ID	THEME	Subtheme	QUESTION	WPs Total	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5
Na1	Nature	Offshore wind and nature	What are suitable and unsuitable locations for offshore wind farms from an ecological perspective (after 2030)?	6							1	1	1	1		1										1
Na2	Nature	Offshore wind and nature	Can a choice for offshore wind farms in areas with valuable benthos lead to ecological benefits if these areas are closed for fisheries?	4									1	1		1										1
Na3	Nature	Offshore wind and nature	Can an offshore wind farm be located in a nature reserve? Where, and under what conditions, and where is that not possible?	7							1		1	1	1					1		1				1
Na4	Nature	Offshore wind and nature	For which species and habitats the increase of offshore wind until 2030 will run into boundaries?	2											1					1						
Na5	Nature	Offshore wind and nature	Which measures can be taken nationally and internationally to effectively maintain, restore and / or strengthen these species and habitats?	5									1		1	1				1		1				
Na6	Nature	Offshore wind and nature	What role can building with nature fulfil in strengthening nature and compensating the negative effects of offshore wind? What are the costs and benefits of various possibilities?	5								1		1	1	1						1				
Na7	Nature	Offshore wind and nature	Which compensation options can be developed?	4								1	1							1		1				
Na8	Nature	Offshore wind and nature	Which innovations can ensure that more power can be installed on the North Sea? What are the costs and benefits of this?	4	1		1	1															1			
Na9	Nature	Offshore wind and nature	Where does the combination of mitigation and population recovery take us? For successful population recovery, research is needed into the possibilities of tackling the greatest threats in the entire life cycle of vulnerable species (in breeding, foraging, migration and wintering areas).	3									1	1								1				
Na10	Nature	Offshore wind and nature	Which other activities on the North Sea have, besides offshore wind, an impact on vulnerable species? Can these activities be more easily mitigated? Can accumulation records be used to keep track of activities that exert pressure on the same vulnerable species?	3											1	1				1						
Na11	Nature	Offshore wind and nature	How can nature enhancement be included and weighed in the conditions for tenders for offshore wind plots?	2	1								1													
Na12	Nature	Offshore wind and nature	What are the consequences, for the ecosystem and the hydromorphological system of the North Sea, of a large-scale increase of offshore wind? How can the positive and / or negative effects be made qualitative, quantitative and possibly monetized? And how can this information be evaluated? What are promising mitigating measures? And is mitigation (cost) effective and efficient?	8			1	1			1	1	1		1					1						1
Na13	Nature	Offshore wind and nature	What is the carrying capacity of the North Sea for the offshore wind function? When is the effect on wind fields limiting?	3			1	1			1															
Na14	Nature	Offshore wind and nature	What is the effect of offshore wind farms on the carrying capacity of the ecological system (primary, secondary and tertiary production)	9			1	1			1	1	1	1	1	1				1						

Na15	Nature	Offshore wind and nature	In the case of a large-scale increase, also areas in the Northern North Sea have to be studied: are all vulnerable species on the radar, or are there new species for which the ecological limits are approaching?	1											1											
Na16	Nature	Offshore wind and nature	Does the large-scale increase of offshore wind increase the exchange between populations of indigenous species? And what does scaling up mean for the distribution/dispersion of invasive species?	1											1											
Na17	Nature	Cumulative effects of pressures	Which methodologies to assess cumulative effects are suitable to integrate in policy making?	1																1						
Na18	Nature	Cumulative effects of pressures	Which species and habitats are under pressure from the accumulation of anthropogenic pressure factors, including climate change, in the (medium and) long term?	5							1		1			1				1						1
Na19	Nature	Cumulative effects of pressures	Is it possible to develop a natural capital accounting methodology for the North Sea that enables to provide an overview of the supply of ecosystem services by the marine environment?	3												1					1				1	
Na20	Nature	Cumulative effects of pressures	With such a system, can a better balance be achieved between the use of the North Sea by economic sectors and the value of ecosystem services of the North Sea?	4											1	1					1				1	
Na21	Nature	Cumulative effects of pressures	Natural capital accounts establish a link between ecological and economic information. How can natural capital accounts make a concrete contribution to answer the questions about cumulative effects?	3											1						1				1	
Na22	Nature	Cumulative effects of pressures	What socio-economic impact has the accumulation of pressure factors on the sectors and other users of the sea?	4			1	1													1				1	
