DRAFT

ANGUILLA SARGASSUM ADAPTIVE MANAGEMENT STRATEGY (SAMS)

VOLUME 2: ACTION APPENDICES

2023

DARWIN INITIATIVE

CANARI

DEPARTMENT OF NATURAL RESOURCES ANGUILLA

GOVERNMENT OF THE VIRGIN ISLANDS

MALHE

CERMES UWI

Organisation of Eastern Caribbean States

TABLE OF CONTENTS

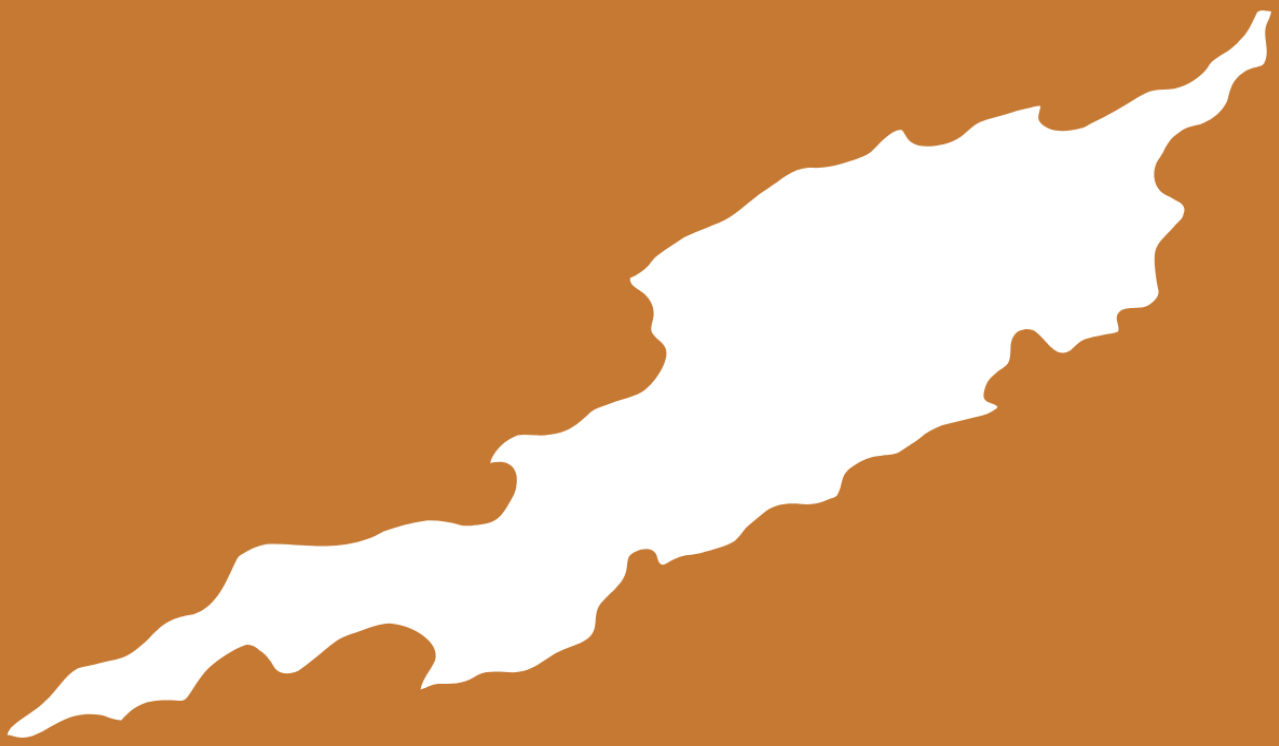
Suggested citation:

CERMES and CANARI. 2023. Draft Anguilla Sargassum Adaptive Management Strategy. Volume 2: Action Appendices. University of the West Indies (UWI) Centre for Resource Management and Environmental Studies (CERMES), Barbados. 105pp

Photo credits:

Top left- Farah Mukhida (Forest Bay) | Top right- The Anguillan (Blowing Point Ferry Terminal jetty)
Bottom left- Anonymous (Sandy Hill Bay) | Bottom right- The Anguilla (Forest Bay)

