Public Perceptions of Deep-Sea Environment: Evidence from Scotland and Norway

Isaac Ankamah-Yeboah, **Bui Bich Xuan, Stephen Hynes, Claire W. Armstrong,**

www.eu-atlas.org

Introduction

- Public perception/acceptance is important to avoid protests like yellow vests in the streets.

- Personal values, norms and institutional trust affects acceptance of political decisions: - literacy is essential.

- Ocean literacy lags environmental literacy and deep sea literacy is less well-known (spatially and temporally distant)

Objective

- To explore public perceptions of the deep sea environment among Scottish and Norwegian public.
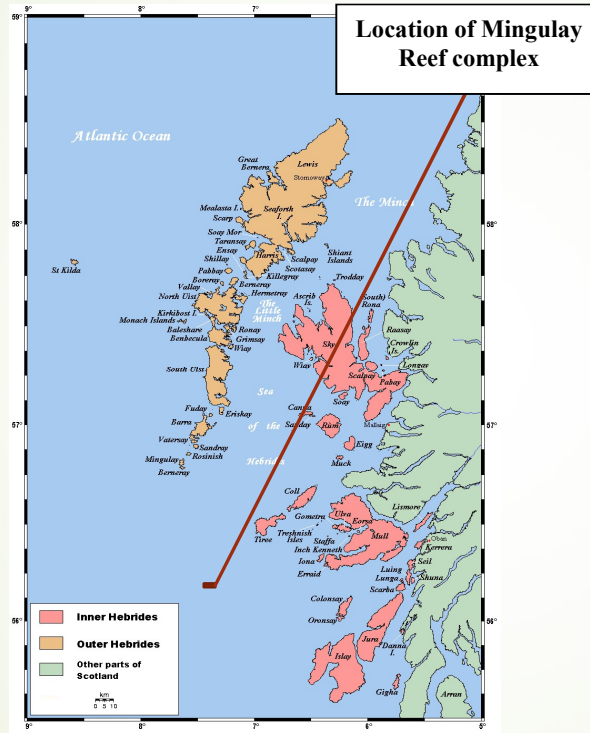
- Specifically:

  - Knowledge and Awareness of Marine Ecosystems
  - Deep sea changes connection
  - Deep sea condition and management rating
  - Pro-environmental concerns

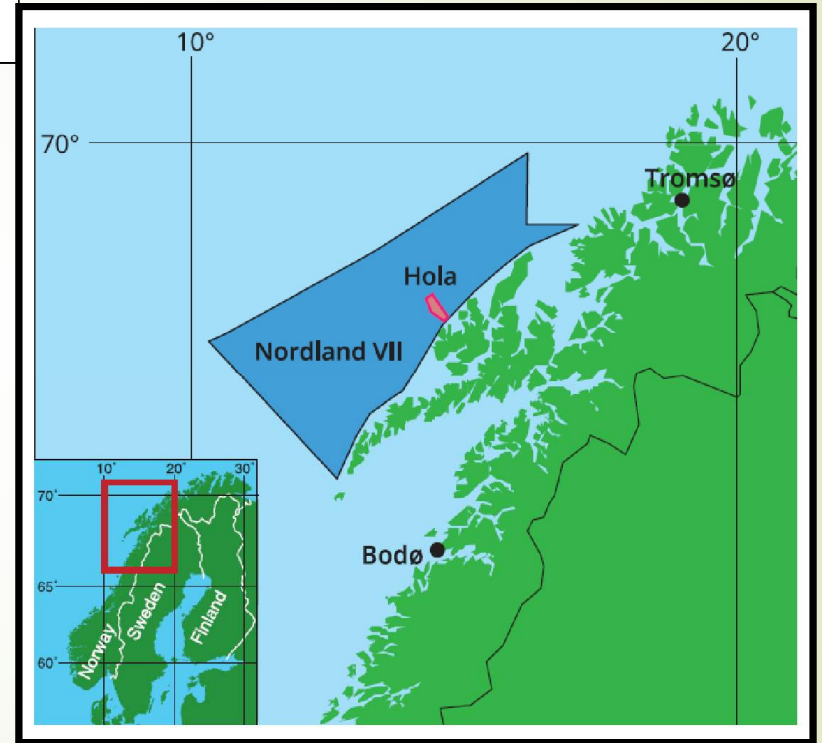**Socio-Economics and Attitudinal factors effect**

Study Area

Location of Mingulay Reef complex

➡ Mingulay Reef Complex (MRC)

