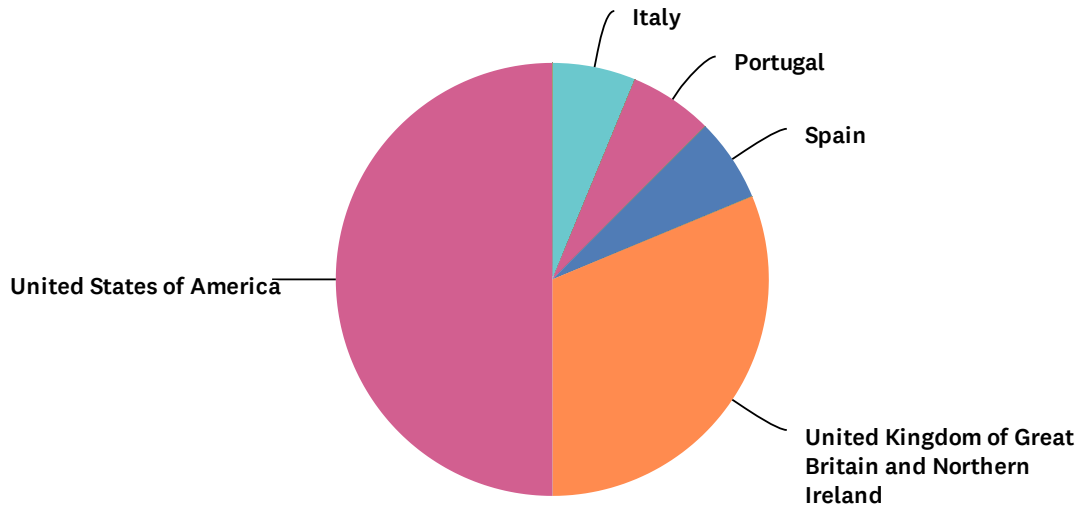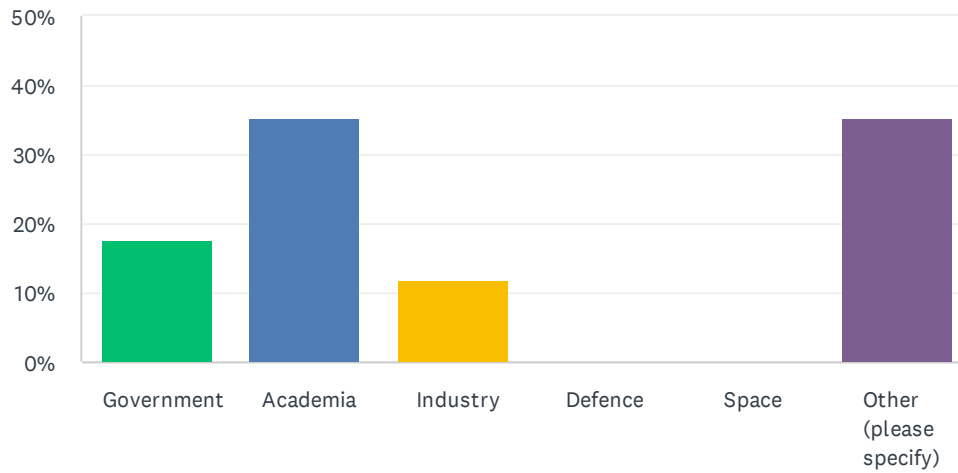# Q5 Your main work location

Answered: 16   Skipped: 1

Q6 Which sectors do you represent or work in?

Answered: 17   Skipped: 0

ANSWER CHOICES	RESPONSES	
Government	17.65%	3
Academia	35.29%	6
Industry	11.76%	2
Defence	0.00%	0
Space	0.00%	0
Other (please specify)	35.29%	6
TOTAL		17

#	OTHER (PLEASE SPECIFY)	DATE
1	science consultant	11/28/2021 10:55 PM
2	Sargasso Sea Commission is a hybrid public private body	11/28/2021 10:43 PM
3	Non-profit / Philanthropy	10/19/2021 4:52 AM
4	Not-for-profit	10/15/2021 7:03 PM
5	NGO and academia and govt	10/13/2021 3:26 PM
6	United Nations organization	10/13/2021 1:47 AM

Q7 If you are within the maritime industry, which specific area/sector do you represent?

Answered: 13   Skipped: 4
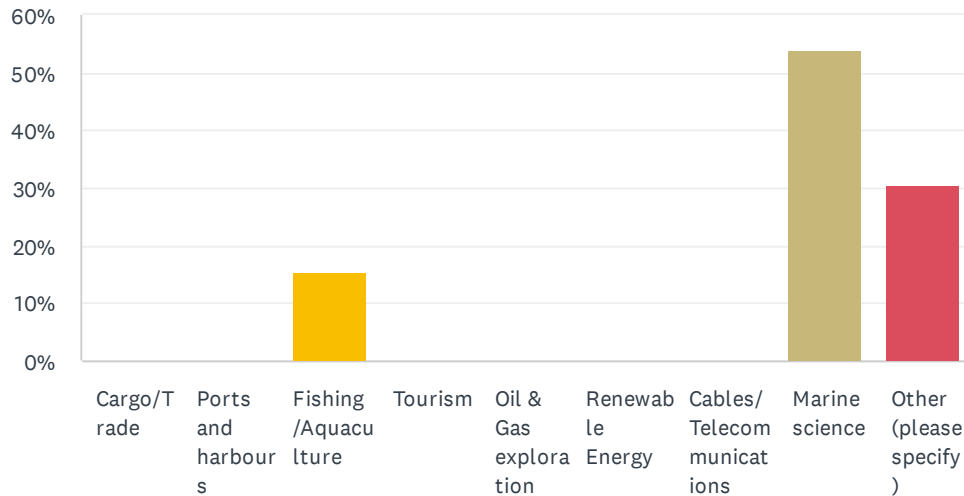
ANSWER CHOICES	RESPONSES	
Cargo/Trade	0.00%	0
Ports and harbours	0.00%	0
Fishing/Aquaculture	15.38%	2
Tourism	0.00%	0
Oil & Gas exploration	0.00%	0
Renewable Energy	0.00%	0
Cables/Telecommunications	0.00%	0
Marine science	53.85%	7
Other (please specify)	30.77%	4
TOTAL		13

#	OTHER (PLEASE SPECIFY)	DATE
1	N/A	11/28/2021 10:43 PM
2	Robotics	10/19/2021 9:43 PM
3	Conservation	10/19/2021 4:52 AM
4	ocean management and governance	10/13/2021 1:47 AM

Q8 What do you consider the main benefits of governing ocean ecosystems? Please rank the following in order of benefit/priority.

Answered: 16   Skipped: 1
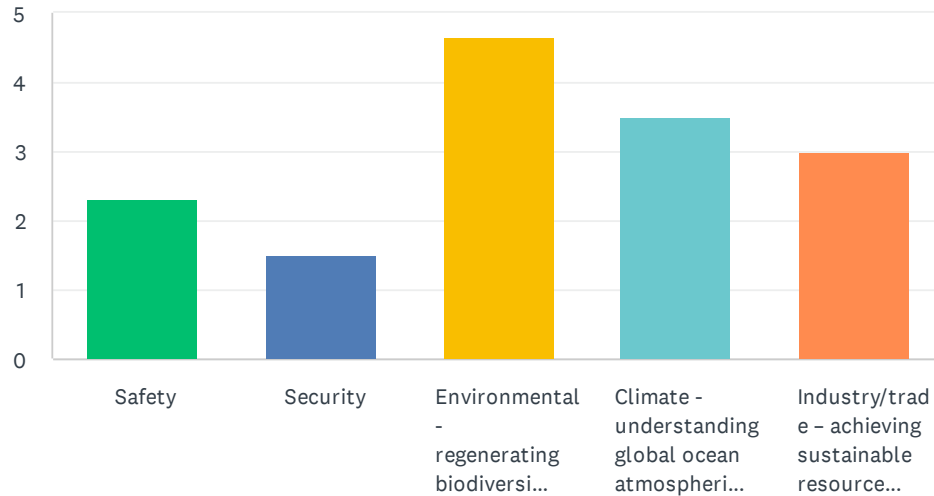
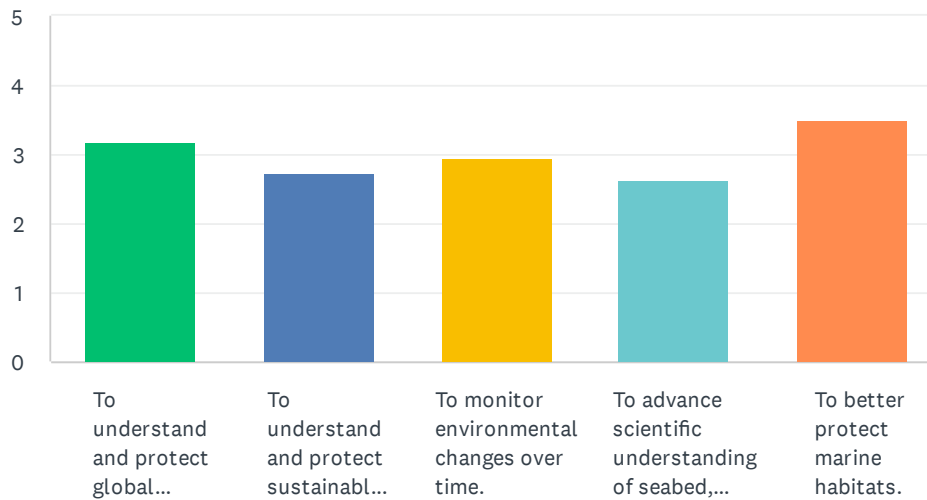|	1	2	3	4	5	TOTAL	SCORE
Safety	6.25% 1	0.00% 0	31.25% 5	43.75% 7	18.75% 3	16	2.31
Security	0.00% 0	0.00% 0	0.00% 0	50.00% 8	50.00% 8	16	1.50
Environmental - regenerating biodiversity and marine life and countering pollution	66.67% 10	33.33% 5	0.00% 0	0.00% 0	0.00% 0	15	4.67
Climate - understanding global ocean atmospheric processes	12.50% 2	43.75% 7	31.25% 5	6.25% 1	6.25% 1	16	3.50
Industry/trade – achieving sustainable resource harvesting/other commercial activities	12.50% 2	25.00% 4	37.50% 6	0.00% 0	25.00% 4	16	3.00