PART A
COUNTRY SPECIFIC



1 PAST OR CURRENT MANAGEMENT PLANS

The Department of Environment (formerly known as the Environment Unit-Department of Natural Resources) published a draft sargassum management strategy in 2015 (UNEP-CEP, 2021)[1]. The Draft Strategy reiterates the preference for manual removal of sargassum from the shoreline but acknowledges that there may be circumstances in which it is necessary to use heavy machinery. The Strategy outlines the process and methods for managing sargassum clean-up campaigns and particularly those that require oversight by a Sargassum Taskforce[2]. Figure 1 shows the designated sites for drying and decomposition of sargassum.

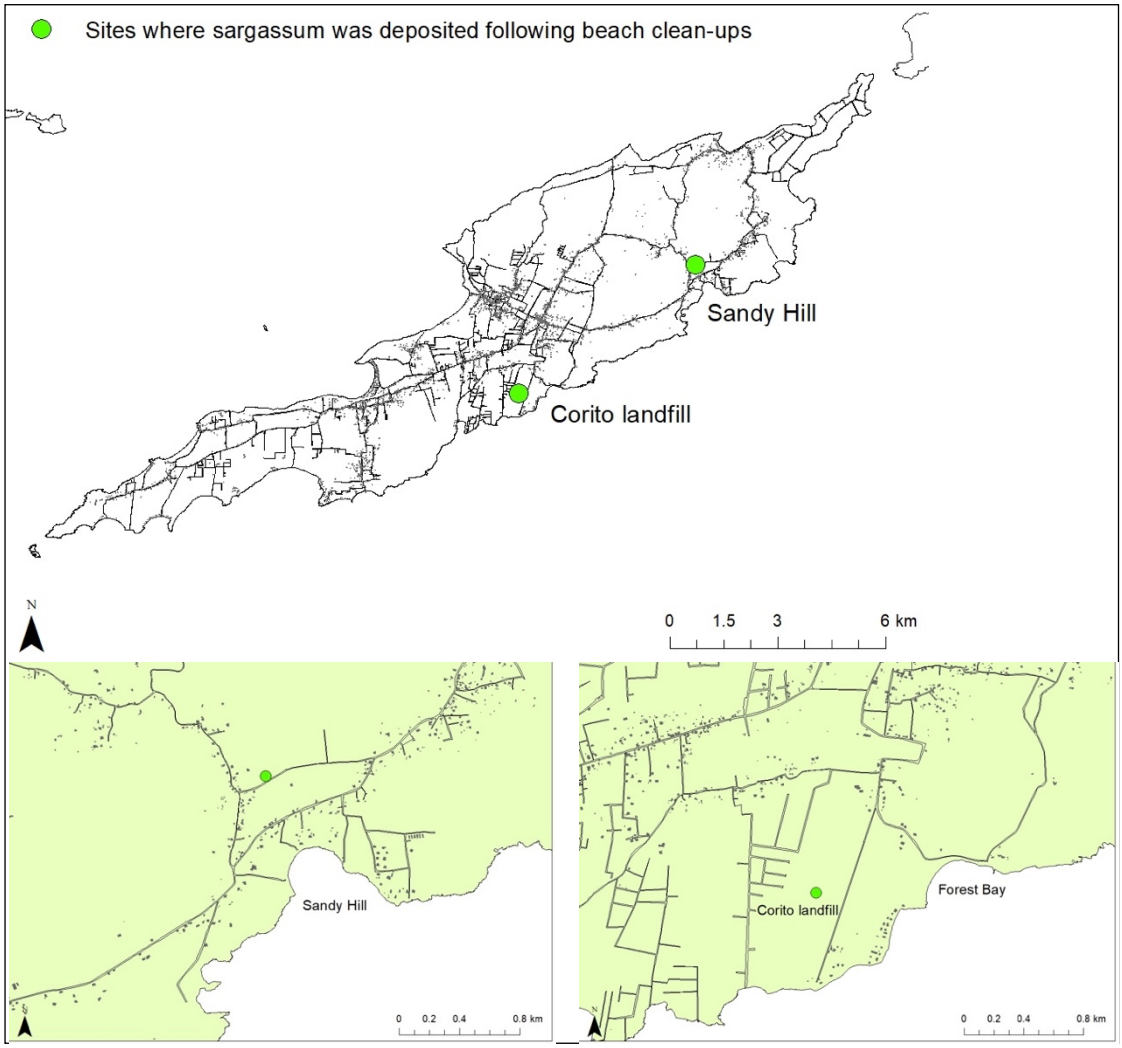


Figure 1: Designated sites for drying and decomposition of sargassum

[1] The Sargassum Management Strategy will be revised and is expected to be presented to the Government of Anguilla Executive Council in mid-2022 for endorsement and adoption. Once approved by the Executive Council, the document will be made publicly available.
[2] Please refer to section: Institutional arrangements for managing sargassum.

2 NATIONAL LAWS, POLICIES AND STRATEGIES THAT SHAPE SARGASSUM MANAGEMENT

This section gives an overview of the existing legislation which provides the framework for sargassum management in Anguilla.

The Beach Protection Act (2000)
This Act provides for the declaration of protected beaches and foreshores and the prohibition of sand mining and aggregate removal from these beaches.

Marine Parks Act (2000)
