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Eleventh Meeting of the Scientific and Technical Advisory Committee (STAC) to the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) in the Wider Caribbean Region

Contracting Parties needs related to managing Sargassum influx and how such influx may affect their implementation of obligations under the SPAW Protocol and Cartagena Convention, as well as the LBS Protocol-Survey analyze

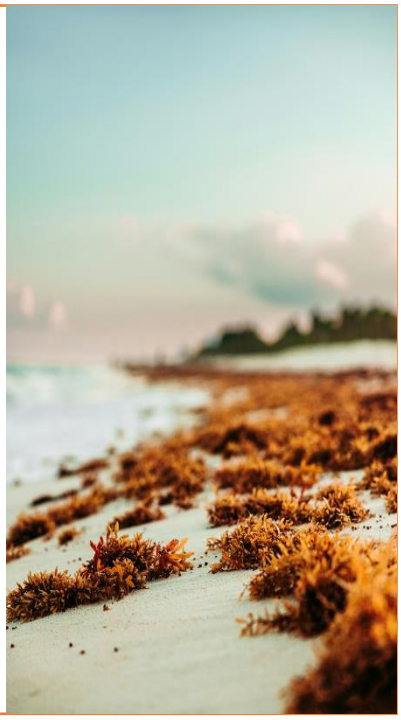
A REPORT OF THE SPAW SARGASSUM WORKING GROUP

SPAW • RAC

SPAW Sargassum Working Group

- *Survey Report* -

Survey Report Content:



A. General Information: Survey context

In 2018, in response to the recognition that pelagic sargassum in the Tropical North Atlantic and Caribbean Sea had become an emergent threat in urgent need of attention, the United Nations Environment - Caribbean Environment Programme (UNEP-CEP) conducted a survey across UNEP-CEP National Focal Points of the member states to better understand the status and needs of the Wider Caribbean Region. The results of this first survey were presented in a Sargassum White Paper 'Sargassum Outbreak in the Caribbean: Challenges, Opportunities and Regional Situation' at the 8th Meeting of the Scientific and Technical Advisory Committee (STAC) to the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) in the Wider Caribbean Region (UNEP 2018).

Fielded from June to August 2024, the survey on the **impact of sargassum inundation[1] on biodiversity and the Cartagena Convention[2]** adds to and updates information collected in 2018 with a focus on members' needs with regard to implementing the Cartagena Convention and its protocols in the face of the continuing sargassum threat (Appendix 2).

[1] While SPAW STAC10 used the term "Sargassum influx," SPAW COP12 and IGM20/COP17 used "Sargassum inundation." This survey uses "Sargassum inundation" for consistency with SPAW COP12 and IGM20/COP17.

[2] Table of Contracting Parties to the Cartagena Convention; SPAW and LBS protocol in Appendix 1

This survey was sent out to the National Focal Point contacts in all countries that are Party to the **Cartagena Convention**, the Protocol concerning Specially Protected Areas and Wildlife (**SPAW Protocol)** and/or the Protocol concerning Pollution from Land-Based Sources and Activities (**LBS Protocol)**. The intent was to enable the SPAW Sargassum Working Group, with contributions from experts from the LBS Protocol, to update and prioritize the proposed action plan for consideration by **SPAW STAC11 and SPAW COP13**. The action plan will then be presented to the Cartagena Convention Conference of the Parties (COP18) for decision. The questionnaire is also intended to enable the SPAW Sargassum Working Group, with contributions from experts from the LBS Protocol, to build a sargassum management issue report with [country mentioned but personally anonymized] information from the survey responses. This survey was conducted pursuant to the SPAW protocol COP12 recommendation: "The Sargassum Working Group [should] survey Contracting Parties on their needs related to managing Sargassum influx and how such influx may affect their implementation of obligations under the SPAW Protocol and Cartagena Convention, as well as the LBS Protocol, as appropriate."

Elaborated by the experts of the Sargassum Working Group (WG) assisted by SPAW-RAC and LBS working group members, the questionnaire was translated into English, French and Spanish and sent out at the end of June 2024 to stakeholders via the UNEP-CEP secretariat. After several reminders in July and August of 2024, 13 Contracting Parties submitted survey responses (11 Parties to the SPAW Protocol and 10 Parties to the LBS Protocol).

The Sargassum Working Group encountered difficulties combining the political framework to which the SPAW protocol is subject with the diverse situations of countries geographically located thousands of kilometers apart, in addition to varying degrees of sargassum inundation depending on a country's location. As a result, it was decided that analysis should be at the smallest territorial scale possible, creating a difference in scale depending on the availability of answers (e.g. responses from Aruba, Bonaire, St Eustatius, St Maarten and Saba were considered independently, although recognising that they represent the Kingdom of Netherlands).

A. General information

A total of 17 respondents (territories and Countries) including 13 of 26 Cartagena Convention Contracting Parties, responded to the survey: Costa Rica, Dominican Republic, Kingdom of the Netherlands (Aruba, Bonaire, Saba, Sint Eustatius, Sint Maarten), Trinidad and Tobago, France (Guadeloupe), Panama, Honduras, Colombia (San Andres), USA, Saint Lucia, Saint Vincent and the Grenadines, Jamaica and Venezuela. This report reflects the situation as reported by these participating countries representing half of the Cartagena Convention member states.

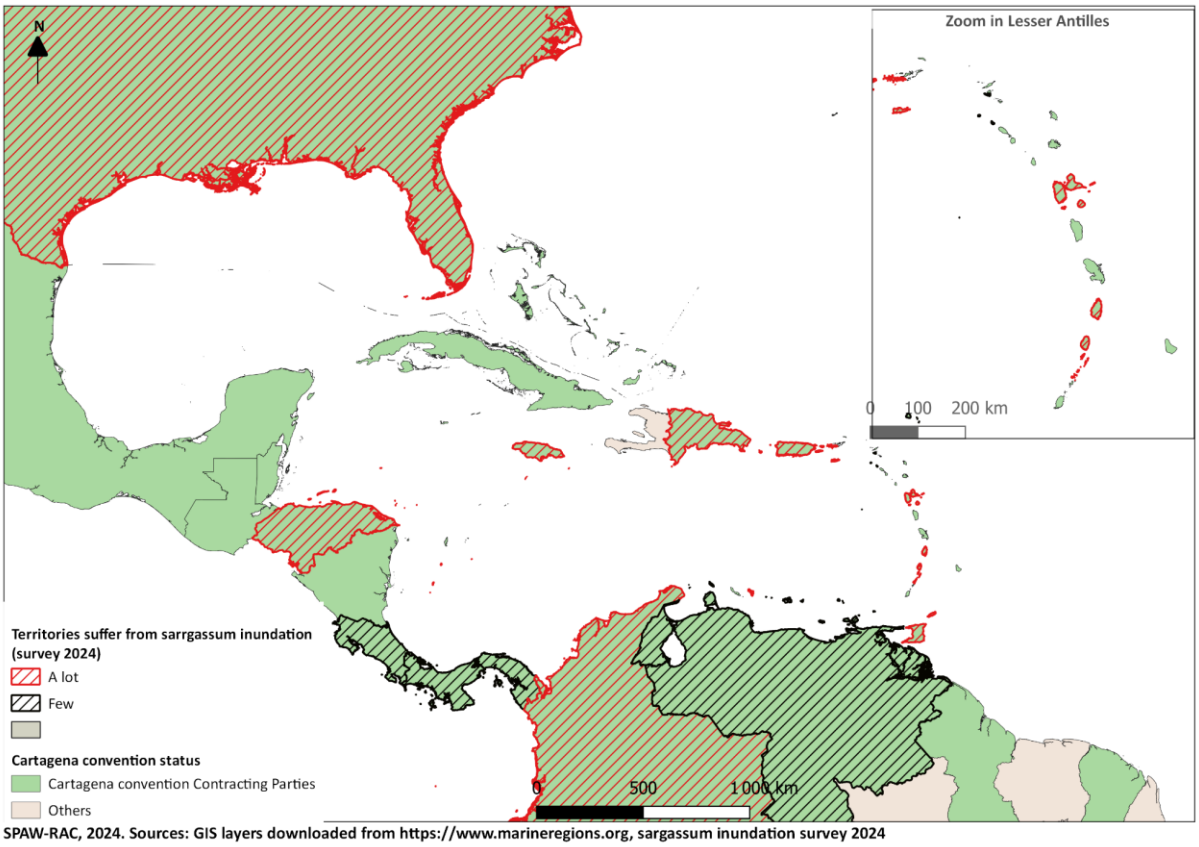


Figure 1. Map of the Caribbean showing Cartagena Convention Contracting Parties and the extent to which they reported suffering from sargassum inundations (Question B.1)

Respondents were first asked about the extent to which their territory is impacted by sargassum inundation events. In total, 10 territories indicated that they 'suffer a lot' , while 7 reported that they 'suffer only a little' (Figure 1).

Among the Contracting Parties who responded and reported their country as severely affected, they also reported disruption to tourism and major impacts on the quality of life for residents (eg. pollution, unpleasant odors, impact on the economy). In contrast, Contracting Parties with less frequent accumulations have reported little impact.

Notably, not all coastlines are always affected; countries generally report the most significant inundations on the exposed windward coasts. For example, in Central America, some beaches – notably between Punta Cana and Manzanillo in Costa Rica – have suffered heavy accumulations of sargassum with high clean-up costs. Here local communities, in collaboration with university researchers and governments have organized clean-up efforts. In Honduras, the Bay Islands have been especially impacted by sargassum inundations. In South America, Colombia reports that the Archipelago of San Andrés, Providencia and Santa Catalina have been particularly affected by sargassum.