➡ Lofoten Vesteralen (LoVe)

atlas

Method

➡ Online survey

➡ Sample: 1,025 (Scotland) and 1,024 (Norway)

➡ Survey design

  ➡ Prior knowledge and awareness

  ➡ Deep sea condition, management

  ➡ Pro-environmental concerns

  ➡ Attitudinal questions

Knowledge Information:
✓ Climatic and anthropogenic impact on seas and wildlife

✓ Government responsible for management and cost implications

✓ Marine Economy & Ecosystems

✓ MRC-LoVe CW coral reefs:
  ✓ Importance
  ✓ Opportunities

Method: Pro-environmental concerns

Likert Scale

Items	Item Short Phrase	Source
The balance of marine biodiversity is very delicate and easily upset	Delicate marine biodiversity	NEP
Human activities are severely abusing marine ecosystems such as m... biologica...		NEP
The key p...		
The key p... damage...		
All comm... in order to...		
Marine lit... environm...		
Healthy s...		
Healthy s...		
Establishm... measure... organisms		
Economic growth is more important than protecting the marine environment	Economic growth	author
As humans we are responsible to protect natural resources to benefit future generations	Environmental citizenship	author

- Strongly Agree (5)
- ...d to ...ee
- ...her ...e nor ...gree
- ...d to ...agree
- Strongly Disagree (1)

Marine litter is one of the key challenges to the marine environment and biodiversity

Healthy seas are central to our well-being

Results: Summary Statistics - Shares

Variable	Mingulay-Scotland		LoVe - Norway	
	Mean	Std. Dev.	Mean	Std. Dev.
Age 18-35	0.101	0.302	0.168	0.374
Age 36-55	0.493	0.500	0.394	0.489
Age 56 and above	0.406	0.491	0.438	0.496
Male	0.440	0.497	0.572	0.495
Tertiary Education	0.518	0.500	0.864	0.343
Full time employed	0.380	0.486	0.592	0.492
Part time employed	0.133	0.339	0.092	0.289
Student	0.064	0.246	0.052	0.222
Unemployed	0.044	0.205	0.021	0.145
Resident of Highlands and Islands	0.063	0.244	-	-
Marine Sports	0.384	0.487	0.466	0.499
Visit to Sea Areas	0.276	0.447	0.639	0.481
Have visited island of Mingulay [or LoVe]	0.023	0.151	0.639	0.481
Have visited island of Barra	0.119	0.324	-	-
Have visited elsewhere in the Outer Hebrides	0.238	0.426	-	-
Have seen Blue Planet II	0.549	0.498	0.429	0.495