This Act outlines the procedure for the designation and acquisition of marine parks. The regulations specify offences, prohibitions, enforcement, and acquisition of permits. The Department of Fisheries and Marine Resources (DFMR) is responsible for the enforcement of this Act. The designated marine parks in Anguilla are: Junks Hole, Dog Island, Prickly Pear Cays and Seal Island Reefs, Sandy Island, Little Bay, Shoal Bay and Island Harbour Reefs, and the Sombrero Island (de Bettencourt & Imminga-Berends, 2015) (Figure 2).

Public Health Act (2002)
This Act outlines how and where waste may be disposed of, including the method of removal and disposal, the place of disposal, and the duties of the owners and/or occupiers of a property in relation to the disposal of waste.

Anguilla Fisheries Development Plan (2015-2025)
The lead agency responsible for marine capture fisheries management is the Fisheries and Marine Resources Unit-Department of Natural Resources. This responsibility is shared with the Attorney General's Chambers and Judicial Office. The Marine Branch of the Royal Anguilla Police Force also assumes responsibilities as an enforcement authority for marine fisheries related issues (Department of Fisheries and Marine Resources, 2015).

While these four structural frameworks are used to inform sargassum management within Anguilla (on land and in the water), the Beach Protection Act (2000) and its supporting regulations are of particular significance as they are used to prevent (or at least minimise) the loss (or removal) of sand from beaches that may arise during sargassum clean-up campaigns.