Q9 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 11   Skipped: 6

#	RESPONSES	DATE
1	No but emphasize the sustainable use of ocean resources	11/28/2021 10:57 PM
2	no	11/28/2021 10:46 PM
3	Maybe recreation?	10/21/2021 1:29 AM
4	Heritage and cultural values Recreation	10/20/2021 5:04 PM
5	No	10/20/2021 3:04 AM
6	Conservation-	10/19/2021 10:22 PM
7	Culture, which I would rank 3rd	10/19/2021 5:12 AM
8	Human well being / ecosystem services. Ranked 3. This is different from industry as it is the broad community of people that rely on the ocean for ecosystem services.	10/15/2021 7:16 PM
9	Protection - supporting climate and environmental health and economic and social wellbeing	10/13/2021 3:31 PM
10	Removal of present situation where in the High Seas there is a mixture of local regulators, vested interest and gaps. Top	10/13/2021 3:15 PM
11	No	10/13/2021 1:56 AM

Q10 Why are you particularly interested in understanding ocean ecosystems as they relate to impacts from climate change and ocean acidification? Please rank the following in order of interest.

Answered: 16   Skipped: 1

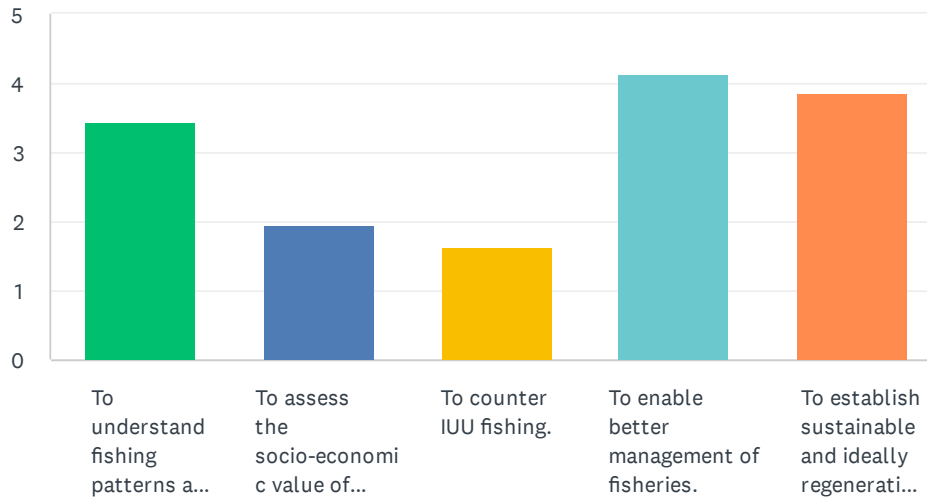|	1	2	3	4	5	TOTAL	SCORE
To understand and protect global environmental interests.	31.25% 5	6.25% 1	31.25% 5	12.50% 2	18.75% 3	16	3.19
To understand and protect sustainable global socio-economic benefits.	6.25% 1	37.50% 6	6.25% 1	25.00% 4	25.00% 4	16	2.75
To monitor environmental changes over time.	18.75% 3	18.75% 3	12.50% 2	37.50% 6	12.50% 2	16	2.94
To advance scientific understanding of seabed, water column and air column characteristics.	12.50% 2	25.00% 4	12.50% 2	12.50% 2	37.50% 6	16	2.63
To better protect marine habitats.	31.25% 5	12.50% 2	37.50% 6	12.50% 2	6.25% 1	16	3.50

Q11 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 8   Skipped: 9

#	RESPONSES	DATE
1	No	11/28/2021 10:57 PM
2	No	11/28/2021 10:46 PM
3	Complete	10/21/2021 1:29 AM
4	No	10/20/2021 3:04 AM
5	to enable a better management of the ecosystem	10/19/2021 10:22 PM
6	Related to climate is the ocean's capacity to sequester CO_2.	10/15/2021 7:16 PM
7	To protect livelihoods and incomes and drive adaptation and mitigation	10/13/2021 3:31 PM
8	No	10/13/2021 1:56 AM

Q12 Why are you particularly interested in understanding ocean ecosystems as they relate to impacts from fisheries? Please rank the following in order of interest.

Answered: 16   Skipped: 1

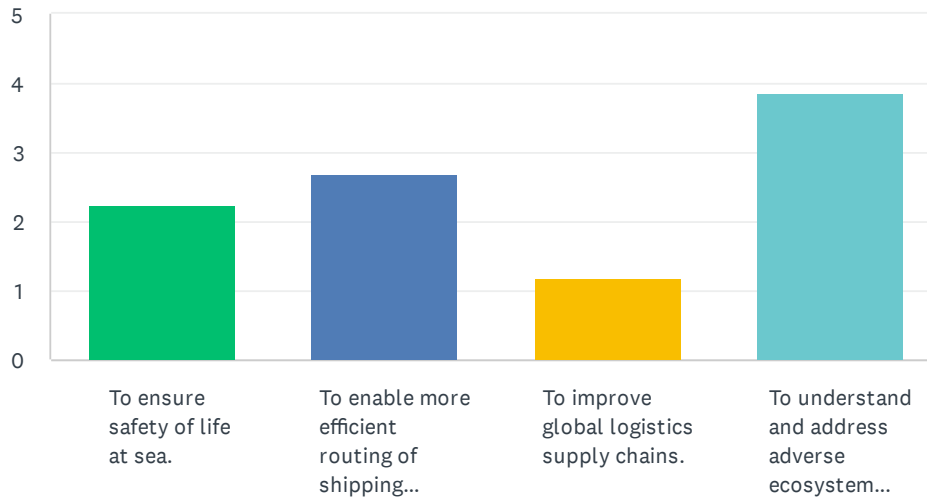|	1	2	3	4	5	TOTAL	SCORE
To understand fishing patterns and behaviours and their environmental impact.	18.75% 3	25.00% 4	43.75% 7	6.25% 1	6.25% 1	16	3.44
To assess the socio-economic value of fisheries.	0.00% 0	6.25% 1	6.25% 1	62.50% 10	25.00% 4	16	1.94
To counter IUU fishing.	0.00% 0	6.25% 1	12.50% 2	18.75% 3	62.50% 10	16	1.63
To enable better management of fisheries.	37.50% 6	37.50% 6	25.00% 4	0.00% 0	0.00% 0	16	4.13
To establish sustainable and ideally regenerative wild fisheries.	43.75% 7	25.00% 4	12.50% 2	12.50% 2	6.25% 1	16	3.88

Q13 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 5   Skipped: 12

#	RESPONSES	DATE
1	No	11/28/2021 10:57 PM
2	No but some are equal value - eg IUU and regenerate fisheries	11/28/2021 10:46 PM
3	No	10/20/2021 3:04 AM
4	to enable a better management of the ecosystem	10/19/2021 10:22 PM
5	No	10/13/2021 1:56 AM

Q14 Why are you particularly interested in understanding ocean ecosystems as they relate to impacts from shipping? Please rank the following in order of interest.

Answered: 16   Skipped: 1

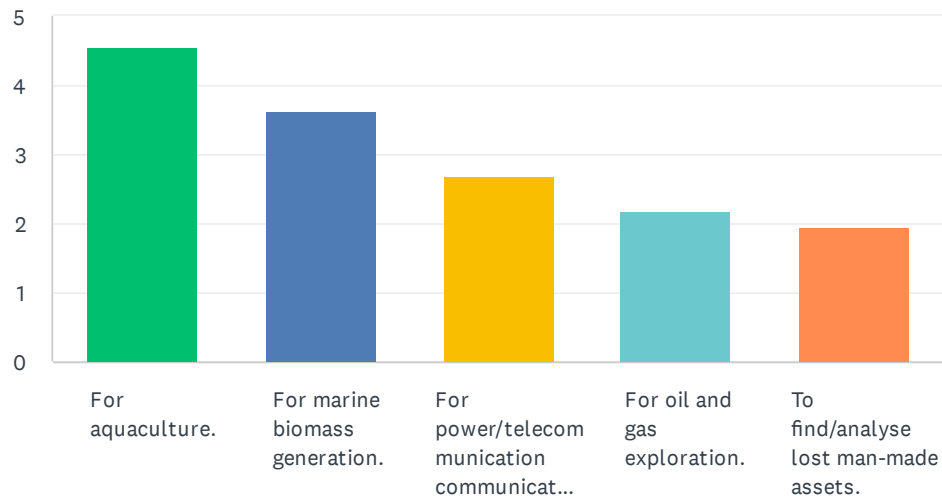|	1	2	3	4	TOTAL	SCORE
To ensure safety of life at sea.	6.25% 1	31.25% 5	43.75% 7	18.75% 3	16	2.25
To enable more efficient routing of shipping reducing emissions (gaseous, acoustic and chemical (eg ballast water)).	6.25% 1	56.25% 9	37.50% 6	0.00% 0	16	2.69
To improve global logistics supply chains.	0.00% 0	0.00% 0	18.75% 3	81.25% 13	16	1.19
To understand and address adverse ecosystem impacts from vessel activities.	87.50% 14	12.50% 2	0.00% 0	0.00% 0	16	3.88

Q15 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 6   Skipped: 11

#	RESPONSES	DATE
1	No	11/28/2021 10:57 PM
2	No	10/21/2021 1:29 AM
3	Ecotourism	10/20/2021 5:04 PM
4	No	10/20/2021 3:04 AM
5	to enable a better management of the ecosystem	10/19/2021 10:22 PM
6	No	10/13/2021 1:56 AM

Q16 Why are you particularly interested in understanding ocean ecosystems as they relate to impacts from other commercial activities? Please rank the following in order of interest.