Na23	Nature	Future knowledge needs	What are the effects of the energy, food and nature transitions on the North Sea for the lower trophic levels of the food web of the North Sea? What are the effects of other activities?	7			1	1			1		1		1	1				1						
Na24	Nature	Future knowledge needs	How do impacts on the lower trophic levels pass through to the higher trophic levels; which knowledge gaps can be identified?	8			1	1			1		1	1	1	1				1						
Na25	Nature	Future knowledge needs	What is the carrying capacity of the North Sea for the activities and spatial uses that are associated with the energy and food transition?	10	1		1	1			1					1	1		1	1	1					1
Na26	Nature	Future knowledge needs	How and where can reference areas be set up and can this coincide with the designated marine protected areas, which conditions should then be met?	7			1	1					1	1						1		1				1
Na27	Nature	Future knowledge needs	Is there a real risk of such a change in biophysical processes in the North Sea that a tipping point or an irreversible situation will be reached? Can it be indicated when such a moment comes into view?	6			1	1					1	1		1				1						
Na28	Nature	Future knowledge needs	How can the concept of resilience of the North Sea be operationalized? Is the system itself able to adapt and absorb changes. Can its resilience be increased? And if so, how?	6			1	1					1							1		1				1
Na29	Nature	Opportunities for restoration and development of nature	Prepare a map with opportunities for measures and pilots for nature restoration and development up to 2030. Also include search areas for new nature after 2030.	3								1	1	1												

Na30	Nature	Opportunities for restoration and development of nature	How can building with nature of offshore wind farms, and perhaps also floating (interrupted) islands, contribute to the recovery/restoration and development of the North Sea nature?	7	1	1				1		1	1	1								1				
Na31	Nature	Opportunities for restoration and development of nature	What are the possibilities for oil and gas platforms that are decommissioned - and in the future offshore wind turbine bases - for (hard substrate) nature development?	6	1							1	1	1									1			1
Na32	Nature	Opportunities for restoration and development of nature	What are the consequences of the clean-up obligation that applies to offshore installations for the then created nature? What does this mean for the non-deterioration principle in the MSFD?	6	1		1	1				1	1	1												
Na33	Nature	Opportunities for restoration and development of nature	What are the opportunities for building with nature on the North Sea? What are opportunities for nature in sand replenishment?	0																						
Na34	Nature	Opportunities for restoration and development of nature	How can opportunities for and risks of building with nature be made clear and evaluated in a transparent manner?	1																				1		
Na35	Nature	Opportunities for restoration and development of nature	What quality requirements must newly created nature meet and how can nature enhancement be measured?	1																		1				
Na36	Nature	Opportunities for restoration and development of nature	How can financial and other costs and benefits of building with nature be made transparent for decision-making?	2																				1	1	
Na37	Nature	Opportunities for restoration and development of nature	How can policymakers give stakeholders incentives (financial or otherwise) to come up with nature-inclusive solutions / stimulate bottom-up initiatives for nature-inclusive solutions.	3																		1		1	1	
Na38	Nature	Opportunities for restoration and development of nature	Which ecosystem services of newly created nature are relevant to which functions and revenue models?	1																					1	
Na39	Nature	Opportunities for restoration and development of nature	How do the (extra) costs of combining wind and nature fit into the total revenue model for wind farms; can it be indicated which price increases are the result of building with nature as a cost item? How can these costs be recovered? What are the possible benefits of combining wind and nature? And how can these benefits be stimulated?	4																	1		1	1	1	
Na40	Nature	Protected areas	What is an ecologically coherent network in the (international) North Sea and what can be the effects of such a network?	0																						
Na41	Nature	Protected areas	What are suitable criteria to assess networks of marine protected areas for interconnectivity and representativeness?	1																						1

Na42	Nature	Protected areas	Are the areas that are now being proposed to be entirely closed to mobile bottom-contacting fishing sufficient to meet the requirements of European regulations (Birds- and Habitats Directive and MSFD). Are there other important/relevant ecological areas that still have to be designated and protected, and what knowledge from the field is still required?	2			1													1
Na43	Nature	Protected areas	What are the preconditions of marine protected area networks to the use of the North Sea? And in order to improve the networks: how and where could this be done in the best way?	2			1													1
Na44	Nature	Protected areas	What are the socio-ecological effects of closing areas for fishing?	2														1	1	