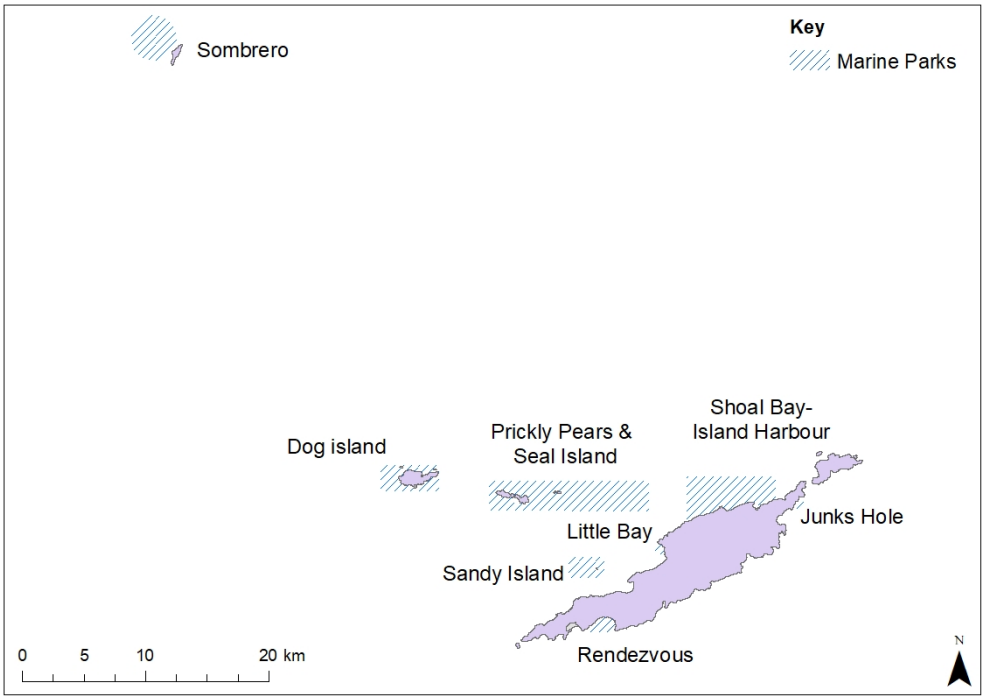


Figure 2: Anguilla's marine park network

3 INSTITUTIONAL ARRANGEMENTS FOR MANAGING SARGASSUM

In 2015, the Government of Anguilla Executive Council established a Sargassum Taskforce to address the significant influxes of sargassum on Anguilla's beaches and nearshore regions. The Taskforce operates in *ad hoc* manner, being called to action whenever permission has been granted to any person, business of government organization to mechanically remove sargassum from any beach on Anguilla. The Taskforce, led by the Department of Natural Resources, is comprised of representatives from the Department of Infrastructure, Department of Health Protection (Environmental Health Unit) and the Department of Lands and Survey.

According to the Taskforce's rules of operation, if heavy machinery is used to remove sargassum, at least two Taskforce members must be present. This oversight not only ensures that sargassum is properly disposed of and that environmental harm and degradation are kept to a minimal, but it also ensures that the removal of sargassum is not being used an opportunity for sandmining (Department of Natural Resources, 2022, pers. comm.). The Taskforce cannot impose fines or penalties, but it can remove authorization to carry out work if cleanup efforts do not follow best practices, as established by the Taskforce. No such stop-work orders have ever been issued, as those conducting clean-up operations have followed recommendations and requests made by the Taskforce with regards to how sargassum is removed and disposed of.

4 RELEVANT STAKEHOLDERS

This section lists the relevant government, civil society, private sector and academia stakeholders involved in sargassum management in Anguilla.

Table 1: Relevant stakeholders in sargassum management in Anguilla

Stakeholder organisation name	Brief description of stakeholder	Likely interest in Sargassum management
Government		
Department of Natural Resources	The Department's general mandate is the promotion of sustainable food production and food security, environmental governance and climate resilience. Its Climate Adaptation, Resilience and Research Office includes a focus on the sustainable use of natural resources and building resilience, including in the coastal and marine environment. Its Food Production Office offers a range of products and extension services including fertilizers and marketing services.	Interest in the management and adaptation to sargassum influxes, as well as potential opportunity for sargassum use, including using sargassum to support natural accretion of beaches and sand dunes Coordinate Taskforce deployment and activities
Department of Disaster Management	The department is responsible for coordinating the general policy and day-to-day administrative matters relating to the preparedness for, mitigation of, response to and recovery from emergencies and disasters in the Territory. They also ensure the full implementation of national disaster management policies and strategies.	Member of the Sargassum Taskforce Interest in sargassum for hazard management
Department of Health Protection	The Environmental Health Unit and Water Laboratory provide services related to food hygiene, water quality, vector control, wastewater, general environmental sanitation, and port health.	Member of the Sargassum Taskforce Assist in coordinating clean-up efforts Public education and sensitisation
Department of Lands and Survey	The Department of Lands and Survey has oversight of beaches (use, protection, access).	Member of the Sargassum Taskforce Approve/Reject applications to use heavy equipment to remove sargassum from any beach on Anguilla (including private beaches)
Department of Physical Planning	Coordinates physical planning, including coastal and marine spatial planning, and oversees development controls and enforcement of regulations	Interest in the management and adaptation to sargassum influxes, including forecasting, data collection, and monitoring via GIS to inform planning No defined or mandated responsibility related to sargassum management