Answered: 16   Skipped: 1

|	1	2	3	4	5	TOTAL	SCORE
For aquaculture.	62.50% 10	31.25% 5	6.25% 1	0.00% 0	0.00% 0	16	4.56
For marine biomass generation.	25.00% 4	43.75% 7	12.50% 2	6.25% 1	12.50% 2	16	3.63
For power/telecommunication communication cable purposes.	0.00% 0	18.75% 3	37.50% 6	37.50% 6	6.25% 1	16	2.69
For oil and gas exploration.	12.50% 2	6.25% 1	12.50% 2	25.00% 4	43.75% 7	16	2.19
To find/analyse lost man-made assets.	0.00% 0	0.00% 0	31.25% 5	31.25% 5	37.50% 6	16	1.94

Q17 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 8   Skipped: 9

#	RESPONSES	DATE
1	No	11/28/2021 10:57 PM
2	No	10/21/2021 1:29 AM
3	Ecotourism	10/20/2021 5:04 PM
4	No	10/20/2021 3:04 AM
5	to enable a better management of the ecosystem	10/19/2021 10:22 PM
6	Newly emerging ocean Carbon Dioxide Removal technology, ranked 4th	10/19/2021 5:12 AM
7	Pollution arising from all sources of human activity.	10/15/2021 7:16 PM
8	No	10/13/2021 1:56 AM

Q18 Have you ever developed a model to estimate the environmental, social and economic value of understanding ocean ecosystems?

Answered: 16   Skipped: 1
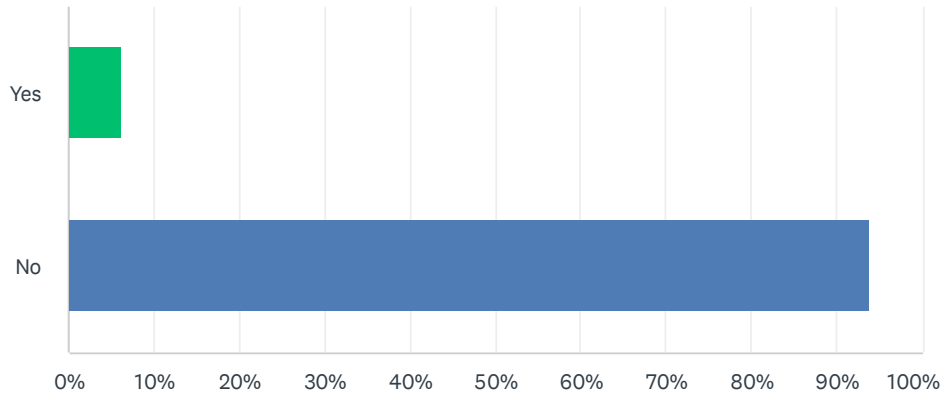
ANSWER CHOICES	RESPONSES	
Yes	6.25%	1
No	93.75%	15
TOTAL		16

#	IF YOU ANSWERED 'YES', PLEASE PROVIDE DETAILS/LINKS.	DATE
1	SSC has commissioned two studies of this by UBCand by Linwood Pendleton at Brest	11/28/2021 10:46 PM
2	Two recent examples of many: Economic Valuation of Reef Ecosystems in the MAR Region and the Goods and Services they Provide (Inter-American Development Bank, The Ocean Foundation, and Metroeconomica, 2021) Integrated Large-Scale Action on Habitat Restoration and Pollution in the CLME+ Region: Baseline and Pre-Feasibility Assessment Report on the Needs and Opportunites for Investment (UNEP Caribbean Environment Programme and The Ocean Foundation, Technical Report No. 03, 2021)	10/19/2021 5:12 AM

Q19 Are you aware of any third-party models for estimating the environmental, social and economic value of understanding ocean ecosystems?

Answered: 15   Skipped: 2
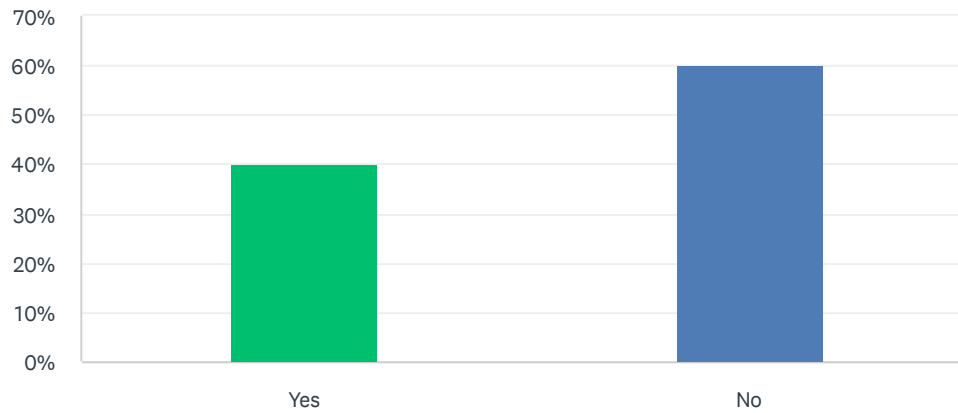
ANSWER CHOICES	RESPONSES	
Yes	40.00%	6
No	60.00%	9
TOTAL		15

#	IF YOU ANSWERED 'YES', PLEASE PROVIDE DETAILS/LINKS.	DATE
1	http://www.sargassoseacommission.org/storage/SCRS_2018_067_Kell_Luckhurst.pdf	10/21/2021 3:23 AM
2	Ecosystem modelling at Plymouth Marine Laboratory	10/20/2021 5:04 PM
3	eg. HYCOM, SEPODYM	10/20/2021 1:39 AM
4	There are probably too numerous to list. Here is a literature review article Milon and Alvarez "The Elusive Quest for Valuation of Coastal and Marine Ecosystem Services" in Water 2019, 11, 1518; doi:10.3390/w11071518 Also see https://www.marineboard.eu/valuing-marine-ecosystems https://doi.org/10.1093/acrefore/9780199389414.013.529	10/19/2021 5:12 AM
5	yes - quite a few studies looking at this from WWF to WRI etc - can easily be googled	10/13/2021 3:31 PM
6	http://www.seapodym.eu/	10/13/2021 2:36 PM

Q20 What are the (maximum three) most significant drivers or issues behind the need for AI/Big Data enhanced ocean governance?

Answered: 14   Skipped: 3

#	RESPONSES	DATE
1	1. To enhance the ability to discern patterns and trends in oceanographic and fisheries datasets 2. To more clearly define environmental changes over time and relate them to possible/probable causes 3. To allow a better definition of the relationship between animal movements /migrations and their association /correlation with oceanographic / environmental variables. varibales	11/28/2021 10:58 PM
2	Need to develop effective low cost management systems for ABNJ Need to utilise widest data sources for assessing state of large marine ecosystems - particularly in ABNJ Need to persuade competent authorities to take (often overdue) actions	11/28/2021 10:50 PM
3	1) The impacts of climate change can occur on small spatial scales. This means applicationos high resolution (Big Data) 2) AI involves predction of the future. The more historical data (Big Data) the more significant the presidicitons will be. 2) From the Remote Sensing perspective there we are now going into decades of data. To maximize the use of this data for climate studies bu definition means Big Data.	10/21/2021 1:43 AM
4	Understanding oceanic impact on climate regulation / change; Sustainable fisheries management; monitoring, assessment and regulation of marine pollution	10/20/2021 5:17 PM
5	Improve integration of heterogeneous, multi-agency ocean data necessary for ecosystem-based assessment/management Enable and provide value-added services and data products for decision support. Automate statistical pattern recognition	10/20/2021 7:04 AM
6	monitoring fish populations critical to the human food chain	10/20/2021 3:20 AM
7	1- Better understand how the environment is changing 2-Acurate models to monitor and predict environmental change and human impact 3-To better process the data	10/20/2021 12:31 AM
8	The data on the high seas ecosystems is from numerous sources, and AI/Big Data will allow us to see patterns emerge across data sets. Climate disruption is rapidly making isolated and independent data sets less useful without seeing the biggest picture. To address climate change we need to rapidly and robustly understand the ocean as an ally and how we can support its carbon and heat sink functions, while protecting ecosystems.	10/19/2021 5:34 AM
9	1. Complexity, diversity and volume of environmental datasets 2. Complexity of human and environmental interactions	10/19/2021 1:48 AM
10	1. Ability to sift multiple data streams to look for patterns that help predict e.g. spatial / temporal distribution of fishing activities. 2. Dynamic management of human activities on the ocean to minimise impacts.	10/15/2021 8:06 PM
11	1. Using all existing (may not be directly available yet tho) technology to remove barriers to management 2. Delivering real time solutions for vast open ocean remote areas 3. making ocean ocean management and governance affordable and removing it from being the 'wild west' mentality	10/13/2021 3:45 PM
12	need for clarity. need for quality control of data.need for agreed processes	10/13/2021 3:26 PM
13	monitoring, surveillance, compliance	10/13/2021 2:52 PM
14	1. Modeling ocean ecosystems and how they respond to various threats and pressures 2. Monitoring the environmental status impact of ocean governance and management interventions 3. Identifying and prioritizing the most impactful and cost effective ocean governance and management interventions.	10/13/2021 2:16 AM

Q21 Are you aware of open source (publicly available) or free datasets (ie government, academic or industrial datasets that can be privately shared) that could be used to understand an ocean ecosystem?