Results: Knowledge and Awareness
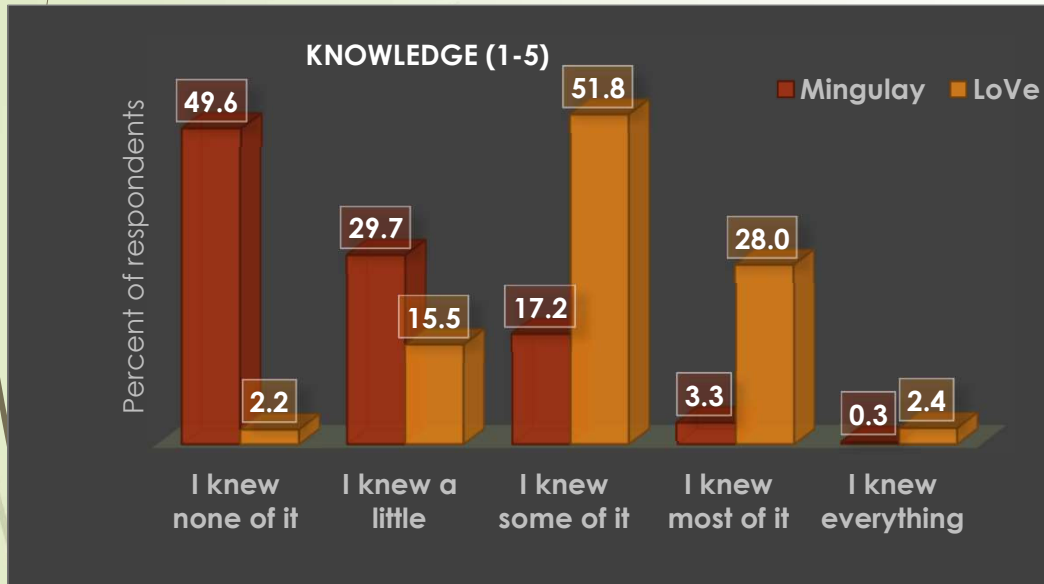
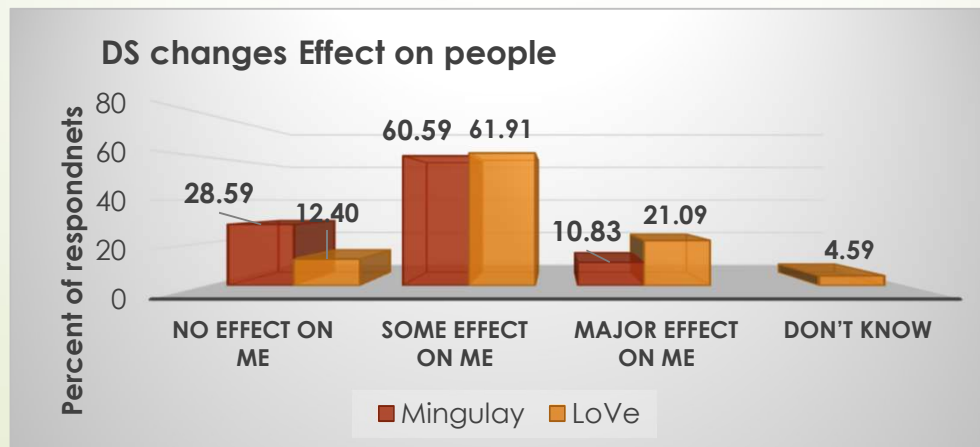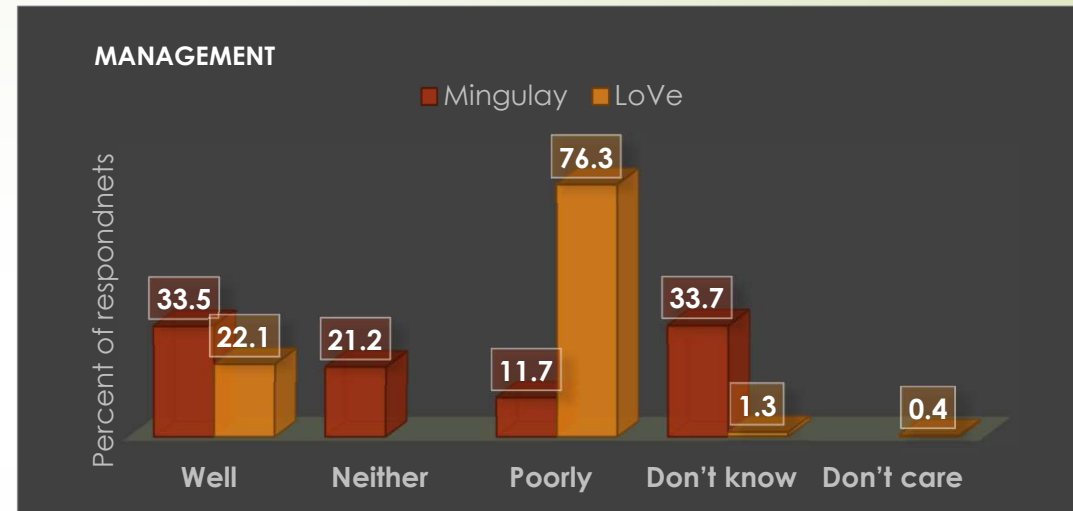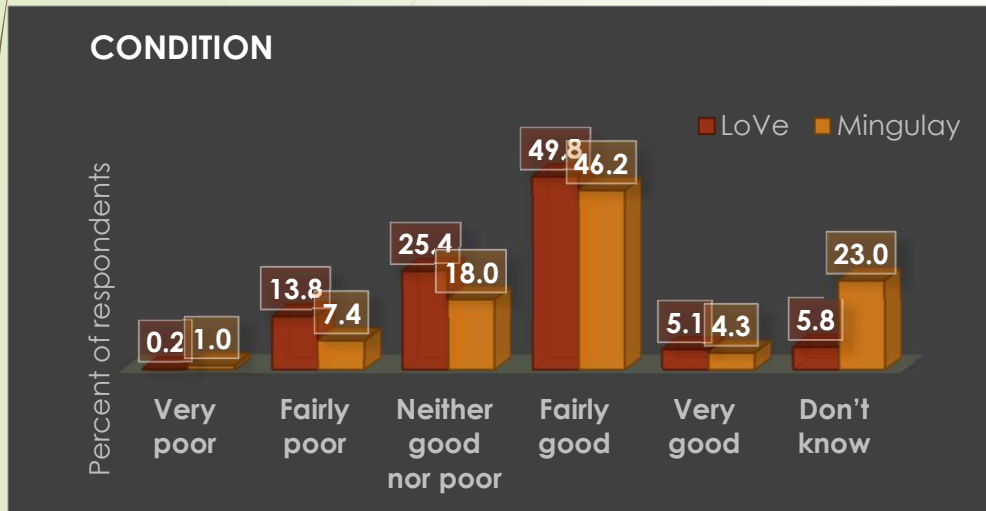MEANS SCORES
Mingulay= 1.75
LoVe= 3.13