Ministry of Tourism	This ministry is responsible for the sustainable development of the tourism sector.	Interest in the management and adaptation to sargassum influxes and maintenance of pristine beaches
Civil Society & Private Sector		
Anguilla Fisherfolk Association (AFFA)	The Anguilla Fisherfolk Association (AFFA) is a non-profit organisation, established for the purpose of improving the fishing industry on the island, building fisherfolk capacity and lobbying for the well-being of fisherfolk and the industry.	Interest in healthy fish populations and ecosystems to reduce vulnerabilities of the fisheries sector to sargassum blooms No defined or mandated responsibility related to sargassum management
Anguilla National Trust	The Anguilla National Trust (ANT) has been instrumental in the creation of Anguilla's national parks, conservation areas, and heritage sites as well as their day-to-day management. They conduct research and conservation work, including habitat and species monitoring and raising public awareness about the island's natural and cultural resources.	Interest in habitat and species management and conservation No defined or mandated responsibility related to sargassum management
Anguilla Hotel and Tourism Association	A trade organisation representing all facets of Anguilla's tourism industry. Their mission is to assist in the professional development of their members through marketing and public relations support, training, information provision and advocacy, and to encourage the continued improvement of Anguilla's tourism product.	Interest in pristine beaches and healthy ecosystems to attract tourist No defined or mandated responsibility related to sargassum management
Island Harbour Initiative	An Island Harbour-based community group with a focus on developing an appreciation for Island Harbour culture and lifestyle while also fostering respect for the natural environment through sustainable practices, education, and social interaction.	Interest in maintaining the aesthetics of Island Harbour beach and the removal of sargassum
Anguilla Enhancement Project	A non-profit organisation that supports sustainable and socially-balanced development of Anguilla, with a focus on healthy, clean natural environments.	Interest in maintaining the integrity and aesthetics of Anguilla's beaches No defined or mandated responsibility related to sargassum management
Academia		
Anguilla Community College	The Anguilla Community College is responsible for pioneering national human	Interest in research in relation to the environment and fisheries sectors

	resource development and tertiary education in Anguilla for a sustainable future.	No defined or mandated responsibility related to sargassum management

5 SARGASSUM RESEARCH AND MONITORING

Anguilla utilizes forecasts derived from University of South Florida's Outlook of Sargassum with reports are sent to the GIS Unit of the Department of Physical Planning. Since February 2018, this tool has been periodically updated to offer an overall perspective of the present bloom situation and potential future blooms for the Caribbean Sea and Gulf of Mexico (University of South Florida, 2021). The Department of Planning shares information with the Department of Natural Resources to give a heads-up on potential sargassum season activity. This data is used by the Department of Natural Resources to determine if extra funding for cleanup activities may be required.

Additionally, the Department of Natural Resources has been keeping an eye on sargassum accumulations on Anguilla's mainland beaches. The 10 beaches most impacted by sargassum inundations were chosen in 2015, and monitoring started thereafter. This include:

- Junks Hole Bay
- Sile Bay
- Mimi Bay
- Sandy Hill Bay
- Long Pond Bay
- Blowing Point Bay
- Rendezvous Bay
- Cove Bay
- Maundays Bay
- Shoal Bay West

Monitoring is conducted twice a month; data collected includes weather conditions, amount and distribution of sargassum accumulation on the beach, any detectable odours, any activities that are being impacted by sargassum accumulation, and recommendations for action. Photographs of each beach are taken and stored. Bi-monthly monitoring and data analysis, combined with forecasting by the University of South Florida, allows for the Department of Natural Resources to conduct comprehensive assessment of trends over time and forecasting of potential Government of Anguilla resources (namely, financial) that may be required to address sargassum inundations in any given year.

5.1 SARGASSUM ASSESSMENT SHEET

Anguilla's Sargassum Assessment Sheet[3]

Table 2: *C-2 Sargassum Impact Indicator* (Rouse and Lake, 2014).