In the Netherlands Antilles, Bonaire reports that sargassum events have severely impacted the east of the island, depleting oxygen and threatening nearshore marine ecosystems, including

mangroves. Equipment costs for clean-up were reported to be close to one million dollars, with recurring costs of around 200,000 USD per year.

In the Lesser Antilles, in the Eastern Caribbean, the island of St. Eustatius reported that sargassum mainly affects the east coast, without significantly impacting human activities, and does not lead to regular clean-ups. In St Lucia, the entire east coast is impacted and beach clearing in 2018 cost approximately 711,000 USD. In Trinidad and Tobago, there is no dedicated budget for sargassum clean-up, although interventions have taken place on the island of Tobago at reported costs in some years up to 250,000 USD. In Guadeloupe, badly impacted areas include Capesterre in the island of Marie-Galante, the east coast of Grande Terre, and the island of la Désirade. Projects have been set up to map affected areas and mitigate impacts on tourism and the environment, particularly in Capesterre and Désirade.

In the Greater Antilles, in the northern Caribbean, the Dominican Republic reported that the easternmost province is the most affected, especially the Bavaro and Punta Cana region, and that annual clean-up costs were around 600,000 USD. The USA reported significant sargassum inundations and clean-up costs. For example, the U.S. Virgin Islands spends approximately 25,000 USD per day during such events. Florida's Miami-Dade County allocates approximately 3.9 million USD per year for sargassum clean-up, and the city of Ft Lauderdale budgets approximately 380,000 USD per year for clearing beaches and composting sargassum.

Overall, sargassum inundations continue to affect Caribbean coastlines, potentially damaging marine ecosystems and negatively impacting tourist and local resident activities and health. Piles of stranded sargassum and poor air quality associated with sargassum decay have resulted in beach closures across several territories, and significant clean-up costs estimated in excess of 100 million USD annually across the Caribbean.

B. Contracting Parties' Needs Relating to Managing Sargassum Inundations

In order to begin assessing Contracting Parties' needs, respondents were asked about their current situation with regard to sargassum-specific management efforts in their country and their perceived needs in this regard. The responses are presented in the following sections

1- Management plan

The responses regarding the existence and effectiveness of a sargassum management plan are summarized in Table 1.

Table 1. Summary of responses by territory to survey questions related to the existence and perceived effectiveness of a sargassum management plan, showing details of activities (topics) covered by management action. (Question B.2)

Respondents	management plan in place	Management plan interests	sargassum mangement plan*	documents available for sharing
Costa Rica	No			
Dominican Republic	In progress	Monitoring and forecasting, beach cleaning, disposal, information	5	
Aruba	Yes	Monitoring and forecasting, beach cleaning, health warnings, information	2	In Dutch, can be send on request
Bonaire	Yes	Monitoring and forecasting, beach cleaning, disposal, health warnings, information	7	Sargassum Response Plan, can be send on request
Saba	No			
Sint Eustatius	No			
Sint Maarten	No	Beach cleaning and Disposal	3	
Trinidad and Tobago	In progress	Monitoring and forecasting, beach cleaning, disposal, Support of entrepreneurs trying to develop uses for sargassum , information	5	National Sargassum National Task Force to oversee coordination and manage response
France	Yes	Monitoring and forecasting, beach cleaning, health warnings, information	4	https://www.guadeloupe.developpement-durable.gouv.fr/en-guadeloupe-r1262.html and https://www.guadeloupe.developpement-durable.gouv.fr/plan-departemental-de-lutte-contre-les-echouages-a3160.html
Panama	No			
Honduras	No	beach cleaning		https://infoinundaciones.com/recursos/item/informe-nacional-honduras/
Colombia	I don't no	Monitoring and forecasting, beach cleaning, disposal, information	9	
USA	No	Monitoring and forecasting, beach cleaning, disposal, Support of entrepreneurs trying to develop uses for sargassum , information		**Not a national plan but some agencies and U.S. states and territories affected by SIEs have informally or formally adopted management plans or delegated their development and implementation to local governments.:** **U.S. Virgin Islands**: https://dpnr.vi.gov/wp-content/uploads/2023/05/Sargassum-Blueprint-FINAL5.2023.pdf, **Florida** : https://myfwc.com/research/about/ear/sargassum/ https://www.sciencedirect.com/science/article/pii/S2667378923000470?via%3Dihub , **Texas** : https://www.glo.texas.gov/coastal/protecting-coast/open-beaches https://www.glo.texas.gov/coast/coastal-management/forms/files/dune-protection-manual-gpb.pdf, **Puerto Rico** : https://www.drna.pr.gov/documentos/protocolo-sargazo-drna-2023/ *and While the following additional resources are not management plans, they may help inform SIE management and response* : -EPA web page on Management Methods for Sargassum inundation events: https://www.epa.gov/habs/management-methods-sargassum-inundation-events-sies -NOAA and University of South Florida Sargassum Inundation Risk Maps: https://cwcgom.aoml.noaa.gov/SIR/ -NOAA Fisheries Southeast Regional Office Frequently Asked Questions Regarding Annual Inundations of Sargassum in the Southeastern United
Saint Lucia	Yes	Monitoring and forecasting, beach cleaning, support of entrepreneurs trying to develop uses for sargassum, information	4	Saint Lucia Sargassum management Plan, available for sharing on request
St. Vincent & the Grenadines	In progress	Monitoring and forecasting, beach cleaning, information	7	Not available for sharing
Jamaica	Yes	Monitoring and forecasting, beach cleaning, information	5	National Response Strategy: The Sargassum Threat. Available upon request to the Agency.
Venezuela	No	Monitoring and forecasting, beach cleaning, information		Fenómeno arribazón de Sargassum impacta playas de Nueva Esparta. Video de Youtube https://www.youtube.com/watch?v=Kcbk2Bg3VZY Revista Centro Nacional de Investigaciones sobre Pesca y Acuicultura CENIPA Ciencia 4: 24-33
*1 is very efficient, 10 is low efficiency				

A total of five (5) respondents (Aruba, Bonaire, Guadeloupe, St Lucia, and Jamaica) indicated that they have a national management plan in place. One (1) country – the USA – reported that although it does not have a national-level plan, a number of its states (e.g., Texas, Florida) and territories (US Virgin Islands and Puerto Rico) impacted by sargassum have adopted management plans, and local governments are implementing mitigation efforts. Three (3) others – the Dominican Republic, Trinidad and Tobago, St Vincent and the Grenadines – reported that they have a management plan 'in progress', whilst the remaining eight stated that there was no sargassum management plan in place (Table 1).

Although not all respondents have a management plan, the majority are engaged in at least some management systems (Table 1, Figure 2).

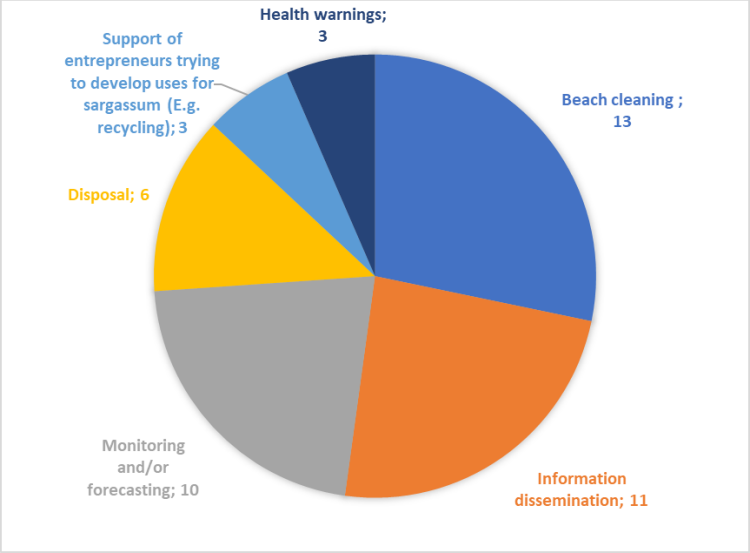


Figure 2. Summary of reported management systems by survey respondents. N represents the number of territories engaged in each activity. A total of 13 respondents answered this question. (Question B.4)

Thirteen (13) respondents reported management systems (Figure 2). All thirteen (13) respondents reported engaging in beached sargassum cleanup. The majority reported disseminating information about sargassum (85%, N=11 respondents), and some form of either monitoring or forecasting sargassum events (77%, N=10 respondents). Although just six (6) respondents reported disposal of sargassum, it is likely that all respondents dispose of at least some of the sargassum cleared from beaches. A few respondents – Trinidad and Tobago, St Lucia, USA – have been supporting entrepreneurial activities for valorizing sargassum. Sargassum management in Guadeloupe, Aruba and Bonaire includes monitoring air quality and issuing health warnings (which may be affected by the gases produced by the rotting of beached sargassum). No respondents reported adoption of insurance or compensation schemes specific to sargassum events.

Of the eight (8) respondents that reported a management plan in place or in progress, only three (3) indicated that they consider it somewhat effective (i.e. gave a score of less than 5), three (3)

considered their plan relatively effective (score 5) and two (2) rated their plan relatively ineffective (score >5) (Table 1). A further two (2) respondents rated the effectiveness of their listed management action (in the absence of a plan), with one suggesting relatively high efficiency (score 3) and one very poor (score 9) (Table 1).