Na45	Nature	Protected areas	Can quotas be fully utilized if the currently proposed protected areas and offshore wind farms are being constructed and where is the tipping point?	2												1		1		
Na46	Nature	Climate change	What are the ecological consequences (including for fish and benthos) of the increasing sand extraction and larger replenishment volumes and how can these consequences be minimized?	0																
Na47	Nature	Climate change	How does the acidification and increase in temperature of the North Sea develop?	0																
Na48	Nature	Climate change	What are the effects of acidification and global warming on the ecosystem of the North Sea? Consider (local) extinction and / or migration of species, other migratory flows, and effects on the energy management.	1	1															
Na49	Nature	Climate change	What are the effects of climate change and acidification on the physical system and how can this affect the food web?	1	1															
Na50	Nature	Climate change	What are the consequences of climate change for existing, emerging and new economic sectors and what are the possible changes for the pressure on North Sea nature?	1														1		
Na51	Nature	Monitoring and data management	Which species and habitats are representative of a healthy and robust North Sea?	2			1													1
Na52	Nature	Monitoring and data management	What is the status and distribution of these species and habitats in the North Sea?	3		1	1	1												
Na53	Nature	Monitoring and data management	Which preconditions from the ecological and physical system (process and system parameters) are crucial for their conservation?	4	1		1			1				1						
Na54	Nature	Monitoring and data management	Are the ecological and physical processes which are crucial to the system, adequately measured in the monitoring program?	3	1					1				1						
Na55	Nature	Monitoring and data management	How can the current monitoring program be adapted to answer questions of the future?	4	1		1	1						1						
Na56	Nature	Monitoring and data management	Can the current implementation of the so called 'WOT' tasks (legal research tasks) in the field of fisheries research still be carried out with regard to the future developments of offshore wind?	0																
Na57	Nature	Monitoring and data management	Every year, large amounts of data are generated on the North Sea. There is a high risk of data fragmentation. How can data from public and private projects be combined in the future?	1																1

Vo1	Food	Fisheries	What are the (cumulative) effects (including on income) of the following four developments for the fishing sector, including the fish processing industry, and fish stocks: (1) a ban on the pulse trawl, (2) the Brexit, (3) the closure of newly designated marine protected areas for (certain forms of) fishing and (4) a (large-scale) increase of offshore wind? What do these developments mean for the ability to use the fish quotas?	2													1						1		
Vo2	Food	Fisheries	What are suitable alternative fishing locations (as alternative to closed areas)? Is the use of fish plots a feasible idea? What are the costs and other socio-economic effects?	2																			1		1
Vo3	Food	Fisheries	Can quotas be fished, if the now proposed protected areas and wind farms are set up or constructed and where is the tipping point?	3													1				1		1		
Vo4	Food	Fisheries	Which form of fishing fits the transitions on the North Sea? What are opportunities for shared use? What conditions must (and can) the fishing and offshore wind energy industry meet to make fishing within offshore wind farms feasible and attractive? What are the possibilities for, and economic impact of passive fishing within offshore wind farms? Can simulation models be used in cooperation with the fishery sector to study the possibilities of precision fishing in offshore wind farms? What is the optimum lay-out of the wind plots to allow for fishing within the offshore wind farm?	3	1															1			1		
Vo5	Food	Fisheries	What are the opportunities for a further increase of sustainable fisheries such as adaptations of current fishing methods, changing to other fishing methods, target species or other activities? How is sustainability defined in this context?	0																					
Vo6	Food	Fisheries	What are the effects of innovative catch techniques such as precision, fly-shoot and twin-rig fishing on the yield, unwanted by-catch, ghostnetting, benthos, fish populations and fuel costs?	0																					
Vo7	Food	Fisheries	What are the consequences for the labour market of the fisheries sector with regard to the foreseen transition?	0																					
Vo8	Food	Fisheries	Can a suitable habitat be created for cod (and other fish, skate) to support fish stock development?	0																					
Vo9	Food	Fisheries	What are the costs and benefits of a transition in the fishing industry and what is the investment threshold?	1													1								
Vo10	Food	Fisheries	How does the ecological footprint of fisheries in the North Sea relate to other animal protein production sectors?	1																1					
Vo11	Food	Mariculture	What is the carrying capacity of the North Sea for various forms of mariculture? This concerns in particular the availability of nutrients and the effects of the extraction of nutrients.	7						1				1	1	1		1	1	1					