Location: _____ **Name of Beach** _____	**Name of Observer(s):** _____ _____
Date:	**Time:**

Weather and Environmental Conditions
Wind Conditions: ☐ Calm Winds ☐ Light Winds ☐ Gentle to Moderate Winds ☐ Strong Winds
Sea Conditions: ☐ Calm Sea ☐ ☐ Choppy Sea ☐ Rough Sea
Presence of Sargassum: ☐Yes ☐ No
Sargassum Odour Level: ☐ None ☐ Mild ☐ Strong ☐Extremely Strong

Status of Sargassum
Location of Sargassum: ☐ In water ☐ On foreshore ☐ Both
State of Sargassum: ☐ Alive ☐ Decomposing ☐ Decomposed
Level of Sargassum (See Guidance Note) :
Distribution on Beach (%): _____ *N.B. Pictures should be taken and inserted in report.*
Activities Impacted: Sea Bathing ☐Yes ☐ No Turtle Nesting ☐Yes ☐ No Fisherfolks Accessibility ☐Yes ☐ No Other (Please Specify): _____ _____ _____
Recommended Cleaning: ☐ Yes ☐ No

Other Comments:

……

……

……

……

[3] Data collated and maintained by the Environment Unit-Department of Natural Resources. Data has yet to be analysed.

Guidance Note

Rank	Description
1	Sporadic Clumps
2	Sargassum accumulates on sand < 1.5 meters AND/OR Sargassum accumulates in water < 5 meters
3	Sargassum accumulates on sand > 1.5 meters AND Sargassum accumulates in water < 5 meters OR > 5 meters plus high turbidity and garbage
4	Sargassum accumulates on sand > 1.5 meters and in water > 5 meters plus at least 2 of criteria 7 to 11
5	Sargassum accumulates on sand > 1.5 meters and in water > 5 meters; foul odour and presence of debris; high turbidity plus anyone one or combination of criteria 9 to 11

6 PROFILES FOR SARGASSUM STRANDING SITES IN ANGUILLA

Sargassum has heavily impacted Anguilla's mainland and its offshore cays. While sargassum inundations have impacted offshore cay nearshore habitats (both in water as well as coastal shorelines), clean-up efforts at these sites have not been prioritised given the nature of the inundations and the natural removal of the seaweed during the months where ground seas are prevalent.

Over the last ten years, beach monitoring has been conducted by the Department of Natural Resources at ten sites around Anguilla, namely at: Junk's Hole Bay, Sile Bay, Mimi Bay, Sandy Hill Bay, Long Salt Bay, Blowing Point Bay, Rendezvous Bay, Cove Bay, Maundays Bay, and Shoal Bay West.

For the scoping exercise, focus has been on sites that have been the most heavily impacted over the last five years and that have affected coastal communities and/or vulnerable or at-risk habitats or species. The loations include those primarily along the southern coastline (Savannah Bay/Junk's Hole Bay, Mimi Bay, Sandy Hill Bay, Long Salt Bay, Forest Bay, Blowing Point Bay, Cove Bay, and Maundays Bay) as well as two sites on the northeastern end of the Anguilla mainland (Shoal Bay East and Island Harbour).

6.1 SHOAL BAY EAST

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Three hotels located directly along the coastline, with no setback from the vegetation line (Shoal Bay Villas, Manoah Boutique Hotel, Zemi Beach House). • One hotel set back from the vegetation line (Elodias Beach Resort). • Six restaurants located directly along the coastline of Lower Shoal Bay East, with no setback from the vegetation line (Elodias Beach Restaurant & Bar, Uncle Ernie's, Madeariman, Olas Tacos Bar & Grill, Tropical Sunset Restaurant & Bar, Gwen's Reggae Bar & Grill). • Launch site for Junior's Glass Bottom Boat. • Once the location of one of Anguilla's larger Amerindian (Taino) settlements. • Beach extensively used by Anguilla residents for recreational activities including picnics and swimming. • Some spearfishing activity along the bordering reef.	• 1.7km bay lined by white sand beach (from Lower to Upper Shoal Bay East). • Representative coastal vegetation along the coastline (in between development) along with dry forest and shrubland to the interior. • Marine park extends from western end of bay (from Zemi Beach House) across the bay and through Island Harbour. • Fountain National Park, located on the western end of Shoal Bay East and directly east of Zemi Beach Hotel, represents Anguilla's largest terrestrial protected area (at just under 12 acres). • Indicator beach for sea turtle nesting activity (leatherback, green, and hawksbill). • Coral patch reef protects the bay although live coral cover is poor. • Extensive erosion occurring on eastern end of the beach, particularly east of Elodias Beach Restaurant & Bar (Upper Shoal Bay East). • Foraging shore birds and seabirds present.