Answered: 14   Skipped: 3

#	RESPONSES	DATE
1	Yes	11/28/2021 10:58 PM
2	COVERAGE - NASA UNESCO date base OBIS MICO project and others at Duke Alex Roger's Oxford Martin School project database (name?) GFW AIS	11/28/2021 10:50 PM
3	Yes	10/21/2021 1:43 AM
4	Yes - HOTS, BATS, PML L4	10/20/2021 5:17 PM
5	Numerous. Too many to list here	10/20/2021 7:04 AM
6	No	10/20/2021 3:20 AM
7	OBIS- marine biodiversity Worms- marine biodiversity Copernicus- environmental data ARGOS- oceaonographic data	10/20/2021 12:31 AM
8	I am not, but I do expect that they exist.	10/19/2021 5:34 AM
9	Yes - there are hundreds of open source or free marine datasets	10/19/2021 1:48 AM
10	Yes, there are many (e.g. World ocean Database, GOOS, OBIS, Genbank) as well as many national databases. Ocean Data Platform in Norway is trying to harmonise these data and render them useful for applications.	10/15/2021 8:06 PM
11	absolutely loads!! We could have a long conversation on this. BUT it is what is in untapped areas where conversations have not been had or not been had in the right way where my greatest interest lies including the cube sat industry	10/13/2021 3:45 PM
12	yes	10/13/2021 3:26 PM
13	https://www.copernicus.eu/en/access-data https://www.fao.org/publications/sofia/2020/en/ The EU Data Collection Framework	10/13/2021 2:52 PM
14	There are certainly many of these such as via US NOAA and similar departments in many countries.	10/13/2021 2:16 AM

Q22 Can you recommend commercial datasets that might be purchased to complement open source or free datasets and to improve understanding of an ocean ecosystem?

Answered: 14   Skipped: 3

#	RESPONSES	DATE
1	No	11/28/2021 10:58 PM
2	AIS is supposed to be free but difficult to access without government support Radar generated data	11/28/2021 10:50 PM
3	My work is pretty limited to NASA and Space Agency data sets. But many of these data sets could certianly have commercial applications.	10/21/2021 1:43 AM
4	No	10/20/2021 5:17 PM
5	It really depends on the problem of interest that these data would support. In terms of remote sensing data, there is a considerable amount of very high resolution imagery from cubesat constellations that are commercially available from companies such as Planet	10/20/2021 7:04 AM
6	No	10/20/2021 3:20 AM
7	no	10/20/2021 12:31 AM
8	Commercial weather services and satellite data. Data collected by shipping and ocean oil and gas exploration firms. Sea floor mapping by sea floor cable firms. etc.	10/19/2021 5:34 AM
9	Global dataset of vessel traffic density	10/19/2021 1:48 AM
10	Huge amounts of data held by oil and gas & cable companies.	10/15/2021 8:06 PM
11	again loads - need to do a review first to determine first and second choices in various areas to then engage those sectors	10/13/2021 3:45 PM
12	no	10/13/2021 3:26 PM
13	https://www.aishub.net/	10/13/2021 2:52 PM
14	No	10/13/2021 2:16 AM

Q23 What are the most important types of data for informing and enabling ocean governance?

Answered: 14   Skipped: 3

#	RESPONSES	DATE
1	Spatial, oceanographic and resource use e.g. fisheries data	11/28/2021 10:58 PM
2	Ecosystem remote monitoring (eg NASA) Vessel movements - fishery and commercial GFW Fish catches by area Animal telemetry	11/28/2021 10:50 PM
3	In my opinion the temperature and sea level of the ocean. Measuring ocean salinity is also critical All of these data sets can have economic impacts on biodiversity. Additionally satellites measure chlorophyll content which would have direct applciations to biodiversity.	10/21/2021 1:43 AM
4	Key parameters identifies by GOOS	10/20/2021 5:17 PM
5	Again this depends on the specific management issues being addressed. For fisheries applications, fisheries dependent and independent data, animal telemetry, environmental remote sensing and circulation.bio-geochemical model datasets	10/20/2021 7:04 AM
6	fish populations and levels of illegal harvesting	10/20/2021 3:20 AM
7	FAIT dta that throught qualitty assessemnt and quality control	10/20/2021 12:31 AM
8	Ocean chemistry, physical oceanography, and marine biology (including botany). Over-layed with human uses of ocean and extraction, and pollution.	10/19/2021 5:34 AM
9	Data showing human use patterns in space and time. Data showing environmental variability over time. Datasets show areas of importance for marine taxa.	10/19/2021 1:48 AM
10	Bathymetry, physical oceanography (e.g. SST, ocean colour, carbon parameters, macronutrients, wind, surface irradiance), biological parameters (e.g. surface primary production), human activities (e.g. vessel movements, especially fishing vessels; pollution, elgl oil, plastics).	10/15/2021 8:06 PM
11	who is doing what where and now - and then presenting that is a usable and enforceable format	10/13/2021 3:45 PM
12	sustained long term	10/13/2021 3:26 PM
13	fishing activity, fish catches	10/13/2021 2:52 PM
14	Primary and secondary productivity Fish catch levels and their relative sustainability Indices of biodiversity Pollutant concentrations in seawater National ocean policies, regulations, inst'l structures Indices of invasive species occurrences Marine trophic levels Estimates of the socioeconomic value of marine ecosystems both market and non-market services	10/13/2021 2:16 AM

Q24 What are the least important (if any) types of data for informing and enabling ocean governance?

Answered: 11   Skipped: 6

#	RESPONSES	DATE
1	Because it is such a complex system, many diffrent types of data will be needed to fully inform a governance program	11/28/2021 10:58 PM
2	Everything helps	11/28/2021 10:50 PM
3	Probably all have a certainl level of importance depending on the application.	10/21/2021 1:43 AM
4	NA	10/20/2021 5:17 PM
5	None	10/20/2021 3:20 AM
6	Marine geology	10/19/2021 5:34 AM
7	Probably no such thing.	10/15/2021 8:06 PM
8	It is all valuable but we need to prioritise them so we only switch on the most relevant layers for management	10/13/2021 3:45 PM
9	one off spot checks	10/13/2021 3:26 PM
10	everything is of value	10/13/2021 2:52 PM
11	none	10/13/2021 2:16 AM

Q25 Can you recommend any extant and emerging/future big data/artificial intelligence technologies that you believe are well suited to gathering and analysing ocean ecosystems?

Answered: 13   Skipped: 4

#	RESPONSES	DATE
1	I am familiar with the COVERAGE project being conducted by HASA - JPL which has already successfully integrated a nnumber of large datasets.	11/28/2021 10:58 PM
2	GFW and its spinoff products SkyBox COVERAGE	11/28/2021 10:50 PM
3	Neural Networks (CNN) is being widely used.	10/21/2021 1:43 AM
4	Machine learning research at UK NOC regarding interpretation of seabed imagery	10/20/2021 5:17 PM
5	AWS, Google Cloud platforms, JPL-SDAP, JPL-CMC, Sagemaker, Tensorflow, PanGeo-XARRAY	10/20/2021 7:04 AM
6	No	10/20/2021 3:20 AM
7	no	10/20/2021 12:31 AM
8	We are looking at emerging new sensors, combined with computing on the edge that will make data more manageable. One company working on this is CSignum.	10/19/2021 5:34 AM
9	Platform technologies like Ocean Data platform and Ocean Tool for Public Understanding of Science (OCTOPUS). For citizen science i-Naturalist.	10/15/2021 8:06 PM
10	So really interesting work going on with new ocean mapping systems etc but you would need to approach the companies involved.....	10/13/2021 3:45 PM
11	bermuda time series	10/13/2021 3:26 PM
12	Electronic monitoring systems onboard fishing vessels, i.e. Set of cameras, GPS and sensors installed on board + analysis software.	10/13/2021 2:52 PM
13	UNSEENLABs - real time satellite data on the location and activity of nearly all vessel sizes Similar for Global Fishing Watch (but only for vessels using AIS) There are a variety of emerging BD/AI/ML technologies that are being used for fish catch analysis - species, catch size, discards, etc.	10/13/2021 2:16 AM

Q26 For a solution to be effective it must be trusted. How might 'trust' be established and defined for AI/Big Data technologies designed to inform or enable ocean governance?

Answered: 13   Skipped: 4

#	RESPONSES	DATE
1	Open communication and parterships which share information are probably the best way to build trust.	11/28/2021 10:58 PM
2	Government endorsed/ financed sources like AIS and NASA Peer reviewed assessment Involvement of UN?	11/28/2021 10:50 PM
3	Eventually it will come down to the effectiveness of the prediction. Validation of results is a key component to any AI application.	10/21/2021 1:43 AM
4	Clear metadata demonstrating appropriate QA/QC	10/20/2021 5:17 PM
5	Open Source software, publicly accessible system/data/results, peer reviewed, use case demonstrations	10/20/2021 7:04 AM
6	Do not know the answer to this question.	10/20/2021 3:20 AM
7	Validation of the tecnhologies, assess the error; bias, limitation, and groundtruthed	10/20/2021 12:31 AM
8	Transparency. Open access for verification. Both the trustworthiness of the institutions involved, but also the engagement of a broad set of stakeholders.	10/19/2021 5:34 AM
9	Data must be traceable from the data producer to the data user, including records of any processing / manipulation of data. Security is also important. These types of activities are done by data platforms.	10/15/2021 8:06 PM
10	through case examples and case law....just as happens with national legislation and in Europe EU Directives	10/13/2021 3:45 PM
11	open systems, agreed data quality, transparency	10/13/2021 3:26 PM
12	transparency and validation	10/13/2021 2:52 PM
13	By combining as open access as possible while ensuring that data quality can be maintained.	10/13/2021 2:16 AM

Q27 What are the (maximum three) most significant improvements to remote sensing technologies expected in the near- and/or medium-term?