Vo12	Food	Mariculture	What is the impact of potential hazards from various forms of mariculture (e.g. the use of antibiotics, escape from farmed fish and mixing of farmed fish with wild fish)?	1										1											
Vo13	Food	Mariculture	What is the total economic value of the current mariculture sector in the Netherlands and what are possible indirect effects on fish processing and supply in case of a change in size?	1																1					

Vo14	Food	Mariculture	Can nature be stimulated to produce more food (e.g. "restocking" in offshore wind farms or supplementary maricultures)? What are the ecological and economic (side) effects of these measures?	5									1		1	1				1	1					
Vo15	Food	Mariculture	Which scenarios can be expected from the socio-economic perspective for the future of mariculture in the North Sea, including species, production methods and size? Also: what is the size/value of this economic interest potentially?	1																	1					
Vo16	Food	Mariculture	Which contribution does mariculture make to climate adaptation and to the circular economy?	2																1	1					
Vo17	Food	Mariculture	Which areas in the North Sea are suitable for several forms of mariculture? Taking into account opportunities and limitations in relation to other spatial use (including other forms of mariculture), nature, logistics (transport from and to the coast), wave climate, currents, availability of nutrients, contaminants, climate change, health and safety legislation and general safety.	7							1					1	1		1	1	1					1
Vo18	Food	Mariculture	Are there opportunities for mobile mariculture, for example on mobile islands or ships?	2						1											1					
Vo19	Food	Mariculture	What are (social) costs and benefits of mariculture in offshore wind farms?	4													1		1		1		1			
Vo20	Food	Mariculture	What are the opportunities, limitations and risks for the combination of mariculture with other forms of use (in particular offshore wind farms) in the North Sea? For which techniques and what types is the combination economically and technically feasible?	9	1	1				1					1		1		1	1	1		1			
Vo21	Food	Mariculture	Which new techniques for mariculture can be applied in the short and medium term?	3													1		1		1					
Vo22	Food	Mariculture	What are the possibilities for markets for sustainably harvested (wild or cultivated) seaweed?	2															1		1					
En1	Energy	Offshore wind energy	What are the most suitable locations from cost, maintenance and spatial perspective (after 2030)?	3	1	1																1				
En2	Energy	Offshore wind	How can sufficient space be created for the increase of offshore wind	2	1															1						
En3	Energy	Offshore wind energy	Do the offshore turbines actually deliver what is intended in practice?	1	1																					
En4	Energy	Offshore wind energy	What are the effects of a possible upscaling of offshore wind on other activities in the North Sea?	3	1																1					1
En5	Energy	Offshore wind energy	What are the costs and benefits of different alternative locations for offshore wind energy, both for the energy company and for the other sectors, such as fishing, shipping, recreation etc. (in short, the rest of society)?	2	1																				1	
En6	Energy	Energy from tidal currents, waves, sun and biomass	What is the potential for the extraction of tidal, wave and solar energy in the North Sea? Which techniques are suitable for this and what is the Technology Readiness Level (TRL) for this?	4	1	1				1													1			
En7	Energy	Energy from tidal currents, waves, sun and biomass	Are systems for collecting tidal, wave and solar energy, suitable to be located in offshore wind farms? What are possibilities outside offshore wind farms? Which factors determine suitable locations?	4	1	1				1													1			

En8	Energy	Energy from tidal currents, waves, sun and biomass	What are the costs and benefits of (the combination of) tidal, wave and solar energy inside and outside offshore wind farms?	4	1	1				1													1			
En9	Energy	Energy from tidal currents, waves, sun and biomass	What are the environmental impacts of the techniques that can generate tidal, wave and solar energy?	4	1	1					1				1											
En10	Energy	Energy from tidal currents, waves, sun and biomass	What is the potential of growing biomass for energy production?	0																						
En11	Energy	Tidal currents, wave action/swell, solar and biomass	Which instruments can stimulate innovation in the offshore energy mix by the government?	2	1																		1			
En12	Energy	Conversion, storage and transportation of energy*	How quickly will the costs of the production of hydrogen at sea by means of wind-generated electricity decrease in the coming years?	3			1	1	1																	
En13	Energy	Conversion, storage and transportation of energy*	Which forms of energy storage have potential (in particular the storage of offshore wind energy converted in the production of hydrogen)? Can (part of) the decommissioned oil and gas infrastructure be used for this purpose?	5	1		1	1	1														1			