Reviewing all responses reveals that sargassum management represents a major challenge for many Caribbean countries due to the scale and frequency of beach strandings. Several in-water and onshore collection techniques are being implemented or have been trialed. These include the use of nets and suction pumps (in-water) and beach cleaning equipment (onshore). Manual beach cleaning efforts are frequent in tourist areas, while mechanical collection is often preferred (because it requires less labour and is therefore often less expensive). However, it is recognized by many that sargassum removal, if carried out mechanically by heavy machinery, can increase beach erosion and harm coastal and marine ecosystems and wildlife, particularly in sea turtle nesting areas.

Specific challenges reported by respondents include the lack of infrastructure for sargassum management, the negative environmental impact of interventions, and limited financial resources for data monitoring, coordination of management, limited personnel for collection, etc. In many territories, the absence of a sargassum management system makes it difficult to store, use or safely dispose of stranded sargassum.

Initiatives to valorize sargassum by transforming the biomass into useful products, such as compost and biofuels, are being explored by several respondents' countries (e.g. Dominican Republic and Honduras) through trial and error and targeted research. Respondents report research initiatives focusing on the potential use of sargassum in other innovative products (e.g. fertilizers, biofuels and biodegradable materials), that require consideration of heavy metals, pesticide residues and microplastics contamination.

Respondents stated that the costs associated with collecting, transporting and disposing of, or storing sargassum are high and are exacerbated by the need for coordination between different players, such as governments, private companies and local communities. Some note that sargassum management requires a collaborative approach, proactive planning and public awareness.

Despite programmes that have been launched to provide cleaning equipment and to assist in developing management plans across pilot sites, several countries are still struggling with the absence of structured national plans further complicating sargassum management.

2- Management needs

Responses to the question on management needs were received from 16 respondents (Costa Rica, Dominican Republic, Aruba, Bonaire, Saba, St Eustatius, St Maarten, Trinidad and Tobago, France (Guadeloupe), Panama, Honduras, Colombia, USA, Saint-Lucia, St Vincent and the Grenadines, Jamaica). Respondents were asked to prioritize their needs, from the given list of possible topics (which included an open choice 'other'), in order to improve management of sargassum. Their responses are shown in Figure 3 and Table 2.

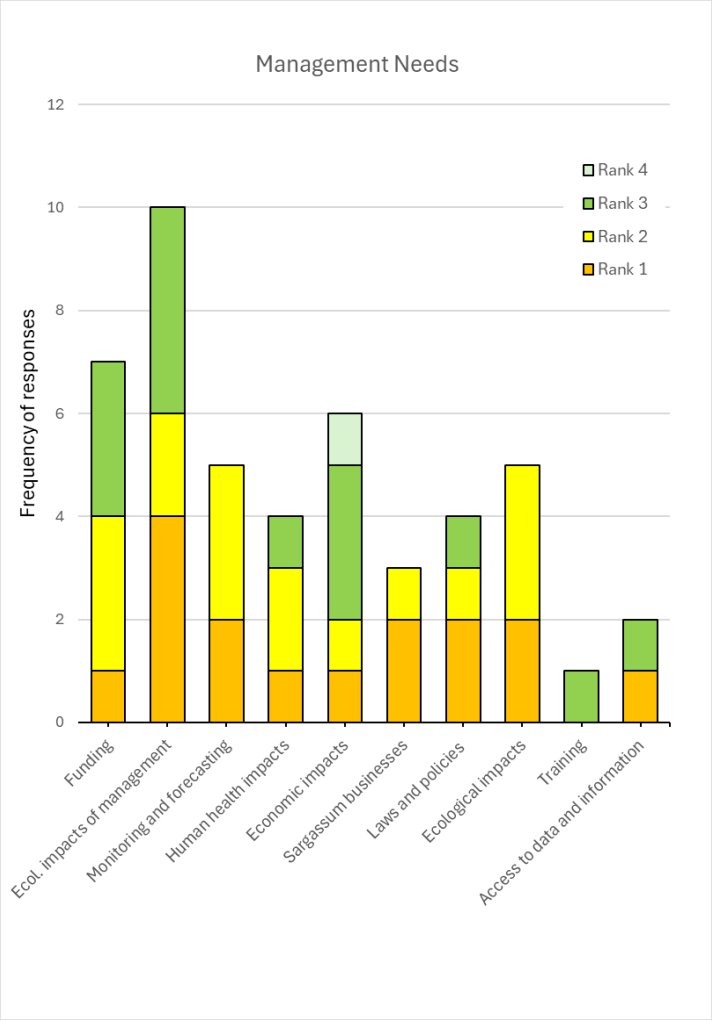


Figure 3. The figure shows the priority needs for managing Sargassum ranked by the territories surveyed. The data represents responses from 16 territories or countries (Costa Rica, Dominican Republic, Aruba, Bonaire, Saba, St Eustatius, St Maarten, Trinidad and Tobago, France (Guadeloupe), Panama, Honduras, Colombia, USA, Saint-Lucia, St Vincent and the Grenadines, Jamaica). It should be noted that most respondents gave at least three subjects of importance, the colorimetric scale making it possible to identify the subjects of importance from the highest level, rank 1 (in orange) to the lowest level of importance, rank 4 (details in Table 2). (Question B.6)

Table 2. Summary of responses from 16 territories regarding sargassum management needs shown by rank. Each rank has been assigned a color code for greater visibility. From the highest rank, rank 1 - orange, rank 2 - yellow, to the lowest rank, rank 3 - green. (Question B.6)

Territory	Funding	Ecol. impacts of management	Monitoring and forecasting	Human health impacts	Economic impacts	Sargassum businesses	Laws and policies	Ecological impacts	Training	Access to data and information	Regional collaboration
Costa Rica	2		3								
Dominican Republic			3		1			2			
Aruba		1			3			2			
Bonaire		3			1			2			
Saba		1			2			3			
St Eustatius				2				3		1	
St Maarten			2				1			3	
Trinidad et Tobago	2	3			1						
France (Guadeloupe)		3				2					
Panama	1	3					2				
Honduras	1		2				3				
Columbia (San Andres)	1		2				3				
USA		1		3				2			
Saint Lucia	3	1		2							
St. Vincent & the Grenadines	2					3			1		
Jamaica		2		1		3					
Venezuela											
TOTAL COUNT	7	9	5	4	6	3	4	6	1	2	0
IMPORTANCE SCORE based on rank points	12	18	12	8	8	8	9	14	1	4	0

Responses to the question on management needs were received from 16 respondents (Costa Rica, Dominican Republic, Aruba, Bonaire, Saba, St Eustatius, St Maarten, Trinidad and Tobago, France (Guadeloupe), Panama, Honduras, Colombia, USA, Saint-Lucia, St Vincent and the Grenadines, Jamaica) and included 10 of the 11 topics listed in the survey questionnaire; no respondents selected 'other' issues (Table 2).

The most pressing management needs based on the importance score (18 points, Table 2) of responses are assessing the ecological impacts of management interventions. There is a strong need for a greater understanding of the full range of potential ecological impacts of sargassum management operations. This is especially true with regard to coastal erosion and habitat destruction caused by management actions such as sargassum removal, and pollution due to storage or disposal. Countries recognize that the implementation of advanced technologies for collection, transport, and processing can enhance operational efficiency and reduce environmental impact.

Assessing the ecological impacts of sargassum inundations themselves (e.g., environmental impacts especially of arsenic and other metalloids, pesticide residues, and microplastics etc) was the next highest scoring need (14 points, Table 2). A better understanding of the ecological impact of sargassum on coastal ecosystems and biodiversity would enable us to intervene more effectively. There is currently a lack of scientific knowledge on the subject.

Two (2) issues - funding and the development of improved monitoring and forecasting of sargassum inundation events - were ranked next, with each receiving equally high importance scores (12 points, Table 2). A lack of model validation data regarding the amount of sargassum landing on coastlines hampers effective forecasting of Sargassum Inundation Events (SIEs) which affects mitigation planning and budgeting. Establishing systems that track sargassum movements and volumes nearshore are a necessity. Funding concerns included the need to raise funds to allocate specific budgets to sargassum management, whilst others also expressed difficulty with budgeting because of unknown costs and unpredictable timing and volume of SIEs. Management plans focusing on the total costs and capacity required for worst-case events could be beneficial.

The next ranked need identified (9 points, Table 2) was developing sargassum-relevant laws and the definition of legal status of sargassum. Defining the legal status of sargassum is important for some territories where harvesting is, or could be, constrained by uncertainty surrounding ownership and access to a shared resource. In fifth place, respondents listed needs with regard to assessing human health, economic impacts and development of viable sargassum businesses (each scoring 8 points, Table 2). Surprisingly, only three (3) territories listed the development of viable sargassum businesses as a management need, although these respondents did rank it highly (Table 2).

Two (2) respondents selected improved access to data and information as a priority, and only one (1) country listed a need for training.

No respondents considered regional cooperation in the top three priority. Although this lack of priority ranking may come as surprising to some respondents, especially given that sargassum is a shared resource as well as a shared challenge, it may not be surprising to others as sargassum typically is only considered a problem once it enters a nation’s jurisdiction.

C. Relevance to the SPAW Protocol

A total of 17 territory respondents comprising 11 (Dominican Republic, Netherlands, Trinidad and Tobago, France, Panama, Honduras, Colombia, USA, Saint-Lucia, St Vincent and the Grenadines and Venezuela) out of 18 SPAW contracting parties and 2 non-contracting parties (Jamaica and Costa Rica) responded to at least some aspects of the SPAW Protocol section of the survey (The list of the SPAW contracting parties is in annex 1, the territories providing at least some responses are listed in Table 3).

1- Impacts on implementation of protocol

For many respondents, sargassum inundation significantly impacts the implementation of the SPAW Protocol. The decomposition of sargassum can degrade water quality, forming a brown plume, rich in suspended particulate matter, nutrients and organic compounds, leading to eutrophication and harming marine life. Furthermore, sargassum accumulations can shade or sink and smother critical marine habitats like seagrasses and coral reefs, which are essential for biodiversity and ecosystem health.