Answered: 13   Skipped: 4

#	RESPONSES	DATE
1	Not sure what is expected as this is not my field but remote sensing data is a very important part of this whole equation because data collection at sea is simply too costly and not timely enough	11/28/2021 10:58 PM
2	1) High spatial resolution. 2) Closer to land 3) Merging of ssatellite sensors to improve quality and resolution.	10/21/2021 1:43 AM
3	Shipboard monitoring of emissions, especially gases	10/20/2021 5:17 PM
4	upcoming missions (within next couple of years) will be increasingly higher resolution and/or hyper-spectral. Thus higher data volume, requiring cloud-based solutions and on-demand visualization/subsetting and analytics services close to the data (minimize data transfers)	10/20/2021 7:04 AM
5	Not familiar with this technology.	10/20/2021 3:20 AM
6	reliability cost effective environmental friendly	10/20/2021 12:31 AM
7	Collecting data via drones and low altitude satellites. Computing on the edge to crunch some data at collection site to make it more useful / manageable. More reliable / affordable sensors more widely deployed.	10/19/2021 5:34 AM
8	Improvements in coverage of SAR imagery Improvements in algorithms to detect floating plastics or sargassum mats	10/19/2021 1:48 AM
9	Cheap optical data from microsatellites. Long-term observations from high-altitude pseudosatellites. Better resolution imagery.	10/15/2021 8:06 PM
10	1. see through the surface layers using fluid lensing (NASA) - maybe onto cube sats soon 2. tracking vessels through cloud using synthetic aperture radar (cube sat - already here) 3. ID using non visually via radio (cube sats - already here) The key issue is delivering near real time several times a day which companies will achieve. This is alongside internet access at sea via low earth orbit making connectivity real time	10/13/2021 3:45 PM
11	lower cost, better spatial resolution	10/13/2021 3:26 PM
12	linking with other types of data	10/13/2021 2:52 PM
13	- live sensing of all fishing vessels no matter the size (already happening) - remote sensing that can detect coastal eutrophication, e.g. the challenge of separating out 'natural' high productivity areas (e.g. natural upwelling) from those that are highly productive due to excess nutrient inputs. - improvements in detecting the quantity, type and movements of ocean plastics	10/13/2021 2:16 AM

Q28 Currently, what are the three greatest technological barriers to improved ocean governance in the Sargasso Sea?

Answered: 14   Skipped: 3

#	RESPONSES	DATE
1	1. Further development and refienment of ocean drones for collecting more spatial / temporal oceangraphic variables. 2. Integration of the different relevant databases to allow a better understanding of the relationships between the variables.	11/28/2021 10:58 PM
2	Up to date data on human activities and impacts Relationship between natural changes and animal movement	11/28/2021 10:50 PM
3	Access to data?	10/21/2021 1:43 AM
4	Need better marine ecosystem modelling Understanding biological corridors between seabed ecosystems (ie seamounts, ridges, etc)	10/20/2021 5:17 PM
5	Lack of an inventory/metadatabase of relevant, available data sources for data/science-driven ecosystem assessment and management. Lack of a data system/s enabling discovery, aggregation, integration, and value-added visualization, computation and other services on relevant data. Lack of definition of data/synthesis/information products facilitating decision support applications of different kinds. Lack of a regional mechanistic models of ecosystem processes	10/20/2021 7:04 AM
6	Reliable data on species populations.	10/20/2021 3:20 AM
7	-4D- data acquistion of the three dimension of the ocean (surface , water column, seafloor) and time series -monitoring real time -capacity to collect and analyze information to be available for governance	10/20/2021 12:31 AM
8	Effective and timely monitoring of the area. Data transmission distances	10/19/2021 5:34 AM
9	Integration of diverse data types. Data warehouse/ data lake setup and use	10/19/2021 1:48 AM
10	Lack of data transparency for fisheries in the region. Lack of capacity to monitor vessel activities. Network of ocean sensors (e.g. oceanographic floats).	10/15/2021 8:06 PM
11	1. who is where and when 2. how activities relate to policies and laws 3. how technology evidence can interact with policy and legislation to cause monitoring and actual enforcement	10/13/2021 3:45 PM
12	lack of monitoring systems, lack of research platforms eg ships, need for autonomous monitoring systems	10/13/2021 3:26 PM
13	lack of data on fisheries, lack of access to existing data, tools for combining them	10/13/2021 2:52 PM
14	- knowledge of how the ecosystem functions - knowledge of linkages to ecosystems external to the Sargasso Sea, particularly those pertaining to the eel fishery and its combined Sargasso/riverine life cycle - knowledge of the activities and behavior of fishing entities, both legal and illegal	10/13/2021 2:16 AM

Q29 Which aspects of ocean governance and ecosystem analysis are sufficient for current and future needs as they stand?

Answered: 14   Skipped: 3

#	RESPONSES	DATE
1	Probably none of them as improvemnts can surely be made in every area.	11/28/2021 10:58 PM
2	None really - only half pictures and data sources do not interface	11/28/2021 10:50 PM
3	Outside my field of expertise.	10/21/2021 1:43 AM
4	Hard to answer as future needs not necessarily known now	10/20/2021 5:17 PM
5	Not an expert in this area by any means but my impression is that ocean governance and ecosystem assessment frameworks for high-seas areas are significant underdeveloped	10/20/2021 7:04 AM
6	Do not know the answer to this question.	10/20/2021 3:20 AM
7	do not have an answer -	10/20/2021 12:31 AM
8	Not much. The Law of the Sea Convention, IMO agreements etc. are important beginnings, but are probably not "sufficient."	10/19/2021 5:34 AM
9	Unsure, maybe shipping lane management?	10/19/2021 1:48 AM
10	There is probably a good background understanding of the surface physical oceanography of the region and long term monitoring from the BATS site. However, most other aspects of ocean governance and science are probably lacking.	10/15/2021 8:06 PM
11	Good science case for the Sargasso Sea and good understanding of the key organisations involved but then tails off when you look at individual actions and activities....	10/13/2021 3:45 PM
12	none	10/13/2021 3:26 PM
13	The precautionary approach and UNCLOS	10/13/2021 2:52 PM
14	For the Sargasso, ocean governance remains very nascent via the creation of the Sargasso Sea Commission. The recently approved GEF-UNDP Sargasso Sea project will make an important contribution to identifying key next steps required to better institutionalize sustainable stewardship of Sargasso Sea resources by the mandated institutions and involved government and other stakeholders.	10/13/2021 2:16 AM

Q30 What enabling or underpinning technologies or infrastructure do you see as necessary prerequisites to realising AI/Big Data solutions?

Answered: 13   Skipped: 4

#	RESPONSES	DATE
1	Not familiar enough with the field to have an opinion	11/28/2021 10:58 PM
2	linkages for various data sources use of a trusted AI technology to model gaps in data ? and all the things we do not know we do not know ...	11/28/2021 10:50 PM
3	computer techology needs to be accessible to deal with the Big Data. Cloud technology could provide solutions.	10/21/2021 1:43 AM
4	Machine learning	10/20/2021 5:17 PM
5	-interoperable data streams form source repositories - scalable data system(s) capable of handling heterogeneous geospatial data types. - web services facilitating on demand data access, transformation, manipulation - web-based visualization and scripting interfaces (eg. Jupyter notebooks) - training datasets	10/20/2021 7:04 AM
6	Sensors to gather reliable data are very limited in what they can measure.	10/20/2021 3:20 AM
7	Effective and timely monitoring of the area. Real time data transmission	10/19/2021 5:34 AM
8	Suitable data storage / access resources.	10/19/2021 1:48 AM
9	Data sources on specific areas (e.g. physical oceanography, biodiversity etc). must have a similar set of semantics to enable interoperability and machine to machine communication. Data must have a platform of some form for harmonisation and then analyses (e.g. Ocean data platform). More sensors, more remote sensing observations for a given time segment.	10/15/2021 8:06 PM
10	The underlying system to bring key layers together and present in a useful real time way......privacy cries may get in the way of this but frankly we all gave them up ages ago (think of google earth and streetview or your phone tracking you etc etc and it is simply something bad guys use to hide behind at sea.....	10/13/2021 3:45 PM
11	autonomous low cost monitoring systems	10/13/2021 3:26 PM
12	Open data	10/13/2021 2:52 PM
13	Not my area of expertise	10/13/2021 2:16 AM

Q31 Please could you briefly describe (or provide references to) one or two use-cases that both illustrate the need for improved ocean governance, and qualitatively describe what a successful AI/Big Data solution would achieve?

Answered: 12   Skipped: 5

| #	RESPONSES	DATE
1	Not able to complete this section	11/28/2021 10:58 PM
2	Duke MICO project providing insights into the importance of migratory corridors linking ecosystems Still unfinished COVERAGE portal	11/28/2021 10:50 PM
3	On example is the need to minotor changes in coastal upwelling and fronts. Fronts can occur over very small spatial scales yet provide ecosystems that promote fisheries. Being able to predict frontal locations is definitely a use canse for application for AI.	10/21/2021 1:43 AM
4	Monitoring environmental impacts of ships operating in ABNJ	10/20/2021 5:17 PM
5	COVERAGE is an example a technology solution/platform and reusable toolkit that tries to address some of the above.	10/20/2021 7:04 AM
6	Over fishing is a major problem in many areas. Understanding the scope and sources of this problem might be possible via Big Data.	10/20/2021 3:20 AM
7	Failure of liability and compensation schemes to cover pollution of the high seas. Lack of, or limited, jurisdiction and control over good and bad activities on the high seas.	10/19/2021 5:34 AM
8	Am working on this at present for biodiversity data. Ocean Data Platform is an important initiative. Rowlands G, Brown J, Soule B, Boluda PT, Rogers AD (2019) Satellite surveillance of the Ascension Island Exclusive Economic Zone and Marine Protected Area. Marine Policy. 101: 39-50. This is a good example of where improved governance (laws) couple with remote sensing surveillance had an impact on fisheries management in Ascension. Note it also picked up threats other than fishing (hazardous cargos).	10/15/2021 8:06 PM
9	not easily on here - happy to discuss	10/13/2021 3:45 PM
10	sargasso sea proven science case for conservation need followed by lack of action/interest by regulatory authorities. solution lies with government agreement followed by uniform processes	10/13/2021 3:26 PM
11	https://www.nature.com/articles/s41559-020-1259-6 Integrated ocean management for a sustainable ocean economy	10/13/2021 2:52 PM
12	Not aware of any case studies that cover both of these attributes (there are of course many on the need for improved ocean governance)	10/13/2021 2:16 AM

Q32 How transferrable do you think a future AI/Big Data Ocean Governance solution for the Sargasso Sea will be to other regions? What would you expect to be the main barriers to transferability?