En14	Energy	Conversion, storage and transportation of energy*	How can we optimize supply and demand of (wind) energy optimally in an international context by using a shared infrastructure at sea?	2			1	1																		
En15	Energy	CCS	Which areas are suitable for CCS and which order of commissioning is the most cost-efficient?	0																						
En16	Energy	CCS	What risks and opportunities can arise from the storage of CO2 on the North Sea?	0																						
En17	Energy	CCS	Can (part of) the oil and gas infrastructure be retained to (temporarily) be used for CO2 storage?	1																			1			
En18	Energy	CCS	What are the (social) costs and benefits of CCS?	0																						
En19	Energy	Energy islands	Which role can (floating or solid) energy islands fulfil in the extraction, conversion, storage and transport of energy?	4	1				1	1													1			
En20	Energy	Energy islands	What is the environmental impact of floating and fixed islands at sea?	8	1	1				1	1	1		1	1								1			
En21	Energy	Energy islands	What are the opportunities for habitats and species in constructing islands?	5		1				1		1		1												1
En22	Energy	Energy islands	Which other activities can - and under what conditions - be linked to energy Islands? Can energy islands be of value for fishing (eg stay of crew, fish processing)?	2						1													1			
En23	Energy	Energy islands	What are the possibilities for valorising knowledge about floating and fixed energy islands for the international market?	4	1	1				1													1			
En24	Energy	Spatial use and shared use of offshore wind farms	Which shared use of wind farms is possible, with due regard for safety, cost-effectiveness and technical preconditions? Particularly interesting are certain types of fishing, mariculture, nature development, extraction of wave, solar and tidal energy and energy storage in hydrogen.	11	1	1			1	1	1		1		1		1			1	1					1

En25	Energy	Spatial use and shared use of offshore wind farms	What is the effect of shared use of offshore wind farms on the electricity price?	3	1		1	1																		
En26	Energy	Spatial use and shared use of offshore wind farms	How can the government manage the shared use of offshore wind farms?	5	1		1	1														1	1			
En27	Energy	Impact of more ship movements	What is a realistic traffic picture that can be expected due to the construction and maintenance of wind farms and other activities at sea? How does this affect safety at sea?	3	1		1	1																		
En28	Energy	Impact of more ship movements	How will the shipping route along the North Pole develop and what consequences does this have for the use of space in the North West part of the North Sea?	2			1	1																		
Ec1	Blue Economy	Sectoral economic effects *	What are the sectoral-economic effects of spatial developments in the North Sea until 2030 (and if quantifiable after 2030), including the development of a competitive position? And in particular, the large-scale increase of offshore wind energy? What are the economic effects on economic developments at Dutch sea ports? And further land-bound economic activities?	1																					1	
Ec2	Blue Economy	Labour market developments *	How does the future offshore labour market look like on the basis of the stated ambitions in the Strategic Agenda North Sea 2030? What expertise is needed, before and after 2030? What type of employment is decreasing? And what consequences can this have in terms of employment, training and labour migration?	1	1																					
Ec3	Blue Economy	Key figures for valuing economic developments for socio-economic effects	Which cost-indicators can be applied with regard to cables, sand extraction, and other offshore activities?	1	1																					
Ec4	Blue Economy	Effects of Government policy *	What are the effects of specific government instruments to achieve the objectives of sectors and government? In particular, of progressive standards, fund formation, and financial incentives?	1	1																					
Ec5	Blue Economy	Stimulation of pilots	How can it be ensured that pilots do not inadvertently get stuck in the process of entering the market? What is the role of the government in this?	1	1																					
Ec6	Blue Economy	Appreciating/ Value ecological and physical effects*	How can the monetized valuation of ecological and physical effects be improved? Can the impact on more primary processes in the ecosystem then be taken into account? What role can Naturally-Capital-Accounts fulfil in a better monetization of ecosystem services?	1																					1	
Ec7	Blue Economy	Appreciating/ Value socio-economic effects*	How should the future cost developments of the production of hydrogen at sea with offshore wind energy be included in Social Cost Benefit Analysis? And other forms of energy and CCS?	0																						
Ec8	Blue Economy	Shared use and burden sharing	Which forms of burden sharing between sectors are possible with shared use of functions and infrastructure?	1	1																					
			Total	344	30	12	19	19	4	12	19	12	27	17	20	18	7	3	7	25	21	14	16	11	12	19

	n	%
Total number of questions	115	100
Number of questions for which WPs deliver knowledge	101	88
Number of questions for which at least 3 WPs deliver knowledge	57	50
Number of questions for which at least 6 WPs deliver knowledge	18	16