Respondents explained that access issues caused by sargassum inundations can hinder necessary monitoring and research activities, affecting the evaluation of protection measures under the SPAW Protocol. Additionally, the negative impacts on local economic activities, such as tourism and fishing, can influence management priorities. Moreover, the high costs associated with sargassum collection may divert resources from other conservation efforts linked to the SPAW Protocol.

Currently, there is insufficient information on the full impacts of sargassum inundation, leading to uncertainty regarding effects on the SPAW Protocol's implementation.

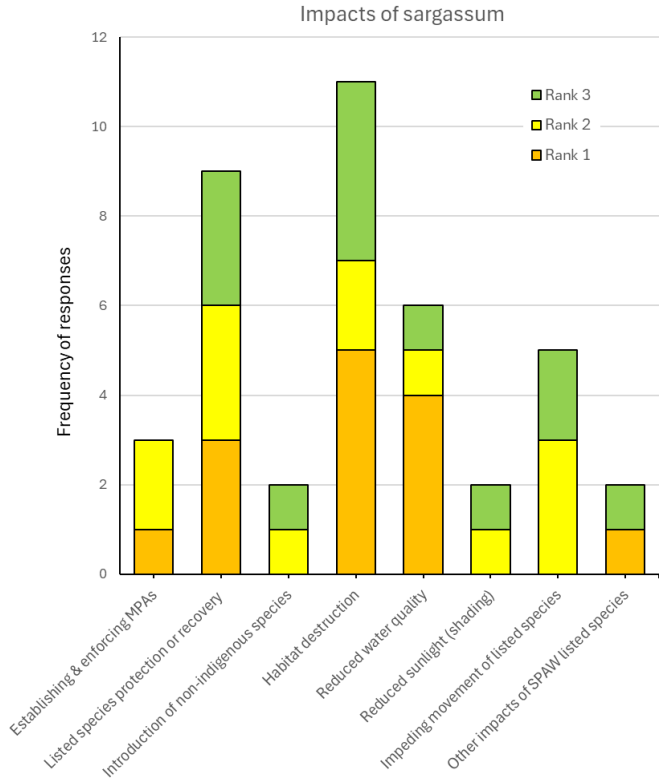


Figure 4. Chart showing the three top ranking sargassum inundation impacts affecting implementation of the SPAW protocol as stated by 14 respondents. Details shown in Table 3. Rank 1 is the highest. (Question C.1)

Table 3. Summary of responses regarding the three top ranking impacts of sargassum inundations on the implementation of the SPAW protocol. Responses are shown by rank (Rank 1 - orange, Rank 2 - yellow, Rank 3 - green) and by rank importance score (Rank 1 = 3 points, Rank 2 = 2 points, Rank 3 = 1 point). Data represent responses from 14 respondents. (Question C.1)

Territory	Establishing & enforcing MPAs	Listed species protection or recovery	Introduction of non-indigenous species	Habitat destruction	Reduced water quality	Reduced sunlight (shading)	Impeding movement of listed species	Other impacts of SPAW listed species
Costa Rica		3	2	1				
Dominican Republic	2			1	3			
Aruba					3	2	1	
Bonaire		2		3	1			
Saba				2	3	1		
St Eustatius		3						
St Maarten		1		3			2	
Trinidad et Tobago				3			2	1
France (Guadeloupe)		1		2	3			
Panama	2	3		1				
Honduras		2	1	3				
Columbia (San Andres)		1					2	3
USA								
Saint Lucia	3			1	2			
St. Vincent & the Grenadines		2		3			1	
Jamaica								
Venezuela								
TOTAL COUNT	3	9	2	11	6	2	5	2
IMPORTANCE SCORE based on rank points	7	18	3	23	15	3	8	4

Respondents indicated that the overriding impact of sargassum inundations on the implementation of the SPAW Protocol was through causing habitat destruction, with 11 territories ranking this impact among the top three, and five territories ranking it the most important (Rank 1), giving this impact the highest importance score of 23 points (Figure 4, Table 3). The next most significant effect of sargassum indicated by respondents (scoring 18 points, Table 3) was on their ability to protect or recover endangered and threatened species. The decline in water quality (ranked in the top 3 by 6 territories and as the major threat by 4 respondents) is the third most important impact (15 points) constraining the implementation of the SPAW protocol. In fourth place (8 points), impeding the movement of SPAW listed species (ranked by 5 territories) is also an obstacle to the implementation of the SPAW protocol (Table 3).

Three respondents indicated that sargassum is constraining the establishment, planning, management or enforcement of protected areas (in this case Marine Protected Areas). Other impacts listed by two respondents included: the introduction of non-indigenous or genetically

altered species; reduced sunlight on sensitive species such as seagrasses; and 'other impacts' on SPAW listed species.

The majority of respondents indicated that sargassum inundations affect the protection and recovery of habitats , and species listed in Annex III of the SPAW Protocol, especially seagrasses and mangroves, although unspecified palms were also mentioned.

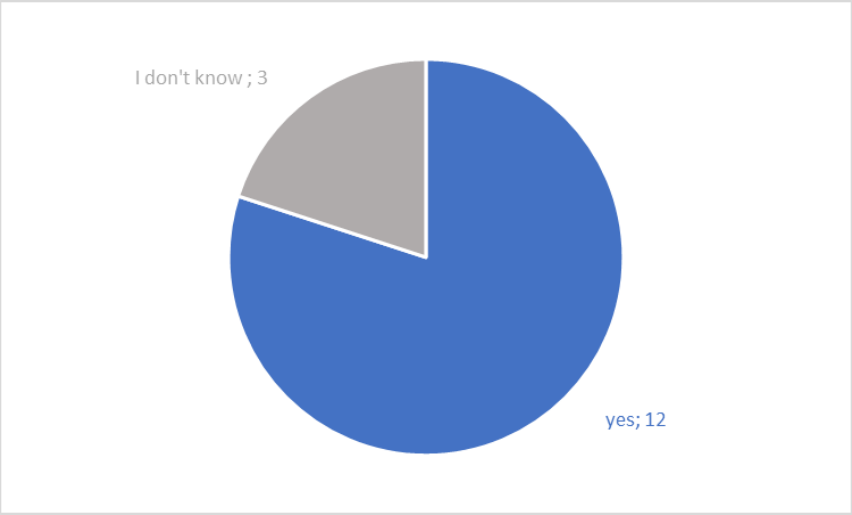


Figure 5. Chart showing responses of 15 respondents to the question of whether any strictly protected flora (Annex 1) or fauna (Annex II) under the SPAW protocol are negatively impacted by sargassum inundations. (Question C.3)

Sargassum inundation affects the protection and recovery of the habitats and flora listed in Annex I and fauna in Annex II of the SPAW Protocol for the majority (80%) of respondents (Figure 5), whilst some were unable to answer due to lack of available scientific information. The species or species groups reported to be most affected (ranked in the top three by respondents) are sea turtles (13 respondents), corals (11), birds (6), the West Indian manatee (4), cetaceans (1), crustaceans and molluscs (1) and sawfishes (1).

Respondents indicated that sargassum inundation blocks access to nesting beaches for sea turtles, affecting hawksbill, green and leatherback turtles, hindering their reproduction and the survival of hatchlings by preventing them from reaching the sea. Management action to clear beaches of sargassum is also reported to have negative impacts on turtle nesting beaches through erosion and storage of cleared sargassum at the top of the beach. Respondents also reported that thick mats of floating sargassum can affect the mobility of and suffocate airbreathing turtles and cetaceans by preventing them from reaching the surface.

Sargassum decomposition also generates water quality problems, including oxygen depletion and increased acidity, affecting the health of coral reefs, mangroves, seagrass beds and fishes. This in turn can affect birds that rely on these habitats and fish for food.

Affected areas have undergone habitat alteration, with floating sargassum rafts reducing light penetration, thus limiting the photosynthesis needed by corals and other marine species, especially seagrasses. The eutrophication caused from degrading sargassum can encourage the proliferation of macroalgae and cyanobacteria, causing changes in ecosystem dynamics. Some respondents also noted that sargassum can smother coral reefs and seagrass beds.

Protected areas are also affected, with impacts on their coastal ecosystems. Clean-up operations, while necessary, risk further degrading beaches. The consequences of sargassum on marine biodiversity and habitats, particularly for turtles and corals, are a cause for concern and require increased attention.

