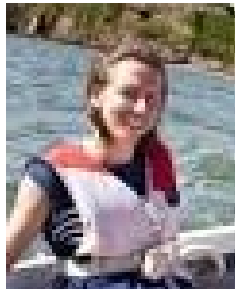# WP5 Valuing Ecosystem Services

Atlas Meeting Mallorca April 2017

Claire W. Armstrong, UiT The Arctic University of Norway

www.eu-atlas.org

Partners involved

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

WP5 Objectives

1. Assess and evaluate goods and services provided by the Atlantic Case Study areas in order to understand and predict future changes in socioeconomic value.

2. Determine the public's willingness to pay for the protection of selected Atlantic Case Study areas and their ecosystem services in light of present-day and the potential of future economic exploitation of Europe's deepwater ecosystems.

3. Provide economic and social context to ATLAS adaptive management planning.

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
D5.6	Report on ocean monetary values and adaptive management and trade-offs	M42

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Choice Experiment

- Investigate the public's willingness to pay for protection of four case study areas and estimate the value of non-market deep-sea ecosystem services
  - Lofoten-Vesteralen Observatory; Mingulay Reef Complex; Azores; Flemish Cap

- Design stage – we need your help!
  - Identifying attributes for the survey
  - More in the breakout session 5!

Attribute Type	Attribute Suggestion?	Levels
Key GES Attribute 1	From cruises?	?
Key GES Attribute 2	Biodiversity Indicator (specific to each case study)	Status quo, increased biodiversity, decreased biodiversity?
Potential Commercial Activities (Blue Growth)	Attractiveness for sustainable industrial activities	Low, Medium, High