Answered: 14   Skipped: 3

#	RESPONSES	DATE
1	If done properly, a Sargasso Sea solution should be transferable to any ocean region with appropriate modifications.	11/28/2021 10:58 PM
2	To be useful it must be transferrable -using SS as a pilot Finance is always the key obstacle Also making sure we can keep up with current thinking and developments	11/28/2021 10:50 PM
3	If the cloud technology proves successful, it could make open source, Big Data easiry transferable.	10/21/2021 1:43 AM
4	Highly applicable but barriers would be political	10/20/2021 5:17 PM
5	Potentially high for managment issues that are common to other regions and that involve comparable data inputs and desired outputs	10/20/2021 7:04 AM
6	Should be very transferable.	10/20/2021 3:20 AM
7	I think it will be highly transferable The main barrier it will depend on the receiver capability, either financial, humanpower and the need or not of capacity building and sharing	10/20/2021 12:31 AM
8	I think it will be a good case study. And, will likely be transferable. I think some governments who are resisting governance of the high seas will also be a barrier to transferability.	10/19/2021 5:34 AM
9	Supporting tech could be very transferable, with challenges around other/new data for differing management issues	10/19/2021 1:48 AM
10	I think the technology should be highly transferable. The only barriers I can perceive are lack of data or data confidentiality / secrecy issues.	10/15/2021 8:06 PM
11	very........barriers will be squabbles over data for example	10/13/2021 3:45 PM
12	s sea is a test case-if it is not transferrable then I wonder what is	10/13/2021 3:26 PM
13	High Need to provide practical examples	10/13/2021 2:52 PM
14	Any well designed AI/Big Data Ocean governance mechanism would be welcome and would likely be easily transferable to other ocean areas given that many of the challenges and data needs for different ocean areas are quite similar.	10/13/2021 2:16 AM

Q33 Geographically, the ocean constitutes approximately two-thirds of the planet; the high seas comprise 64 percent of its surface and nearly 95 percent of the ocean's volume. Where should priorities be set? Please rank the following in order of priority.

Answered: 14   Skipped: 3
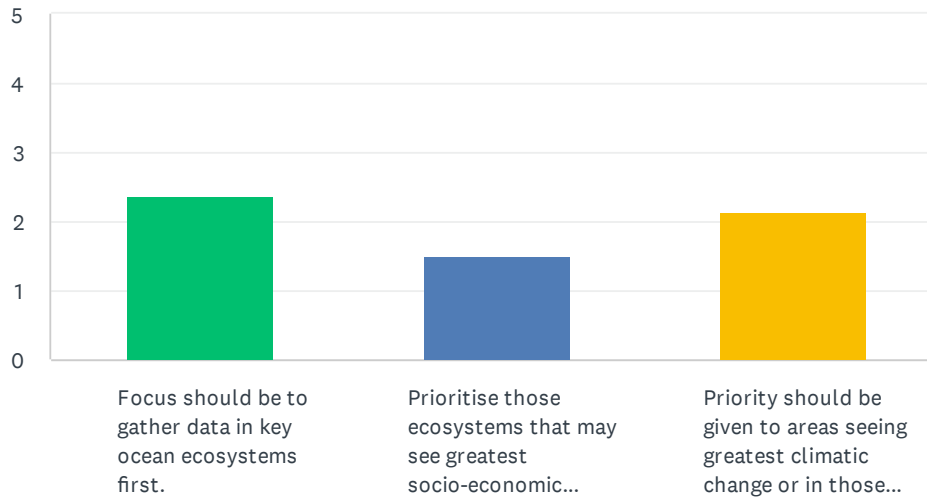
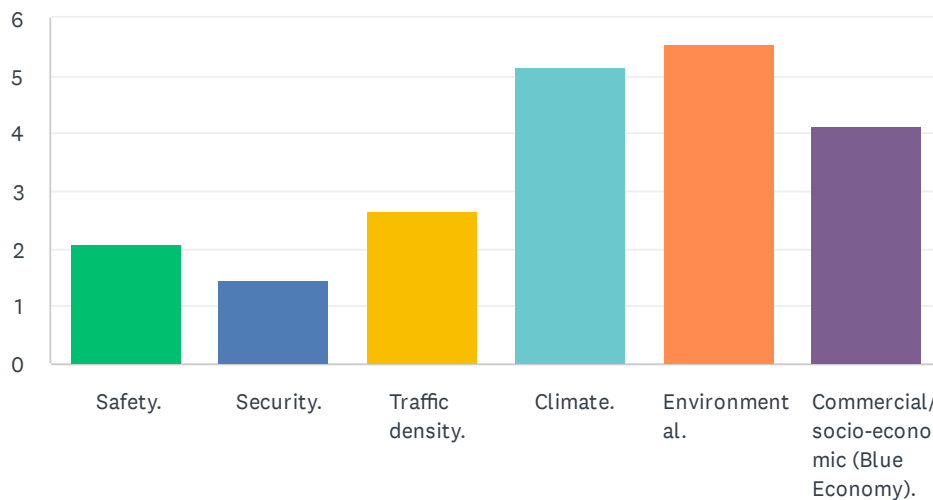|	1	2	3	TOTAL	SCORE
Focus should be to gather data in key ocean ecosystems first.	57.14% 8	21.43% 3	21.43% 3	14	2.36
Prioritise those ecosystems that may see greatest socio-economic growth.	14.29% 2	21.43% 3	64.29% 9	14	1.50
Priority should be given to areas seeing greatest climatic change or in those waters with scant oceanographic data.	28.57% 4	57.14% 8	14.29% 2	14	2.14

Q34 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 8   Skipped: 9

#	RESPONSES	DATE
1	Nothing is missing	11/28/2021 10:59 PM
2	No	11/28/2021 10:51 PM
3	NO	10/21/2021 1:46 AM
4	Areas expected to have greatest or changing environmental impacts (tourism, pollution. IUU, etc)	10/20/2021 5:20 PM
5	No	10/20/2021 3:23 AM
6	Focus on ecosystems where data are already available to perfect approaches.	10/15/2021 8:08 PM
7	I dont really agree with the above list - we should start with a combination of what we have agreed to protect but are not doing right now, coupled with other vulnerable areas and the generally with holding everyone to account on sustainability principles across the remaining area	10/13/2021 3:48 PM
8	1 Areas that are deemed to face the most significant and immediate threats due to unsustainable use	10/13/2021 2:20 AM

Q35 Which factors should be given greater weighting within an ocean governance data gathering prioritisation modelling tool? Please rank the following in order of priority.

Answered: 14   Skipped: 3

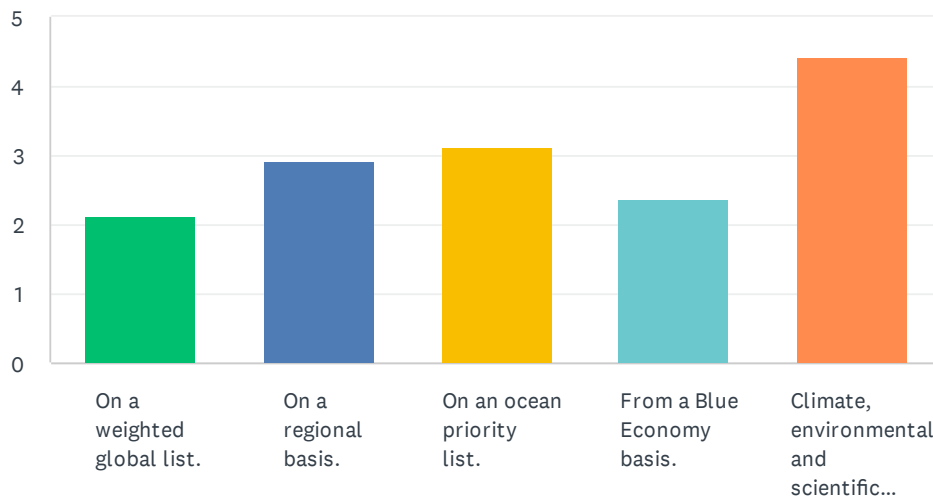|	1	2	3	4	5	6	TOTAL	SCORE
Safety.	0.00% 0	0.00% 0	0.00% 0	28.57% 4	50.00% 7	21.43% 3	14	2.07
Security.	0.00% 0	0.00% 0	0.00% 0	7.69% 1	30.77% 4	61.54% 8	13	1.46
Traffic density.	0.00% 0	0.00% 0	14.29% 2	50.00% 7	21.43% 3	14.29% 2	14	2.64
Climate.	28.57% 4	57.14% 8	14.29% 2	0.00% 0	0.00% 0	0.00% 0	14	5.14
Environmental.	57.14% 8	42.86% 6	0.00% 0	0.00% 0	0.00% 0	0.00% 0	14	5.57
Commercial/socio-economic (Blue Economy).	14.29% 2	0.00% 0	71.43% 10	14.29% 2	0.00% 0	0.00% 0	14	4.14

Q36 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 6   Skipped: 11

#	RESPONSES	DATE
1	No	11/28/2021 10:59 PM
2	No	11/28/2021 10:51 PM
3	No	10/21/2021 1:46 AM
4	Fisheries resources, other ecosystem services of regional importance	10/20/2021 7:07 AM
5	No	10/20/2021 3:23 AM
6	No	10/13/2021 2:20 AM

Q37 How should we prioritise ecosystem data gathering projects? Please rank the following in order of priority.