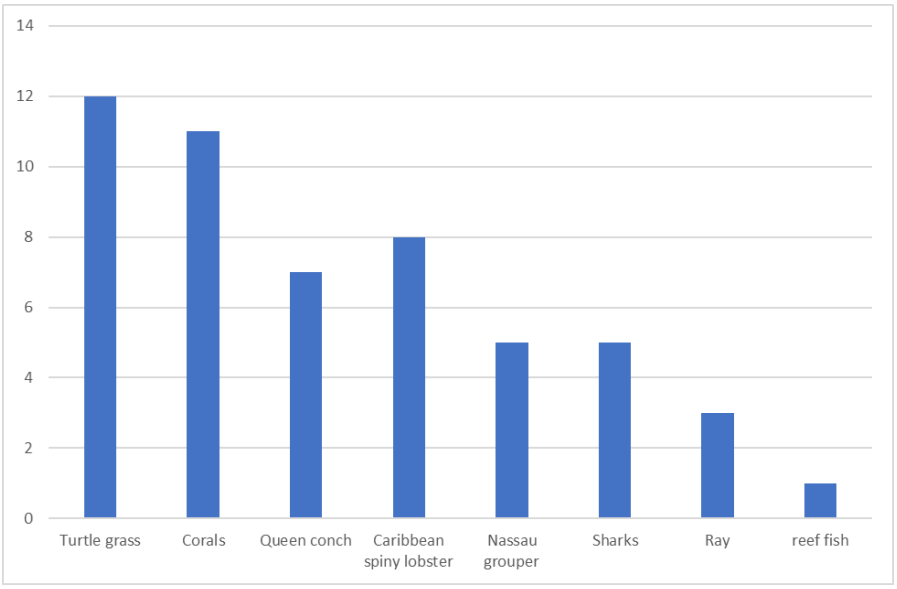


Figure 6. Number of respondents reporting SPAW Annex III species (top 3) that are negatively impacted by sargassum inundations (Question C.4)

Respondents also report that sargassum inundation affects the protection and recovery of habitat and flora and fauna listed in Annex III of the SPAW Protocol, especially turtle grass, corals, queen conch and spiny lobster (Figure 6). Almost a third of respondents also listed Nassau grouper and sharks among the top 3 species most affected (Figure 6).

Respondents indicate that seagrass beds, especially turtle grass, suffer direct impacts such as shading from floating sargassum rafts, causing reduced light needed for photosynthesis and thus limiting their growth and ability to act as a refuge for many marine species. Furthermore, decomposing sargassum sinks and can actually smother seagrasses as well as releasing toxic gases, increasing seawater acidity and reducing dissolved oxygen to critically low levels resulting in extensive mortality of turtle grass beds. Similarly, corals suffer from reduced light and hypoxia, which can lead to coral bleaching episodes and increased mortality. Sargassum inundations may also indirectly contribute to the proliferation of invasive species, further altering ecosystem structure.

Respondents also indicate that mangroves can be affected by sargassum that becomes trapped amongst the tree roots and decomposes, resulting in diminished ability of mangrove roots to

exchange gases leading to a decrease in productivity and disruption of reproduction in these trees and their ability to filter pollutants, an ecosystem service that helps protect adjacent ecosystems such as seagrass meadows and coral reefs. In extreme cases, the anoxic conditions generated by the decomposition of sargassum can lead to mortality of the roots and ultimately to loss of the mangrove trees. Although specific impacts on other marine species, such as conch or lobster are not well documented, respondents recognize that sargassum accumulation affects the entire coastal ecosystem and associated biodiversity conservation and management efforts.

Whilst territories recognize the impacts, they remain concerned by the lack of scientific knowledge about the real mechanisms of these impacts of sargassum inundation on biodiversity that would help with developing more effective management tools.

2- Domestic measures to counter implementation impacts

The lack of sargassum management plans is a problem commonly reported by several respondents, including Costa Rica, hindering efforts to counter impacts on their ability to implement the SPAW protocol. Other countries, such as the Dominican Republic and Aruba, are implementing specific measures to mitigate impacts on their biodiversity, such as integrated sargassum collection and management, and awareness-raising and collaboration. Actions vary among territories ranging from: the monitoring and cleaning of key turtle nesting beaches by coastal communities in Trinidad and Tobago; to rapid action to remove sargassum from the water column and littoral zone, aimed at ensuring ecosystem resilience in Bonaire; to research initiatives in Honduras on the potential uses of sargassum (although the latter action is not directly tackling conservation of specially protected areas and wildlife). As outlined in the previous section on management, respondents such as the USA and several others reiterated actions being taken to improve monitoring and forecasting of sargassum inundation as relevant to improving implementation of the SPAW protocol impacted negatively by sargassum inundations. In addition, actions such as the use of floating barriers to divert or hold floating sargassum away from SPAW species and ecosystems, and improved collection of stranded sargassum on beaches were reported by several territories.

D. Relevance to the LBS Protocol

From the thirteen (13) Cartagena Convention Contracting Parties responding to this section of the questionnaire, three (3) are not party to the LBS Protocol, thus response data from the ten (10) countries (Costa Rica, Dominican Republic, France, Honduras, Jamaica, Panama, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago and USA) that are party to the LBS protocol were used for this analysis (LBS contracting parties listed in annex 1). Figure 7 shows a chart based on the responses of the ten (10) LBS Contracting parties to question D.1: Does sargassum inundation in your country affect how your country approaches the prevention, reduction, and/or control of pollution from land-based sources and activities?

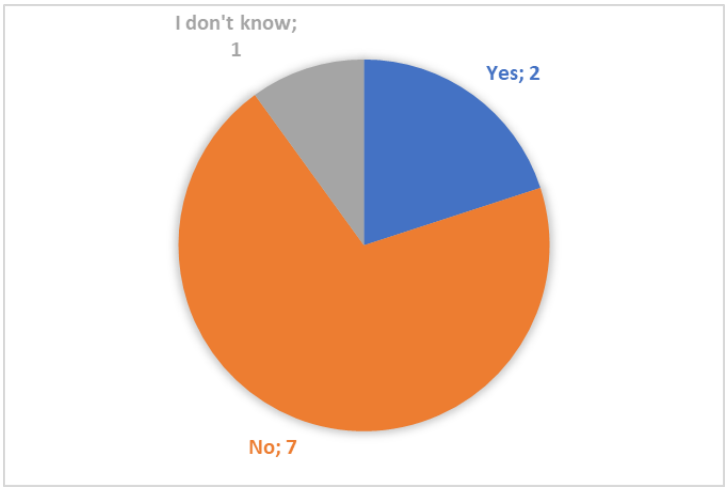


Figure 7: Chart showing the responses of the ten (10) LBS Contracting Parties respondents to the question D.1: Does sargassum inundation in your country affect how your country approaches the prevention, reduction, and/or control of pollution from land-based sources and activities?

Seventy percent (70%) of the countries responded "No" that sargassum inundation does not affect their country's approaches in the prevention, reduction, and/or control of pollution from land-based sources and activities, while twenty percent (20%) of countries indicated "Yes". Ten percent (10%) of countries could not provide a definite response to this question and indicated, "I don't know".

In response to question D1, countries were asked to provide an explanation if they responded "Yes". Some of the countries provided an explanation whereas some countries did not. Some countries who responded "No" also provided an explanation to question D1.

Based on the explanation countries provided to question D1, there are mixed responses on the countries' approach to sargassum inundation in the prevention, reduction, and/or control of pollution from land-based sources and activities.

Some responses indicate that sargassum does impact the prevention, reduction, and control of pollution from land-based sources. Both the Dominican Republic and St Lucia indicated that sargassum inundation affects the approach taken which requires sargassum management. Decomposing sargassum releases nutrients such as nitrogen and phosphorus, which can contribute to eutrophication in coastal waters and complicate pollution control efforts. Additionally, the mass accumulation of sargassum can overwhelm waste management and water treatment systems, diverting resources from other pollution reduction initiatives. St Lucia indicated collection/ removal of sargassum mainly take place when a large amount of sargassum inundation occurs which significantly affects coastal stakeholders.

Other responses emphasize that efforts to control nutrient pollution at the source can help address local sargassum blooms. The USA indicated that by controlling nutrients through regulatory and voluntary nutrient reduction approaches, agencies would address the main driver of local sargassum blooms in coastal waters. During the past 30 years, nutrient reductions by states and territories through the US were encouraged and supported by (1) development and

adoption of numeric nutrient criteria and voluntary nutrient reduction strategies, (2) development and implementation of Total Maximum Daily Loads, (3) the establishment and enforcement of pollutant permit limits for wastewater, and (4) offering support to voluntary nutrient reduction programs for protection and restoration of estuarine systems.

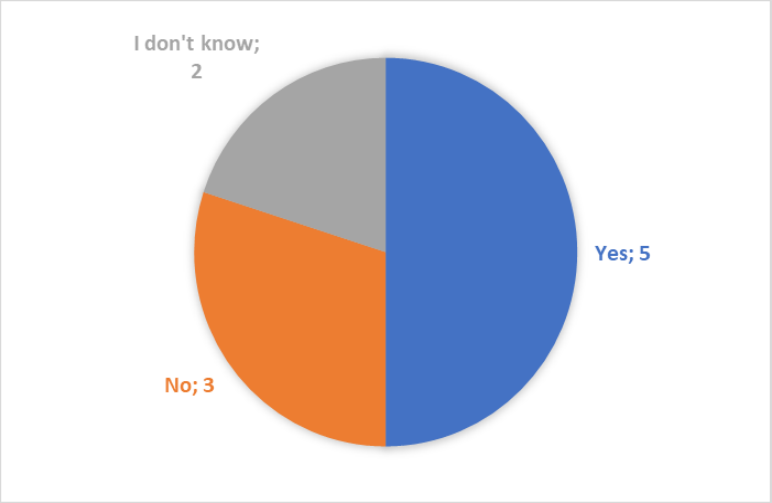


Figure 8: Chart showing the responses of the ten (10) LBS Contracting parties respondents to the question D.2 : Does your country consider sargassum should be an additional priority pollutant of concern in Annex 1 of LBS protocol?

Fifty percent (50%) of the countries responded "Yes" that sargassum should be considered an additional priority pollutant of concern in Annex 1 of LBS protocol, while twenty percent (20%) of countries indicated "No" and thirty percent (30%) of countries responded, "I don't know".