Choice Experiment

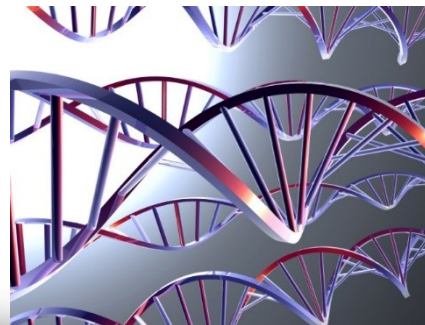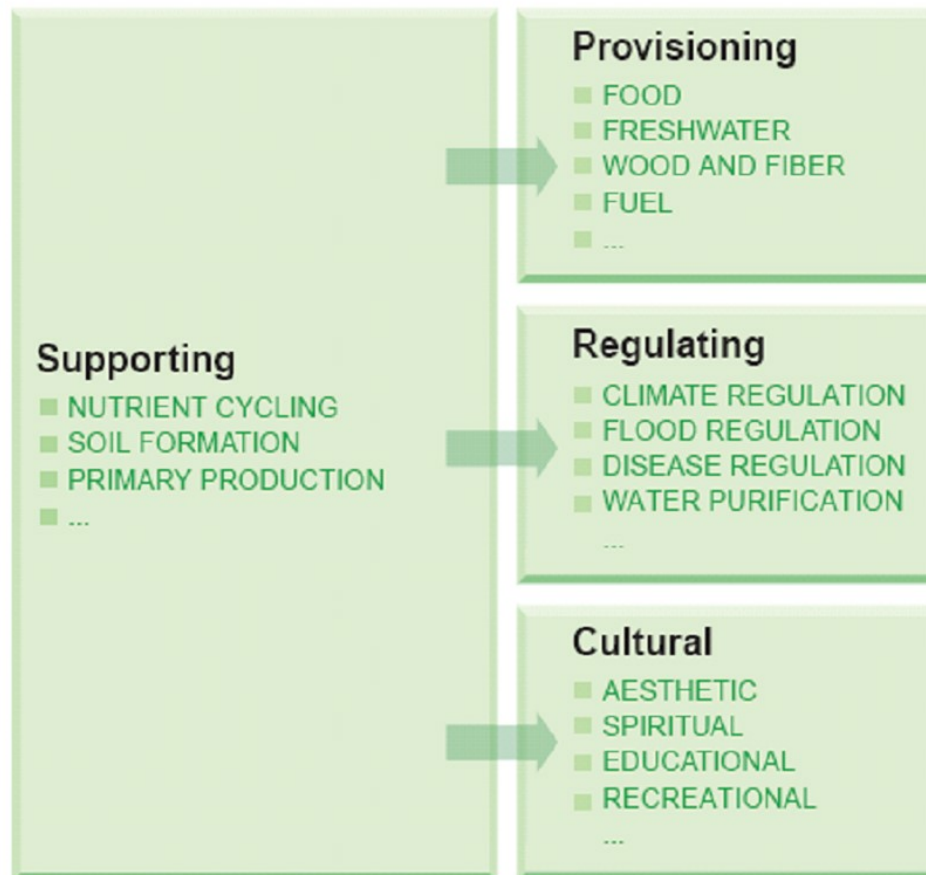| Attribute Type	Attribute Suggestion?	Levels
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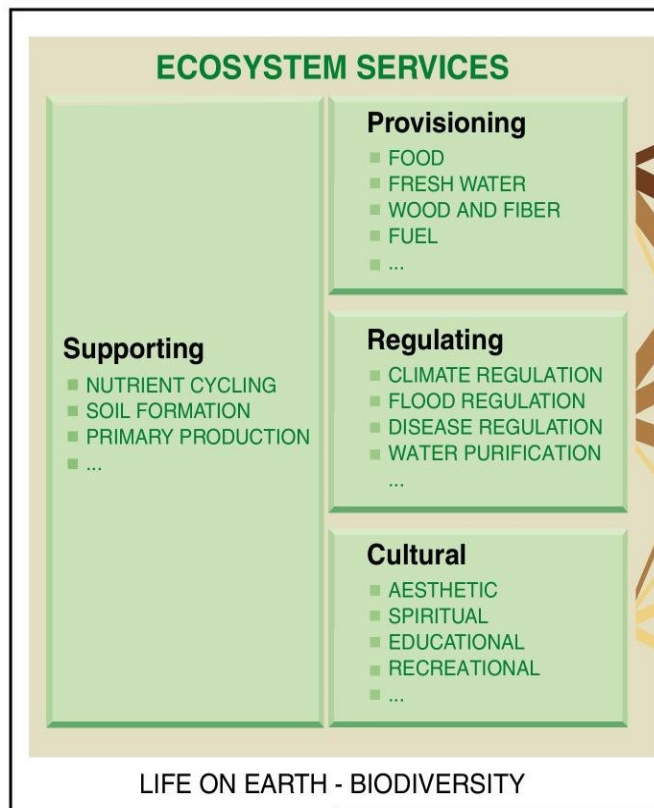| Number	Deliverable Title and Description	Month
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Ecosystem services?

Kirsten Gravningen

VINTAGE CLASSICS
GREGORY PECK
MOBY DICK

Havforskningsinstituttet

Colourbox

www.eu-atlas.org

Millennium Ecosystem Assessment

CONSTITUENTS OF WELL-BEING

ECOSYSTEM SERVICES

Provisioning
- FOOD
- FRESH WATER
- WOOD AND FIBER
- FUEL
- ...

Supporting
- NUTRIENT CYCLING
- SOIL FORMATION
- PRIMARY PRODUCTION
- ...

Regulating
- CLIMATE REGULATION
- FLOOD REGULATION
- DISEASE REGULATION
- WATER PURIFICATION
- ...

Cultural
- AESTHETIC
- SPIRITUAL
- EDUCATIONAL
- RECREATIONAL
- ...