MEDIAN SCORES:
Mingulay=2
LoVe=3
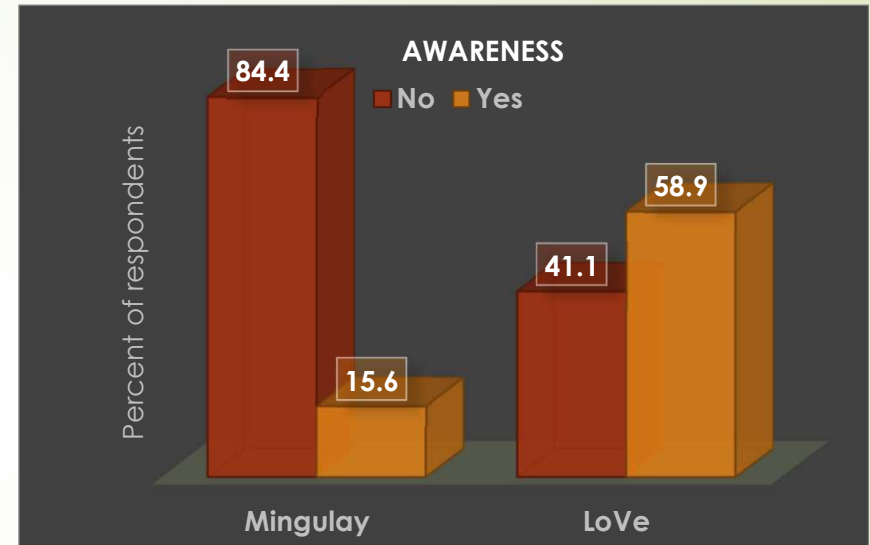
Results: Knowledge and Awareness

Variables	Mingulay – Scotland		LoVe - Norway	
	Knowledge (Ologit)	Awareness (Logit)	Knowledge (Ologit)	Awareness (Logit)
	Coef	**Coef**	**Coef**	**Coef**
Male	0.134	0.089	-0.113	0.224
Age 36-55	0.066	0.911**	0.223	0.174
Age 56 and above	0.289	1.571***	0.414**	0.285
Tertiary Education	0.322***	-0.198	0.575***	0.275
Blue Planet II	0.495***	0.473**	0.543***	0.870***
Highlands and Islands	0.677**	0.349		
Sea Industry	1.088***	0.902***	0.612***	0.572***
Marine Sport	0.488***	0.252	0.614***	0.481***
Visit to Sea Areas	0.874***	1.209***	0.451***	0.547***
Member of Env. Org	-	-	0.551***	0.624**
Constant	-	-3.761***	-	-1.255***
Observations	1,025	1,025	1,024	1,024
Wald Chi2	133.71***	89.14***	100.59***	104.84***
Pseudo R2	0.061	0.113	0.049	0.087

Results: Deep sea (DS) CONDITION and MANAGEMENT Rating

CONDITION

Percent of respondents

LoVe ■ Mingulay ■

	Very poor	Fairly poor	Neither good nor poor	Fairly good	Very good	Don't know
LoVe	0.2	13.8	25.4	49.8	5.1	5.8
Mingulay	1.0	7.4	18.0	46.2	4.3	23.0

MANAGEMENT

Percent of respondnets

Mingulay ■ LoVe ■

	Well	Neither	Poorly	Don't know	Don't care
Mingulay	33.5	21.2	11.7	33.7	
LoVe	22.1		76.3	1.3	0.4