Countries that indicated sargassum should be an additional priority pollutant of concern in Annex 1 of LBS protocol were Dominican Republic, Honduras, Panama, St Lucia and Trinidad and Tobago. The countries indicated sargassum is a growing environmental concern which has environmental, socioeconomic and health impacts. There is need for response planning in the management of sargassum inundation events. Decomposing sargassum reduces oxygen concentration in sensitive ecosystems, and it may serve as a matrix to carry/transport land-based pollutants as well as bioaccumulated heavy metals, metalloids, and nutrients which are then released during its decomposition. Jamaica and USA did not support treating sargassum as an additional priority pollutant of concern in Annex 1 of LBS protocol.

USA indicated that some of the land-based sources of pollution controlled under Annex I of the LBS Protocol may contribute to the exacerbation of sargassum inundation events (SIEs) and more effective implementation of relevant Annex I pollutants may be a tool Parties should consider when developing activities to control SIEs. Additional research and/or assessments are needed to identify management strategies that could be implemented as part of the Cartagena Convention and/or RAC activities.

Costa Rica was uncertain and indicated that analysis had not been carried out at a national level as to whether sargassum should be treated as an additional pollutant of concern. Both France and St Vincent and the Grenadines were also uncertain.

The explanation countries provided to question D2 on whether sargassum should be an additional priority pollutant in Annex 1 of the LBS Protocol indicates that sargassum is a growing concern based on the potential environmental and socio-economic impacts that may include harms to human health, hypoxia, bioaccumulation of heavy metals and other pollutants.

Table 5 presents a summary of countries' responses by order of total ranking (highest priority) of components of the LBS Protocol and workstreams of the Secretariat's Assessment & Management of Environmental Pollution Programme. Based on the response from countries on sargassum inundation "Formulating and implementing monitoring and assessment programs to assess patterns and trends in the environmental quality" was ranked the highest priority while "Participation for the promotion of public access to relevant information and documentation concerning pollution of the Convention area and the opportunity for public participation in decision-making processes" was ranked the lowest priority.

Table 5 : Summary of responses shown in order of highest priority (lowest total rank) to the question 'How does the issue of sargassum inundation intersect with the following components of the LBS Protocol and workstreams of the Secretariat's Assessment & Management of environmental Pollution Programme?' (Question D.3).

LBS Protocol and workstreams of the Secretariat's Assessment & Management of Environmental Pollution Programme	Colombia	Costa Rica	Dominican Rep	Honduras	Jamaica	Panama	St Lucia	SVG	T and T	USA	**Total Ranking**(order of priority)
1. Formulating and implementing monitoring and assessment programs to assess patterns and trends in the environmental quality	1	1	8	6	NR	1	1	3	2	1	**24**
2. Developing management plans and demonstration projects to reduce marine pollution	2	4	1	2	NR	2	4	9	4	4	**32**
3. Develop and adopt guidelines concerning environmental impact assessments.	4	5	2	5	NR	3	3	2	NR	11	**35**
4. Identifying and assessing sources and activities contributing to pollution	3	5	11	1	NR	5	2	11	5	2	**45**
5. Develop National Programmes of Action for Integrated Watershed and Coastal Area	7	3	10	10	NR	4	8	1	NR	7	**50**
6. Sharing data and information on best management practices and most appropriate technologies	9	2	9	7	1	7	9	7	1	3	**55**
7. National laws in place to develop subregional and regional plans, programmes and measures to prevent, reduce and control pollution of the Convention.	6	6	3	11	NR	6	10	10	NR	6	**58**
8. Develop and implement individually and collectively programmes on environmental education and awareness for the public related to the need to prevent, reduce and control pollution of the Convention area.	5	5	5	4	4	8	6	6	8	8	**59**
9. Cooperation and assistance bilaterally or, where appropriate, on a sub-regional, regional or global basis or through competent organizations in the prevention, reduction and control of pollution of the Convention area including transboundary pollution.	8	3	7	3	2	11	11	8	3	5	**61**
10. Develop information systems and networks for the exchange of information.	10	3	4	8	2	9	7	4	6	10	**63**
11. Participation for the promotion of public access to relevant information and documentation concerning pollution of the Convention area and the opportunity for public participation in	11	5	6	9	3	10	5	5	7	9	**70**
NR- No rank assigned.											

E. Relevance to the Cartagena Convention

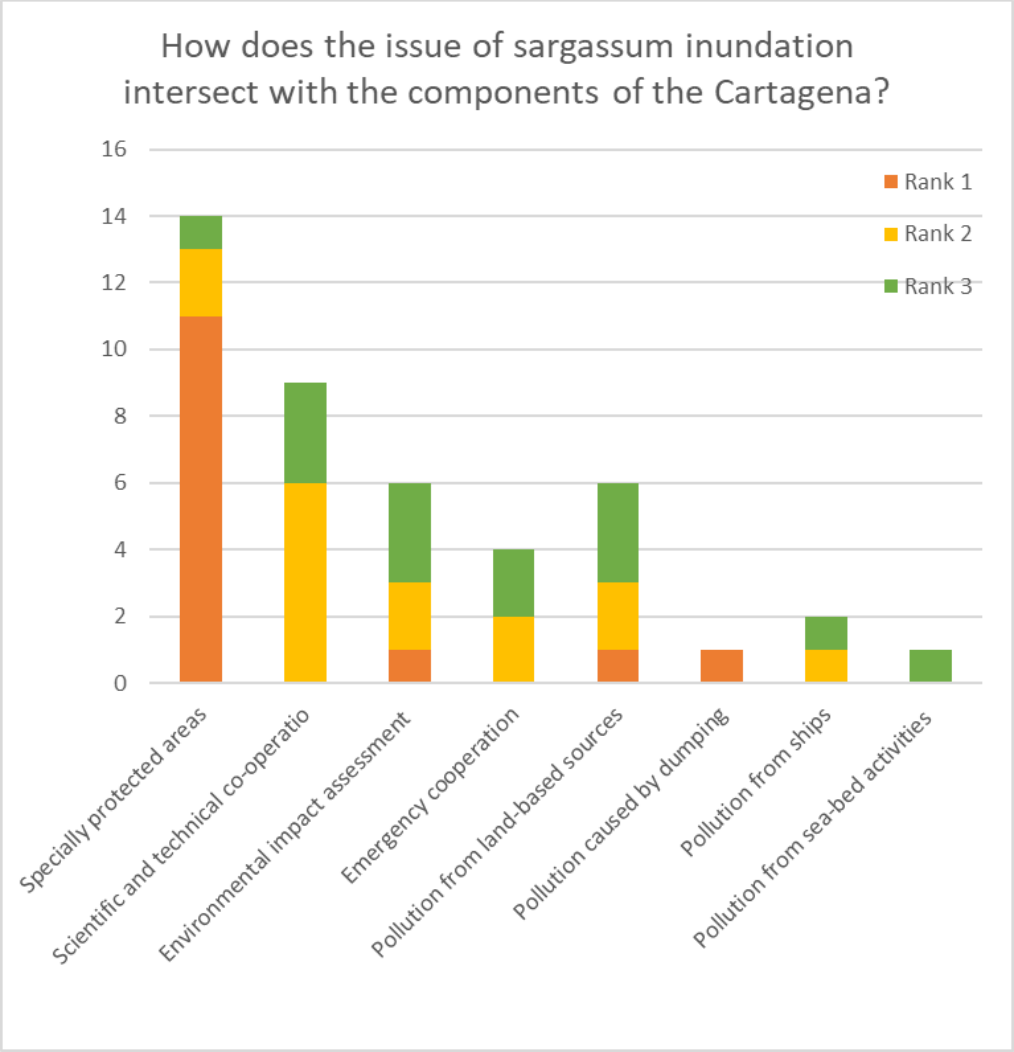


Figure 9: Summary of responses shown as top 3 priority issues to the question 'How does the issue of sargassum inundation intersect with the components of the Cartagena convention?' (Rank 1 - orange, Rank 2 - yellow, Rank 3 - green) (Question E.1)

According to the respondents, the major issues (i.e., those scored within the top 3) of sargassum inundation that intersect with the components of the Cartagena Convention are illustrated in Figure 9. The most frequently listed and highest ranked issue concerned specially protected areas (e.g., protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened or endangered species, establish protected areas). The second most frequently listed was that of scientific and technical co-operation (e.g., to cooperate in scientific research, monitoring, and the exchange of data and other scientific information). In third place were two other issues equally listed and ranked: pollution from land-based sources (e.g., coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures sewage, or any other sources); and environmental impact assessment (e.g., develop technical and other guidelines to assist the planning of their major development projects in such a way as to prevent or minimize harmful impacts, ensure the assessment of, the potential effects of such

projects on the marine environment, particularly in coastal areas, so that appropriate measures may be taken to prevent any substantial pollution). Four respondents considered emergency cooperation as an important intersect with the convention, whereas other issues were only considered priority by two territories (pollution from ships) or a single territory (pollution from dumping, or from seabed activities) (Figure 9).

The relationship between the Cartagena Convention and the sargassum inundation issue highlighted by respondents confirms that sargassum presents a real challenge to its implementation by members, especially with regard to marine 'specially protected areas'. They also highlight the importance of scientific and technical cooperation in tackling the many aspects of sargassum management, and the intersection with management of marine pollution. Occurrence of sargassum blooms can be exacerbated by nutrient pollution, sargassum is also capable of bioaccumulating toxins and can itself contribute to both nutrient and toxic pollution when it decomposes in the large volumes associated with sargassum inundations.

As respondents frequently pointed out, when sargassum decomposes, it can consume oxygen from the water column and create hypoxic conditions that can be detrimental to marine environments negatively affecting many marine species Nutrient pollution contributes to eutrophication, which can intensify the negative effects of sargassum on coral reefs and seagrass beds. Additionally, improper disposal of sargassum can lead to pollution from heavy metals. Some respondents highlight that the development of national and regional management plans to address the impacts of sargassum is crucial for the implementation of the Cartagena Convention. The USA also emphasizes the importance of international cooperation, academic research to fill scientific gaps, and acknowledging the wider implications of sargassum inundation events, including their effects in West Africa.

