice Experiment and Contingent Valuation



- Mingulay Reef (UK)
- Azores (Portugal)
- LoVe Observatory (Norway)
- Flemish Cap





## Discrete Choice Experiment

- Choice experiments present respondents with scenarios that represent combinations of ecosystem services and monetary costs
- Ask for most preferred combination
- Analyse using random utility model to infer trade-offs across attributes and hence values
- There is a trade-off between maintaining and protecting deep sea ecosystems versus using the deep sea



Attribute	Description	Levels
Area Protected	Scale of protected area - % of VME area protected relative to total sea area	1.5% (status quo) of deep sea protected 6% protected 10% protected
Potential Commercial Activities (Blue Growth)	Change in commercial activities (value of output measure)  - Trade off between VME protection and development of commercial activities	Decrease / Increase / No change  Current level of growth & employment / 10% increase / 30% increase  % changes (activity)
Surveillance and Monitoring of MPAs	It has been suggested that more effort should be given to the monitoring and control of activities in current protected areas	<i>Low level of monitoring:</i> VMS reporting every two hours (STATUS QUO)  <i>Medium level of monitoring:</i> VMS reporting every hour  <i>High level of monitoring:</i> VMS reporting every 30 minutes. Observers on board
Cost	Monitoring and enforcement of the management plan will be costly  <ul style="list-style-type: none"> <li>The tax will be payable by all households in <b>UK / Norway / Portugal</b> for the next five years</li> </ul>	EURO / NOK / GBP



## GES & Willingness To Pay

- ATLAS scientists have determined health of the deep sea environment can be assessed by four descriptors of GES from the MSFD

D1:Marine Biodiversity

D3:Health of commercial fish and shellfish

D6:Seafloor integrity to ensure ecosystem function

D10:Marine litter

- Contingent Valuation Method (CVM)
  - Elicit public WTP for improved health of deep sea
  - National – UK, Norway, Scotland
  - International – Flemish Cap - ABNJ

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# Thank You!

## Presenter details:

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Template developed by AquaTT



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