Answered: 14   Skipped: 3

|	1	2	3	4	5	TOTAL	SCORE
On a weighted global list.	0.00% 0	0.00% 0	50.00% 7	14.29% 2	35.71% 5	14	2.14
On a regional basis.	14.29% 2	14.29% 2	35.71% 5	21.43% 3	14.29% 2	14	2.93
On an ocean priority list.	7.14% 1	50.00% 7	7.14% 1	21.43% 3	14.29% 2	14	3.14
From a Blue Economy basis.	0.00% 0	35.71% 5	0.00% 0	28.57% 4	35.71% 5	14	2.36
Climate, environmental and scientific priority.	78.57% 11	0.00% 0	7.14% 1	14.29% 2	0.00% 0	14	4.43

Q38 Is there anything significant missing from the above list? If so, what is it and where would you place it in the ranking?

Answered: 6   Skipped: 11

#	RESPONSES	DATE
1	No	11/28/2021 10:59 PM
2	No	11/28/2021 10:51 PM
3	No	10/21/2021 1:46 AM
4	Define regional - transboundary, LMEs, seas?	10/20/2021 5:20 PM
5	No	10/20/2021 3:23 AM
6	No	10/13/2021 2:20 AM

Q39 In addition to the Sargasso Sea, are there other ocean ecosystems that you wish to better understand?

Answered: 14   Skipped: 3
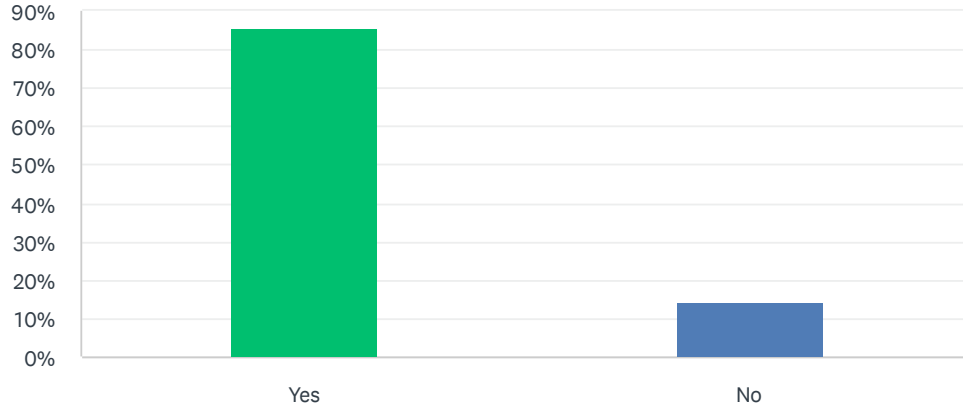
ANSWER CHOICES	RESPONSES	
Yes	85.71%	12
No	14.29%	2
TOTAL		14

Q40 Please share details of your ecosystem(s) of interest.

Answered: 12   Skipped: 5

#	RESPONSES	DATE
1	Under the auspices of the FFEM project, we will be collaborating on a study of the Thermal Dome ecosystem off Costa Rica in the eastern Pacific looking for similarities and differences with the Sargasso Sea. The Gulf of Guinea off west Africa is also of considerable interest because it is the main spawning area in the Atlantic for three main species of tuna and it is where the majority of the tuna catch in the Atlantic is taken.	11/28/2021 11:00 PM
2	Coastal Upwelling. These have large economic and social impacts.	10/21/2021 1:48 AM
3	Arctic Ocean	10/20/2021 5:22 PM
4	Eastern Tropical Pacific,Gulf Stream, California Current System, Benguela, estaurine-coastal ocean interface	10/20/2021 7:10 AM
5	North Atlantic deepsea and in particular the Mid Atlantic Ridge at the Azores triple junction	10/20/2021 12:36 AM
6	Polar regions Costa Rican dome Caribbean Sea	10/19/2021 5:39 AM
7	Costa Rica Thermal Dome	10/19/2021 1:58 AM
8	Western Indian Ocean.	10/15/2021 8:11 PM
9	all existing marine world heritage sites then all large existing offshore MPAs.....	10/13/2021 3:49 PM
10	north west indian ocean	10/13/2021 3:32 PM
11	North Atlantic	10/13/2021 2:55 PM
12	UNDP works in around 14 of the world's Large Marine Ecosystems representing 94 countries who shave these ecosystems. In each one, UNDP supports countries with multi-country 'fact finding' to establish LME diagnostics, and follows this with support to the multi-country negotiation of a regional Strategic Action Programme consisting of agreed policy, regulatory and institutional reforms, and investments, towards bringing (or maintaining) sustainable use of these ecosystems. The Sargasso Sea GEF project will be utilizing the same GEF methodology in preparing its Ecosystem Diagnostic Analysis and Strategic Action Program.	10/13/2021 2:26 AM

Q41 Why do you want to understand this ecosystem(s)?

Answered: 12   Skipped: 5

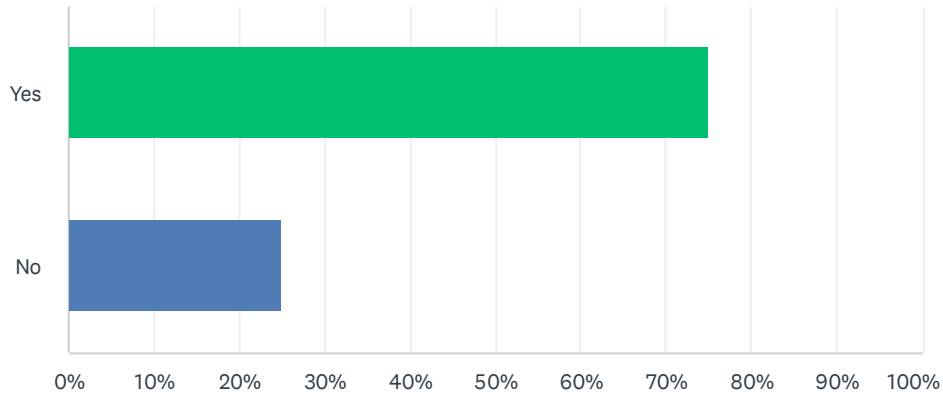| #	RESPONSES	DATE
1	To better understand and define the dynamics of open ocean ecosystems.	11/28/2021 11:00 PM
2	Impacts of Climate Change to these systems.	10/21/2021 1:48 AM
3	Subject to great change due to climate change, ice-free Arctic will create new opportunities for blue economy (shipping, fishing, tourism, etc)	10/20/2021 5:22 PM
4	Scientifically interesting, socio-economically important	10/20/2021 7:10 AM
5	Because they host vulnerable ecosystem and species, they have a lot of habitat creation, tehy seem to be important for several migratory species,	10/20/2021 12:36 AM
6	Polar regions and Costa Rican dome are also high seas areas (or include high seas areas). Caribbean sea is i) a place were we work; and ii) is being affected by sargassum blooms (to compare with data from Sargasso Sea)	10/19/2021 5:39 AM
7	Similar needs for improved management of an important high-seas area	10/19/2021 1:58 AM
8	High human pressures (growing); high biodiversity (poorly understood); poor governance, especially in areas beyond national jurisdiction.	10/15/2021 8:11 PM
9	because we are hampered in management by not using all the powerful tools available to inform budgets, vfm and decisions	10/13/2021 3:49 PM
10	complex mix of ocean/atmosphere /ecology . socioeconomics, security	10/13/2021 3:32 PM
11	Currently working in the area	10/13/2021 2:55 PM
12	Each of these ecosystems is of tremendous socioeconomic value to the people who inhabit these coastal areas and many if not all of the LMEs contain globally significant biodiversity. Sustaining the world's LMEs represents a commitment made by the GEF since its first operational strategy in 1995.	10/13/2021 2:26 AM

Q42 Have you applied for funding/resource to understand this ecosystem(s)?

Answered: 12   Skipped: 5

#	RESPONSES	DATE
1	Yes, the SSC is a partner in the FFEM project.	11/28/2021 11:00 PM
2	NO	10/21/2021 1:48 AM
3	No - retired	10/20/2021 5:22 PM
4	Yes	10/20/2021 7:10 AM
5	yes	10/20/2021 12:36 AM
6	Yes	10/19/2021 5:39 AM
7	Yes - joint funding the the Sargasso Sea from FFEM	10/19/2021 1:58 AM
8	Yes and got it.	10/15/2021 8:11 PM
9	no	10/13/2021 3:49 PM
10	before retirement	10/13/2021 3:32 PM
11	Yes	10/13/2021 2:55 PM
12	Since 1991, UNDP has mobilized about $500 million in GEF financial resources to support the aforementioned governance and management work in LMEs.	10/13/2021 2:26 AM

Q43 Have you articulated the environmental, social or economic value of understanding this ecosystem(s)?