F. Conclusion

This survey captured important information from half of the 26 Contracting Parties to the Cartagena Convention, covering a wide geographical spread across the entire Caribbean region, including mainland and island nations, and representing a broad range of governance arrangements and economic status. The survey findings are thus considered representative of the diversity of nations across the Convention area and to reflect fairly, the variable experiences of members to the impacts and management challenges of sargassum inundations.

The survey responses confirm what is broadly known about the impacts of sargassum inundations, but also bring new information from across the entire region that serves to highlight the complexity of the challenge posed by massive sargassum strandings and especially how they impact on countries' abilities to implement the Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, and its associated SPAW and LBS protocols.

The environmental, economic and social impacts of the sargassum phenomenon are clearly significant, affecting marine ecosystems, water quality, biodiversity and key sectors such as tourism, fishing and health. The impact of sargassum inundations varies across the Cartagena Convention area, with some locations experiencing significantly higher intensities than others

depending on exposure to the sargassum transport pathways into and through the Caribbean Sea and subtropical North Atlantic. Furthermore, not all coastlines within a nation are affected equally, and thus there is considerable variation in the level of impacts on marine and coastal ecosystems and on key economic sectors, based on their location, coastal geomorphology and orientation relative to incoming sargassum.

There is also significant diversity in the capacity of members to manage the challenges posed by sargassum inundations with regard to implementing many aspects of the Convention. While some countries have established, or are in the process of developing, management plans to deal with sargassum at the national or local level, these plans are reported by most respondents as in need of improvement and strengthening at several levels, with current approaches typically remaining fragmented and ineffective.

Most countries are engaged in some form of sargassum management, whether or not they have a specific sargassum management plan in place. The most ubiquitous management actions currently include clearing (and disposing of) beached sargassum (at significant cost), dissemination of information, and monitoring and forecasting arrival of sargassum. We note that few are engaged in attempts to valorize sargassum and none have insurance or compensation schemes for losses attributed to sargassum inundations.

Responses to many of the targeted survey questions will inform efforts to update and prioritize recommended actions in the proposed Action Plan for consideration by SPAW STAC11 and SPAW COP13, and ultimately for presentation to the Convention Conference of Parties (COP18).

1- Relevance to Cartagena Convention

Overall, respondents most frequently listed areas where they considered that the sargassum inundation issue and the Cartagena Convention intersect. These, in order of importance, are:

- Implementation of specially protected areas.
- Scientific and technical collaboration.
- Environmental impact assessment.
- Pollution from land-based sources.

2- Management

The most pressing (top 4) management needs iterated by respondents are:

- Improved understanding of the **ecological impacts of sargassum management actions** (such as clearing beaches, use of in-water barriers, sinking sargassum, storage/disposal of sargassum on land).
- Improved understanding of the multiple **ecological impacts of sargassum inundations** (such as release of toxic gases; leaching of nutrients, heavy metalloids, pesticide residues and microplastics; uptake of toxins by crops when sargassum is used in agriculture).
- Access to sufficient **funding** and assistance with budgeting for sargassum management (to allow for specific budget allocation to sargassum management and planning).

- Improved **forecasting** of sargassum stranding events (such as coupling of existing open ocean forecasts with local geomorphology, currents and winds).

3- SPAW Protocol

The challenges of effectively implementing the SPAW protocol when faced with sargassum inundations was raised as one of the greatest concerns among members. The top 4 most pressing challenges listed by respondents include:

- Habitat destruction by sargassum inundations (especially of key habitats such as coral reefs, seagrass meadows and mangrove forests).
- Protection or recovery of listed species and their habitats (especially - sea turtles, corals, birds and manatees on Annex I & II; and turtle grass, corals, lobster and conch on Annex III).
- Reduced marine water quality caused by high volumes of decomposing sargassum trapped nearshore.
- Restricted movement of listed species (especially of nesting endangered sea turtles)

Among the most frequently cited constraints for effective implementation of the SPAW protocol and in line with previously stated management needs (section F2) are:

- Lack of, or ineffective, sargassum management plans.
- Lack of in-depth scientific knowledge.

4- LBS Protocol

Although of concern to fewer members than the SPAW protocol, implementation of the LBS Protocol is nonetheless somewhat compromised by sargassum inundations in some countries. The top 4 issues of greatest concern for this protocol are listed as:

- Assessing and monitoring environmental quality.
- Development of management plans and demonstration projects aimed at reducing marine pollution.
- Creating appropriate guidelines for environmental impact assessments.
- Identifying the source of pollution.

Furthermore, the proposed listing of sargassum as an additional priority pollutant of concern in Annex 1 of LBS protocol was only supported by 50% of respondents.

Appendix 1 Status of ratification of the Cartagena Convention and its Protocols

State	Date of Ratification or Accession		
	Cartagena Convention and Oil Spills Protocol	SPAW Protocol	LBS Protocol
Antigua and Barbuda	11-Sep-86		13-July-10
The Bahamas	24-Jun-10	24-Jun-10	24-Jun-10
Barbados	28-May-85	14-Oct-02	29-Jun-19
Belize	22-Sep-99	04-Jan-08	04-Feb-08
Colombia	03-Mar-88	05-Jan-98	
Costa Rica	01-Aug-91		26-May-16
Cuba	15-Sep-88	04-Aug-98	
Dominica	05-Oct-90		
Dominican Republic	24-Nov-98	24-Nov-98	06-Sep-12
France	13-Nov-85	05-Apr-02	04-May-07
Grenada	17-Aug-87	05-Mar-12	05-Mar-12
Guatemala	18-Dec-89		
Guyana	14-Jul-10	14-Jul-10	14-Jul-10
Haiti			
Honduras	13-Oct-18	13-Oct-18	13-Oct-18
Jamaica	01-Apr-87		05-Nov-15
Mexico	11-Apr-85		
Netherlands	16-Apr-84	02-Mar-92	
Nicaragua	25-Aug-05	04-May-21	
Panama	06-Nov-87	27-Sep-96	09-Jul-03
St. Kitts and Nevis	15-Jun-99		
Saint Lucia	30-Nov-84	18-May-00	30-Jan-08
St. Vincent and the Grenadines	11-Jul-90	26-Jul-91	
Suriname			
Trinidad and Tobago	24-Jan-86	10-Aug-99	28-Mar-03
United Kingdom	28-Feb-86		
United States of America	31-Oct-84	16-Apr-03	13-Feb-09
Venezuela	18-Dec-86	28-Jan-97	
European Economic Commission			

Appendix 2 Survey questionnaire instrument shared with all National Focal Point contacts in all countries Party to the Cartagena Convention and its SPAW and LBS protocols.

SPAW Sargassum Working Group

- Survey -

*This questionnaire is intended for focal points in countries that are Party to the **Cartagena Convention**, the Protocol concerning Specially Protected Areas and Wildlife (**SPAW Protocol)** and/or the Protocol concerning Pollution from Land-Based Sources and Activities (**LBS Protocol)**. It will enable the SPAW Sargassum Working Group to update and prioritize the proposed action plan for consideration by **SPAW STAC11 and SPAW COP13**. The action plan will then be presented to the Cartagena Convention Conference of the Parties (COP18) for decision.*

The questionnaire will also enable the SPAW Regional Activity Center (SPAW-RAC) to build a sargassum management issue report with [country mention but personally anonymized] information from the survey responses.

According to the COP12 recommendation: "The Sargassum Working Group Survey Contracting Parties on their needs related to managing Sargassum influx and how such influx may affect their implementation of obligations under the SPAW Protocol and Cartagena Convention, as well as the LBS Protocol, as appropriate."

*Thank you for taking part in this questionnaire on the **impact of sargassum inundation[1] on biodiversity and the Cartagena Convention**. Please send one reply to the survey per country signatory to the Cartagena Convention, in Word format, by email to these two addresses from SPAW-RAC: auriane.petit@developpement-durable.gouv.fr and geraldine.conruyt@developpement-durable.gouv.fr*

Content:

SECTION A: General Information

Country[2]

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*Full name of the reporting institution**

Name(s) and position(s) of the reporting officer(s)[3]:

Email address:

SECTION B: Countries Needs related to managing Sargassum inundation

1. *Does your country experience **Sargassum inundation**?*

¨ *A lot* | ¨ *A little* | ¨ *No* | ¨ *I don't know*

Please provide any supporting information you may have access to for your country, e.g., the amount of money spent on Sargassum clean up every year, the proportion of your country's linear beachfront that experiences inundation every year, and/or the proportion of tourist activities canceled due to Sargassum inundation every year (Optional).