DS changes Effect on people

Percent of respondnets

	NO EFFECT ON ME	SOME EFFECT ON ME	MAJOR EFFECT ON ME	DON'T KNOW
Mingulay	28.59	60.59	10.83	
LoVe	12.40	61.91	21.09	4.59

Mingulay ■ LoVe ■

Results: Deep sea (DS) CONDITION and MANAGEMENT Rating

Variables	Condition (Ologit)		Management (Logit)		Effect on me (Ologit)	
	Mingulay	LoVe	Mingulay	LoVe	Mingulay	LoVe
	Coef	Coef	Coef	Coef	Coef	Coef
Male	0.029	0.593***	0.042	0.735***	-0.104	-0.777***
Age 36-55	0.463**	0.440**	0.230	0.268	0.213	0.400**
Age 56 and above	0.629***	0.385**	0.300	0.304	-0.223	0.127
Tertiary Education	0.202	0.122	-0.156	-0.338	0.324**	0.124
Blue Planet II	0.401***	0.009	0.353**	0.274*	0.140	0.572***
Highland and Islands	0.309	-	-0.302	-	0.117	-
Sea Industry	-0.416	0.502***	-0.320	1.104***	0.528**	0.157
Marine Sport	0.074	-0.068	0.106**	0.795***	0.044	0.768***
Visit to Sea Areas	0.273*	0.285**	0.322***	0.700***	0.610***	0.274*
Member of Env. Org	-	-0.274	-	0.671***	-	0.982***
Constant			-1.149	-3.006		
Observations	789	965	1,025	1,024	1,025	977
Wald Chi2	31.54***	47.92***	17.18**	105.97***	41.58***	105.28***
Pseudo R2	0.016	0.023	0.014	0.11	0.03	0.072

Variables	Condition (Ologit)		Management (Logit)		Effect on me (Ologit)	
	Mingulay	LoVe	Mingulay	LoVe	Mingulay	LoVe
	Coef	**Coef**	**Coef**	**Coef**	**Coef**	**Coef**
Male	0.029	0.593***	0.042	0.735***	-0.104	-0.777***
Blue Planet II	0.401***	0.009	0.353**	0.274*	0.140	0.572***
Member of Env. Org	-	-0.274	-	0.671***	-	0.982***

Results: Pro-environmental Concerns

Item Code	Mingulay				LoVe			
	Obs.	Mean	SD	AGREE (Tend to + Strongly)	Obs.	Mean	SD	AGREE (Tend to + Strongly)
Delicate marine biodiversity	942	4.31	0.71	80.88	1,024	4.09	0.77	82.52
Human abuse	964	4.31	0.77	81.18	1,024	4.30	0.72	89.26
Fisheries pressure	812	3.59	0.87	44.19	1,024	3.23	0.79	33.1
Sea floor damage	806	3.87	0.82	53.27	1,024	3.49	0.79	49.03
Sustainable exploitation	937	3.97	1.04	67.03	1,024	4.34	0.77	88.87
Marine litter challenge	969	4.47	0.70	86.93	1,024	4.15	0.78	82.52
Central to our well-being	988	4.38	0.74	85.07	1,024	4.52	0.72	92.48
Central to economic security	948	4.14	0.80	75.22	1,024	4.19	0.80	83.01
MPA is important	973	4.36	0.72	83.8	1,024	4.12	0.87	80.47
Economic growth	979	3.86	1.06	65.85	1,024	4.04	0.93	75.49
Environmental citizenship	1,002	4.62	0.62	91.22	1,024	4.54	0.75	92.48
Mean		4.17	0.31			4.09	0.40	

What are the Socio-Economic variants?