LIFE ON EARTH - BIODIVERSITY

Security
- PERSONAL SAFETY
- SECURE RESOURCE ACCESS
- SECURITY FROM DISASTERS

Basic material for good life
- ADEQUATE LIVELIHOODS
- SUFFICIENT NUTRITIOUS FOOD
- SHELTER
- ACCESS TO GOODS

Health
- STRENGTH
- FEELING WELL
- ACCESS TO CLEAN AIR AND WATER

Good social relations
- SOCIAL COHESION
- MUTUAL RESPECT
- ABILITY TO HELP OTHERS

Freedom of choice and action
OPPORTUNITY TO BE ABLE TO ACHIEVE WHAT AN INDIVIDUAL VALUES DOING AND BEING

Source: Millennium Ecosystem Assessment

ARROW'S COLOR
Potential for mediation by socioeconomic factors
- Low
- Medium
- High

ARROW'S WIDTH
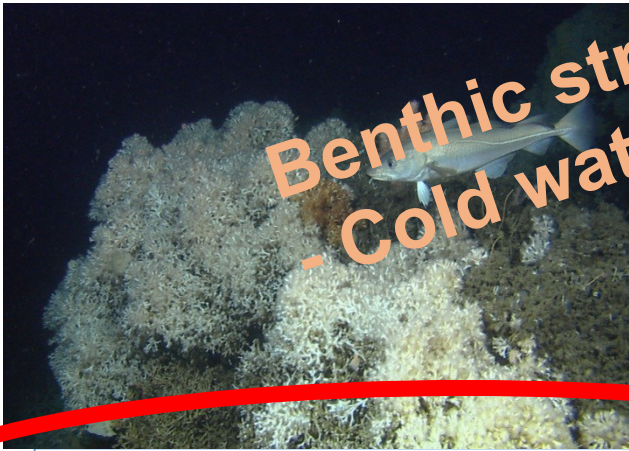Intensity of linkages between ecosystem services and human well-being
- Weak
- Medium
- Strong

Benthic structure
- Cold water coral

Ecosystem function

→ **Ecosystem service**

- **Habitat for fish**
- **Cultural service**

→ **Benefit**

- **Protect and provide for fish**
  - **Esthetics**
  - **Future?**

→ **Value**

- **Indirect use values**
- **Bequest and existence values**
- **Option values**

Benthic structure
- Cold water coral
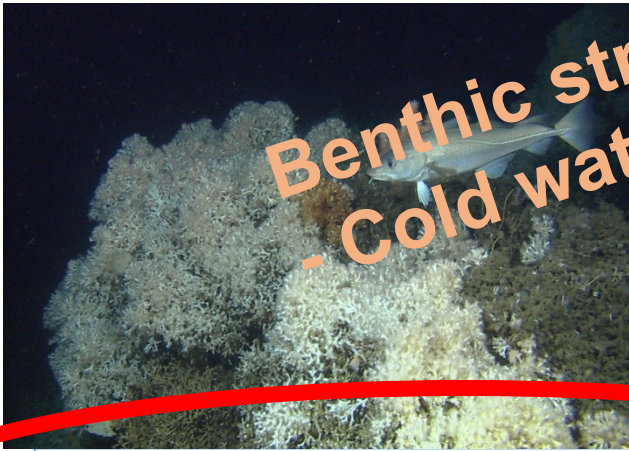
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Value

- **Option values**
- **Indirect use values**
- **Bequest and existence values**

Data collection

Delphi survey - expert opinion in two steps

1) Assessment by experts

$\Rightarrow$ Analyse expert opinion

$\Rightarrow$ Inform experts

2) Ask experts to assess again

$\Rightarrow$ convergence?

http://www.ancient-origins.net/myths-legends/pythia-oracle-delphi-001641

Survey today in two main parts

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

$\Rightarrow$ Positive/negative?