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2. *Does your country have a **management plan for sargassum inundation** in place?*

¨ *Yes* | ¨ *No* | ¨ *In progress* | ¨ *I don't know*

(a) *Are these documents available for sharing?* ¨ *Yes* | ¨ *No*

(b) *Please provide a website or URL reference or bibliographic reference to link the response to the appropriate information/document that is maintained by your country. Extend table where necessary*

Name of the document	***Website/URL Reference/Bibliographic Reference***

3. *Can you please share any information with respect to implementation/ challenges / successes/ lessons learnt on Sargassum inundation management in your country?*

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4. *What kind of **sargassum management system(s)** does your country have in place?*

¨ *Monitoring and/or forecasting*

¨ *Insurance and compensation schemes*

¨ *Beach cleaning*

¨ *Disposal*

¨ *Support of entrepreneurs trying to develop uses for sargassum (E.g. recycling)*

¨ *Health warnings*

¨ *Information dissemination*

¨ *None*

¨ *If other, please specify*

---

5. *Can you put a score on the effectiveness of your sargassum management plan? (1 is very efficient, 10 is low efficiency)*

¨ *1* | ¨ *2* | ¨ *3* | ¨ *4* | ¨ *5* | ¨ *6* | ¨ *7* | ¨ *8* | ¨ *9* | ¨ *10*

6. *What are your **management needs**? (Please rank according to order of importance to your country, with 1 being the most important.)*

	Developing laws, policies, and/or manage/respond to Sargassum inundation
	Training
	Access to data and information
	Developing and/or accessing monitoring and forecasting tools
	Assistance with funding (e.g., budget examples)
	Assessing economic impacts of sargassum inundation
	Assessing ecological impact of sargassum inundation
	Assessing the potential ecological impacts of sargassum inundation management and response measures (collection, disposal, etc.)
	Assessing human health impacts of sargassum inundation
	Developing viable businesses with sargassum
	Regional collaboration

If other, please specify

Please provide any details you wish to share regarding your country's Sargassum management needs:

SECTION C: Relevance to the SPAW Protocol

If your country is Party to the SPAW Protocol, please answer the questions below. If not, please proceed to Section D.

Cartagena Convention and its Protocols: https://wedocs.unep.org/bitstream/handle/20.500.11822/27875/SPAWSTAC5_2012-en.pdf?sequence=1&isAllowed=y

Annexes to the SPAW Protocol: https://www.car-spaw-rac.org/IMG/pdf/annexes_i_ii_iii_of_spaw_protocol_revised_cop10_honduras_2019-2.pdf

1. *In your country's view, which sargassum inundation impacts **affect your country's implementation of the SPAW Protocol**? (Please rank according to order of importance to your country, with 1 being the most important.)*

	Establishment, planning, management, and/or enforcement of Protected Areas (E.g. Marie Protected Areas)
	Protection and/or recovery of endangered and threatened species
	Introduction of Non-Indigenous or Genetically Altered Species
	Habitat destruction
	Reduced water quality
	Introduction of Non-Indigenous or Genetically Altered Species
	Reduced sunlight (e.g., for seagrasses)
	Impediment to movement of protected species
	Other impacts on protected areas and/or species listed in the Annexes of the SPAW Protocol (e.g., sea turtles)

If other, please specify

---

2. *Does the influx of sargassum into your country affect the protection and recovery of the environments and flora listed in III of the SPAW Protocol? (Please rank them in order of importance to your country, with 1 being the most important).*

	Mangrove (E.g. black mangrove, red mangrove, mangle-chandel, buttonwood, white mangrove)
	Palm (E.g. Florida royal palm, Caribbean royal palm, imperial palm, overtop palm)

	Aquatic plants (E.g. turtle grass, florida key seagrass, hairy spoon seagrass, engelmann's seagrass, beaked tasselweed, widgeongrass)

*3. Does Sargassum inundation in your country affect protection and recovery of species of **flora listed in Annex I and/or fauna listed in Annex II** of the SPAW Protocol (strictly protected)?*

¨ *Yes* | ¨ *No* | ¨ *I don't know*

(a) If yes, which species/groups of species? (Please rank according to order on importance to your country, with 1 being the most important)

	Sea Turtles (e.g., Loggerhead Sea turtle, Green sea turtle, Hawksbill turtle, Kemp's Ridley turtle, Olive Ridley turtle, Leatherback sea turtle)
	Birds (e.g., Piping Plover, Least Tern, Roseate Tern, Eskimo curlew, Brown Pelican, European Storm-Petrel, Black-capped Petrel, Audubon's Shearwater, etc.)
	Sawfish (e.g., Smalltooth sawfish, Largetooth sawfish)
	Cetaceans (e.g., Blue whale, Humpback whale, Sperm whale, Killer whale, Short-finned pilot whale, Fraser's dolphin, Common bottlenose dolphin, Risso's dolphin, etc.)
	West Indian manatee
	Corals (e.g., Acroporidae (Staghorn coral, Elkhorn coral), Faviidae (Boulder star coral, Mountainous star coral)

Other, please specify

(a) Please provide details on how sargassum inundation affects the protection and recovery of species listed in Annexes I and II of the SPAW Protocol in your country.

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*4. Does Sargassum inundation in your country affect the protection and recovery of species of **flora and/or fauna listed in Annex III** of the SPAW Protocol (regulation of exploitation)?*

¨ *Yes* | ¨ *No* | ¨ *I don't know*

¨ *Turtle grass*

¨ *Corals (e.g., Hydrocorals (e.g., fire corals), Black corals, Gorgonians, Stony corals, etc.)*

¨ *Queen conch*

¨ *Caribbean spiny lobster*

¨ *Nassau grouper*

¨ *Sharks (e.g., Oceanic whitetip shark, Silky shark, Whale shark, Hammerhead shark, etc.)*

¨ *Rays (e.g., Reef manta ray, Manta ray)*

¨ *If other, please specify*

Please provide details on how Sargassum inundation affects the protection and recovery of species listed in Annex III of the SPAW Protocol in your country.

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5. What measures is your country putting in place to counter impacts species listed in the Annexes of the SPAW Protocol?

SECTION D: Relevance to the LBS Protocol

If your country is Party to the LBS Protocol, please answer the questions below. If not, please proceed to Section E.

Cartagena Convention and its Protocols:
https://wedocs.unep.org/bitstream/handle/20.500.11822/27875/SPAWSTAC5_2012-en.pdf?sequence=1&isAllowed=y

https://www.unep.org/cep/what-our-pollution-or-lbs-protocol

1. *Does sargassum inundation in your country affect how your country approaches the **prevention, reduction, and/or control of pollution from land-based sources** and activities? If yes, please explain.*

2. *Does your country consider sargassum should be an **additional priority pollutant of concern in Annex 1** of LBS protocol?*

¨ *Yes* | ¨ *No* | ¨ *I don't know*

3. *In your country's view, how does the issue of sargassum inundation intersect with the following components of the **LBS Protocol** and workstreams of the Secretariat's Assessment & Management of Environmental Pollution Programme? (Please rank in order of relevance to Sargassum inundation, with 1 being the most relevant.)*

	Formulating and implementing monitoring and assessment programs to assess patterns and trends in the environmental quality
	Sharing data and information on best management practices and most appropriate technologies
	Develop National Programmes of Action for Integrated Watershed and Coastal Area
	Identifying and assessing sources and activities contributing to pollution
	Developing management plans and demonstration projects to reduce marine pollution
	National laws in place to develop subregional and regional plans, programmes and measures to prevent, reduce and control pollution of the Convention.
	Cooperation and assistance bilaterally or, where appropriate, on a sub-regional, regional or global basis or through competent organizations in the prevention, reduction and control of pollution of the Convention area including transboundary pollution.
	Develop and adopt guidelines concerning environmental impact assessments.
	Develop information systems and networks for the exchange of information.
	Participation for the promotion of public access to relevant information and documentation concerning pollution of the Convention area and the opportunity for public participation in decision-making processes.

	Develop and implement individually and collectively programmes on environmental education and awareness for the public related to the need to prevent, reduce and control pollution of the Convention area.

If other, please specify

SECTION E: Relevance to the Cartagena Convention

Cartagena Convention: https://wedocs.unep.org/bitstream/handle/20.500.11822/27875/SPAWSTAC5_2012-en.pdf?sequence=1&isAllowed=y

1. *(a) In your country's view, how does the issue of sargassum inundation intersect with the components of the **Cartagena**? (Please rank the following components in order of relevance to sargassum inundation, with 1 being the most relevant)*

	Pollution from ships (e.g., discharges from ships)
	Pollution caused by dumping (e.g., wastes and other matter at sea from ships, aircraft or manmade structures at sea)
	Pollution from land-based sources (e.g., coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures sewage, or any other sources)
	Pollution from sea-bed activities (e.g., resulting directly or indirectly from exploration and exploitation of the sea-bed and its subsoil)
	Specially protected areas (e.g., protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened or endangered species, establish protected areas)
	Co-operation in cases of emergency (e.g., to respond to pollution emergencies, to control, reduce or eliminate pollution or the threat of pollution, aware of cases in area is in imminent danger of being polluted or has been polluted)
	Environmental impact assessment (e.g., develop technical and other guidelines to assist the planning of their major development projects in such a way as to prevent or minimize harmful impacts, ensure the assessment of, the potential effects of such projects on the marine environment, particularly in coastal areas, so that appropriate measures may be taken to prevent any substantial pollution)
	Scientific and technical co-operation (e.g., to cooperate in scientific research, monitoring, and the exchange of data and other scientific information)

(b) Please provide details on how sargassum inundation relates to the implementation of the Cartagena Convention in your country?

SECTION F: Any other comments

Is there anything else you would like to share related to sargassum inundation in your country?

Thank you for your contribution. The results of the questionnaire will be analyzed by the working group experts and SPAW-RAC. This analysis will be submitted to the Parties at STAC 11 and COP 13.

Please send one reply to the survey per country signatory to the Cartagena Convention, in Word format, by email to these two addresses from SPAW-RAC: auriane.petit@developpement-durable.gouv.fr *and* geraldine.conruyt@developpement-durable.gouv.fr

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[1] While SPAW STAC10 used the term "Sargassum influx," SPAW COP12 and IGM20/COP17 used "Sargassum inundation." This survey uses "Sargassum inundation" for consistency with SPAW COP12 and IGM20/COP17.

[2] One survey per country.

[3] Not mandatory. Data will be analyzed at country level.