Results: Pro-environmental Concerns MIMIC Model
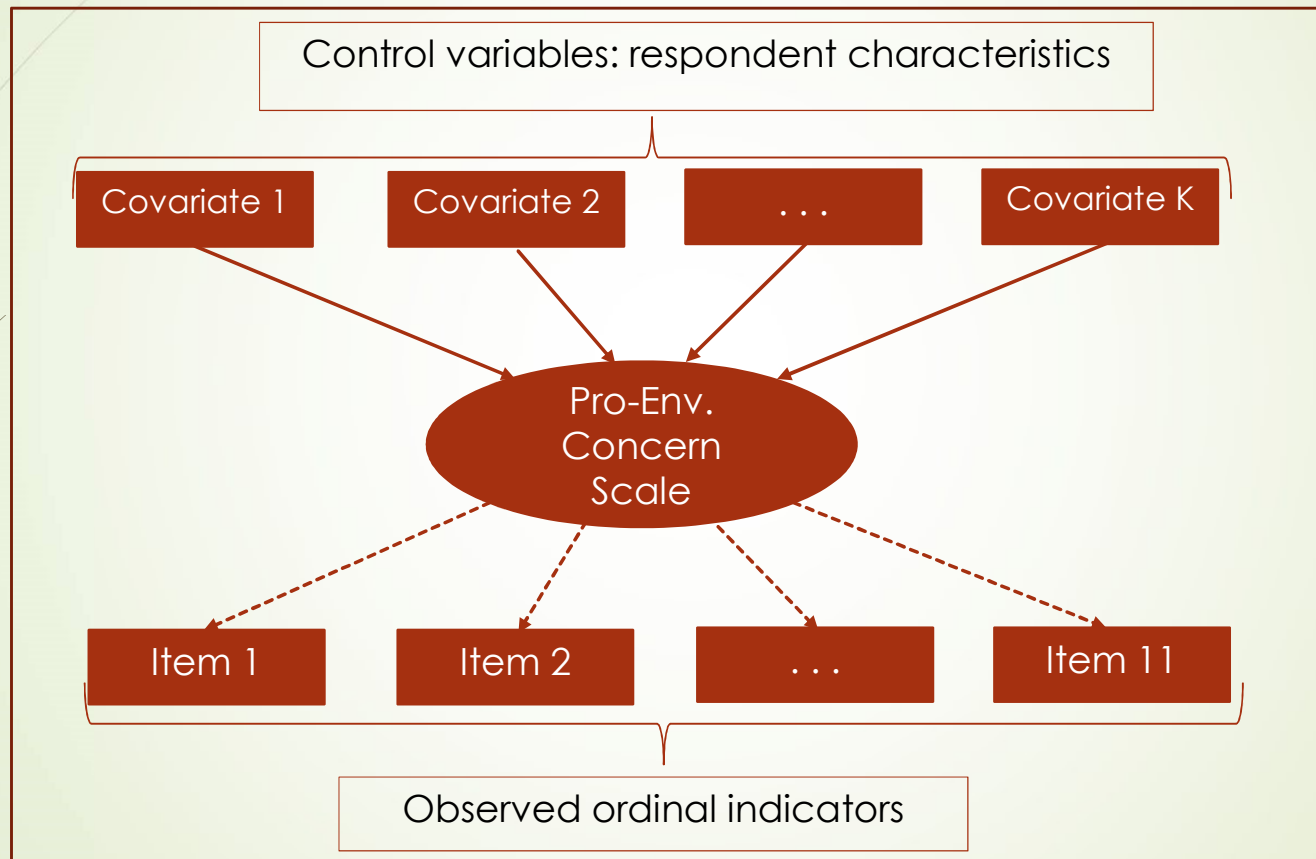
GSEM: A MIMIC Model of Single Latent Variable: Pro-Environmental Concern

Results: Influencers of Pro-environmental Concerns

	LoVe	Mingulay
Structural	Coeff	Coeff
Male	-0.64***	-0.01
Age 36-55	0.17	0.28
Age 56 and above	0.14	0.54**
Tertiary Education	0.39*	0.20
Blue Planet II	0.69***	0.73***
Member of Env. Organization	1.13***	-
Highland and Islands	-	0.28
Sea Industry	-0.82***	-0.54**
Marine Sport	0.10	-0.05
Visit to Sea Areas	0.06	0.30*
Deep-sea changes effect on me	0.71***	1.38***
At least some prior knowledge	0.38***	0.38**
Obs	1024	1005
Loglik	-10479	-11311

Conclusion

- Public knowledge of the deep sea is low for Scottish and moderate for Norwegians

- Awareness of cold-water corals was high for LoVe and low for Mingulay

- Deep sea condition is perceived to be "fairly good" but people are dissatisfied with the management of it (low institutional trust)

- There are ecocentric attitudes towards the marine environment – implying support for conservation goals

Further Inquiry ....

- Does acceptance translate into Financial commitments?

- Visit the ATLAS POSTER:

Economic Valuation of New Deep-Sea Management Options: A Latent Class Comparison of Norway and Scotland

Isaac Ankamah-Yeboah[a], Bui Bich Xuan[b], Stephen Hynes[a], Katherine Needham[c], and Claire W. Armstrong[b]
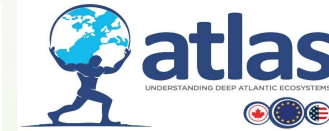
Thank You

www.eu-atlas.org