$\Rightarrow$ Severity of the effect

$\Rightarrow$ Likelihood of the effect occuring

2) Identify ecosystem services in **case study area(s)**

And some follow-up questions

Identifying Ecosystem Services and associate risks in case study areas of the North Atlantic:

Your nationality:
Your expertise:
Your gender:

Positive and/or negative effect (**+, - or na, i.e. positive effect, negative effect or not applicable**)

Long run effect - up to year 2100 **(Number shows degree of severity of effect from 1 to 5 where 1 = very lo to 5 = very high degree of severity)**

Likelihood of effect occuring **(Number shows how probable it is that there will be an effect upon the ecosystem service 1= very low to 5 = very high probability)**

Please assess how you think different human aspects impact on ecosystem services:

Ecosystem services:		Temperature change			Ocean acidification			Fishing		
		Pos/Neg	Effect	Likelihood	Pos/Neg	Effect	Likelihood	Pos/Neg	Effect	Likelihood
Provisioning	Fish/shellfish									
	Oil/gas/energy									
	Minerals									
	Chemicals/pharmaceuticals									
	Waste disposal sites									
	Raw materials									
	Other….									
Regulating	Climate regulation									
	Waste absorption/detoxification									

Identifying Ecosystem Services and associate risks in case study areas of the Nort

Your nationality:	Norwegian
Your expertise:	Economics
Your gender:	female

Positive and/or negative effect (+, - or na, i.e. positive effect, negative effect or not a

Long run effect – up to year 2100 (Number shows degree of severity of effect from 1 t
to 5 = very high degree of severity)

Likelihood of effect occuring (Number shows how probable it is that there will be an
ecosystem service 1= very low to 5 = very high prob

Please assess how you think different human aspects impact on ecosystem services:

Ecosystem services:		Temperature change			Ocean acidification			
		Pos/Neg	Effect	Likelihood	Pos/Neg	Effect	Likelihood	Pos/N
Provisioning	**Fish/shellfish**	+	3	3	-	3	2	-
		-	4	5				
	Oil/gas/energy	na			na			na
	Minerals	na			na			na
	Chemicals/pharmaceuticals	na			na			na
	Waste disposal sites							

On a scale of 1 to 5 (1 = very uncertain, 5 = very certain) how certain do you feel about your answers:

Are there some aspects above that you feel very certain or uncertain about?

	Very certain:	
	Very uncertain:	

Please note the ecosystem services you believe to be present in *a (or several)* *Atlas case study areas* of your cho

Ecosystem services:		Case study area: *Tick for presence*	Case study area: *Tick for presence*
Provisioning	Fish/shellfish		
	Oil/gas/energy		
	Minerals		
	Chemical/Pharmaceuticals		
	Waste disposal sites		
	Raw materials		
	Other….		
Regulating	Climate regulation		
	Waste absorption/detoxification		
	Carbon sequestration/absorption		
	Biological regulation		
	Other….		
Cultural services	Recreation		
	Tourism		
	Educational		
	Aesthetic		
	Cultural heritage		
	Indigenous heritage		
	Existence/bequest		
	Biodiversity		
	Other….		
Supporting	Nutrient cycling / biological pump		

Are there some aspects above that you feel very certain or uncertain about?

Very certain:	Fishing effects
Very uncertain:	Ocean acid

Please note the ecosystem services you believe to be present in *a (or several) Atlas*

		Case study area:	Case study area:	
		LOVE	Azores	
Ecosystem services:		*Tick for presence*	*Tick for presence*	
Provisioning	**Fish/shellfish**	x	x	
	Oil/gas/energy	x		
	Minerals		x	
	Chemical/Pharmaceuticals	x	x	
	Waste disposal sites	x	x	
	Raw materials	x		
	Other….			
Regulating	**Climate regulation**	x	x	
	Waste absorption/detoxification	x	x	
	Carbon sequestration/absorption	x	x	
	Biological regulation	x	x	
	Other….			
Cultural services	**Recreation**	x		
	Tourism	x		
	Educational	x	x	

Two additional questions (if you would like to add comment):

To what extent do you think the ecosystem services framework is a valid and useful approach to understanding human human dependence on marine environments?

To what extent do you think monetary valuation of changes in ecosystem services provides robust and relevant informat for management decisions regarding marine environments?

Please send this file to: claire.armstrong@uit.no

Thank You!

atlas

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