Answered: 12   Skipped: 5

ANSWER CHOICES	RESPONSES	
Yes	75.00%	9
No	25.00%	3
TOTAL		12

#	IF YOU ANSWERED 'YES', PLEASE PROVIDE DETAILS/LINKS.	DATE
1	it has been articulated in the FFEM project document.	11/28/2021 11:00 PM
2	Within NASA and conferences.	10/21/2021 1:48 AM
3	On a collaborative, multiscientific project, where scientists from difefrent areas work together	10/20/2021 12:36 AM
4	Please see 2021 reports mentioned earlier in answers to this survey.	10/19/2021 5:39 AM
5	Proposals to work in the western Indian Ocean have mainly focused on filling in large gaps on environmental data / biodiversity with a view to better ecosystem-based management of EEZs or the high seas.	10/15/2021 8:11 PM
6	major reviews done of marine world heritage sites and some analysis of other large offshore MPAs as part of the cases for their creation	10/13/2021 3:49 PM
7	previous work	10/13/2021 3:32 PM
8	Value of fishery resources	10/13/2021 2:55 PM
9	A few - but not enough, unfortunately - of the LMEs UNDP has supported have conducted detailed economic valuation analyses. One good example is the Benguela Current LME in southern Africa whose goods and services are valued at about $54 billion per year.	10/13/2021 2:26 AM

Q44 What marine geospatial information is needed by you? Please tick all that apply.
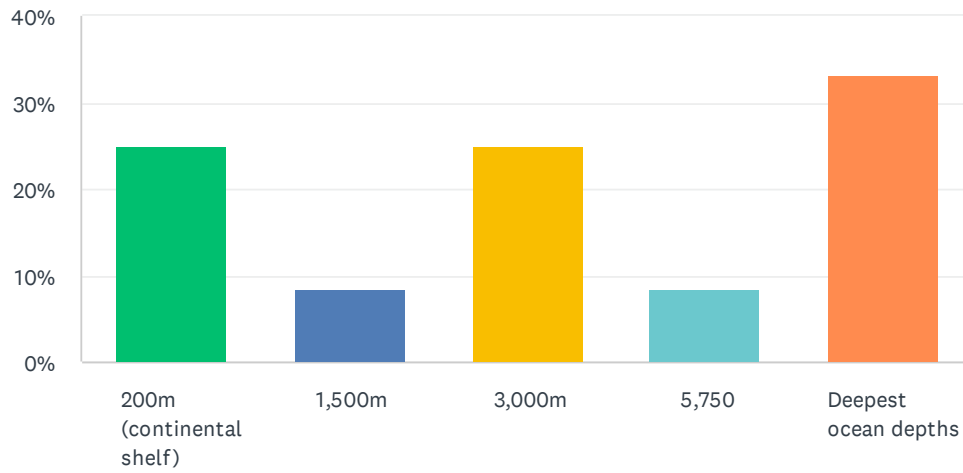
Answered: 12   Skipped: 5
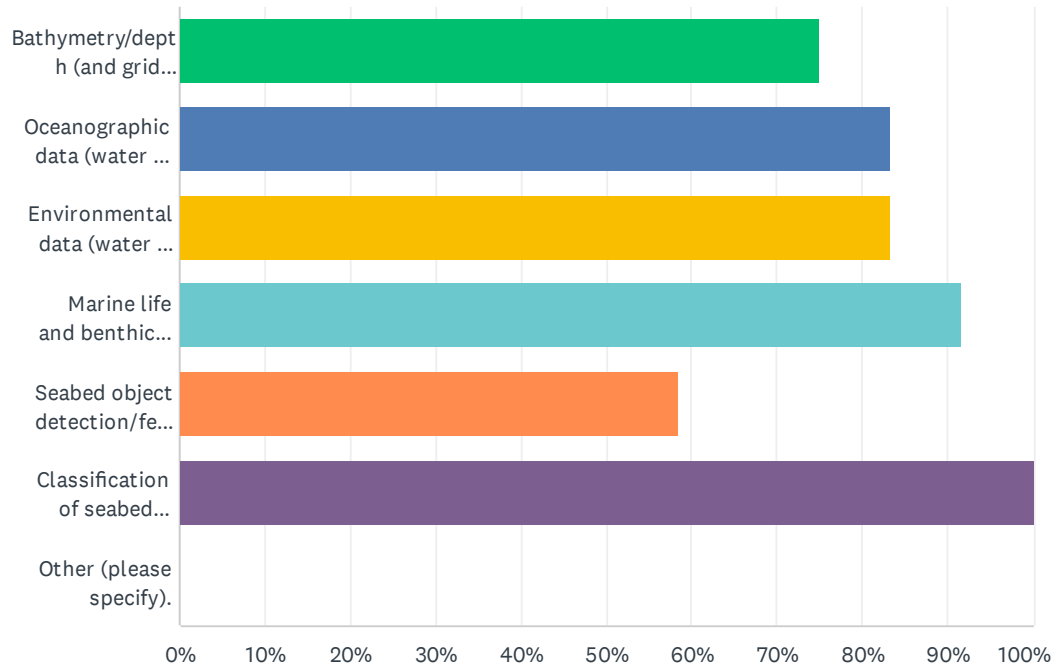
ANSWER CHOICES	RESPONSES	
Bathymetry/depth (and grid resolution).	75.00%	9
Oceanographic data (water and air column).	83.33%	10
Environmental data (water and air column).	83.33%	10
Marine life and benthic data (water and air column).	91.67%	11
Seabed object detection/features.	58.33%	7
Classification of seabed features.	100.00%	12
Other (please specify).	0.00%	0
Total Respondents: 12		

#	OTHER (PLEASE SPECIFY).	DATE
	There are no responses.	

Q45 To what depths do you require ocean governance information?

Answered: 12   Skipped: 5

ANSWER CHOICES	RESPONSES	
200m (continental shelf)	25.00%	3
1,500m	8.33%	1
3,000m	25.00%	3
5,750	8.33%	1
Deepest ocean depths	33.33%	4
TOTAL		12

Q46 What level of detail and density of ocean ecosystem data is needed?

Answered: 12   Skipped: 5
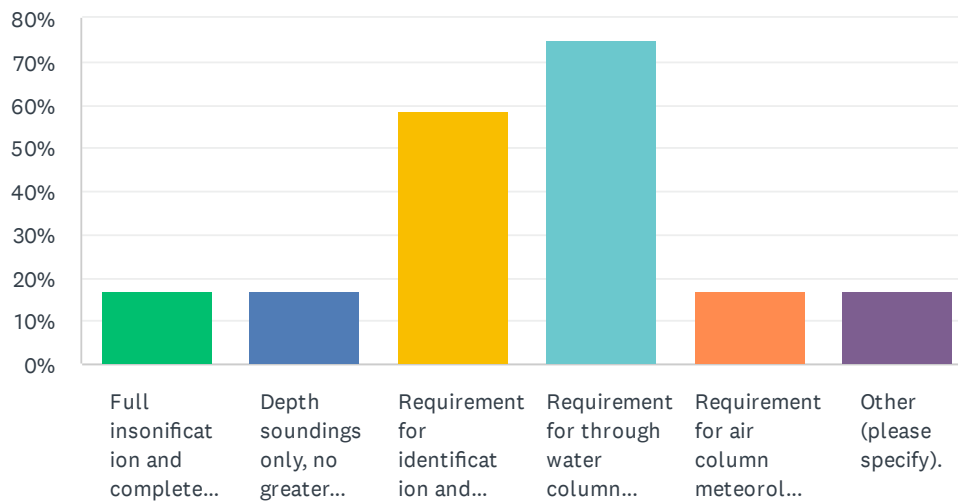
ANSWER CHOICES	RESPONSES	
Full insonification and complete coverage of the seabed.	16.67%	2
Depth soundings only, no greater than 100m apart.	16.67%	2
Requirement for identification and classification of seabed features.	58.33%	7
Requirement for through water column oceanographic data.	75.00%	9
Requirement for air column meteorological data.	16.67%	2
Other (please specify).	16.67%	2
Total Respondents: 12		

#	OTHER (PLEASE SPECIFY).	DATE
1	ideally time series of horizonatally resolved data for a range of key environmental and biological variables	10/20/2021 7:18 AM
2	I do not understand your question neither the one before	10/20/2021 12:38 AM

Q47 How would you want to use, or access marine geospatial data collected?

Answered: 12   Skipped: 5
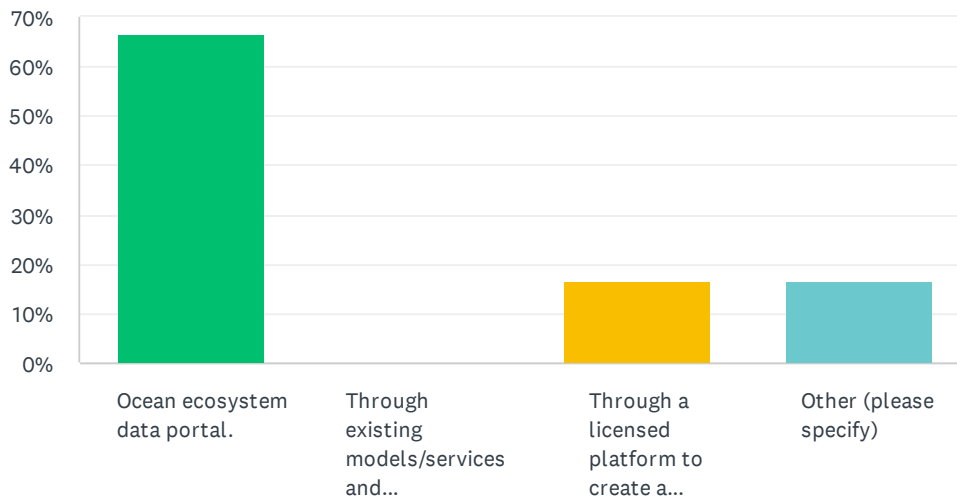
ANSWER CHOICES	RESPONSES	
Ocean ecosystem data portal.	66.67%	8
Through existing models/services and publications.	0.00%	0
Through a licensed platform to create a tailored fused product for own needs.	16.67%	2
Other (please specify)	16.67%	2
TOTAL		12

#	OTHER (PLEASE SPECIFY)	DATE
1	Potentially all of the above	10/20/2021 7:18 AM
2	needs to be decided based on what at the end of the day will be used for management and enforcement - the tool is only the means to an end	10/13/2021 3:51 PM