• One of Anguilla's most densely developed beaches for tourism.	

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Oct 2011	Moderate volume of sargassum present on beach	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation using rakes
Nov 2011	No sargassum present on beach[1]	No action required
Dec 2013	No sargassum present on beach[1]	No action required
Jan 2015	Light volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation using rakes
Jul 2015	No sargassum present on beach[2]	No action required
Aug 2015	No sargassum present on beach[2]	No action required
Sep 2015	Light volume of sargassum present on beach[2]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation using rakes
Oct 2015	No sargassum present on beach[2]	No action required
Nov 2015	No sargassum present on beach[2]	No action required
Aug 2016	No sargassum present on beach[1]	No action required
Jan 2017	No sargassum present on beach[1]	No action required
Jan 2018	No sargassum present on beach[1]	No action required
Nov 2019	No sargassum present on beach[1]	No action required
Mar 2020	No sargassum present on beach[1]	No action required
Jul 2021	High volume of sargassum present on beach[3]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation using rakes
Mar 2022	Sargassum remnants present on beach[4]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation using rakes
Apr 2022	Sargassum remnants present on beach[4]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation using rakes

GENERAL RECORDED IMPACTS

- Compared to other beaches, particularly along the southern coastline of the mainland, the volume of sargassum impacting Shoal Bay East is low.
- Sargassum accumulating in the nearshore waters impacts swimming and snorkeling activities.
- Consistent manual cleaning using rakes particularly in front of hotels, villas, and restaurants, with sargassum left to decompose naturally along the vegetation line.

NOTES

[1] From Google Earth historic images
[2] From ANT sea turtle monitoring records
[3] From media posts
[4] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Eastern end of Lower Shoal Bay East, next to Elodias Beach Restaurant &	Paved side road, becomes unpaved dirt/marl private access road to Elodias

	Bar. This access leads directly to the sand but traverses through private property. Permission to use access for this purpose would be required.	Beach Resort and Elodias Beach Restaurant & Bar.
Vehicular	Middle of Lower Shoal Bay East, between Manoah Boutique Hotel, Uncle Ernies, and Madeariman. This access leads directly to a small and narrow parking area for Madeariman. Access to the beach is by a footpath.	Paved main road.
Vehicular	Middle of Lower Shoal Bay East, leading to Tropical Sunset Restaurant & Bar and leads to parking area for the restaurant. Access to the beach is by foot through sparse seagrape vegetation and short boardwalk to the restaurant.	Unpaved dirt/marl road.
Vehicular	Eastern end of Lower Shoal Bay East, leads to Gwen's Reggae Bar & Grill. This access is usually chained and leads to a parking area for Gwen's Reggae Bar & Grill. Road lines Fountain National Park and should be public.	Unpaved dirt/marl road.
Vehicular	Eastern end of Lower Shoal Bay East, between Zemi Beach House and Fountain National Park. This access is the official public access to the beach and leads directly to the sand. Large boulders block vehicles from driving onto the beach.	Unpaved dirt/marl road.
NOTES Beach access road between Zemi Beach House and Fountain National Park offers the best access to the beach, although it is on the most eastern side of the beach. Boulders preventing vehicular access would need to be removed. Access through this location is public. There is adequate space for the maneuvering of machinery. There is no space for temporary storage of sargassum due to private landownership and the high level of tourism activities.		

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes NB: Adequate access for mechanical and manual clean-up efforts.
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No NB: Individuals spearfish for subsistence. With the development of a marine park management plan for Shoal Bay-Island Harbour Marine Park in 2022, it is likely that the marine park will become a no-take area.
How close is the community to the Bay?	Very close. NB: Residential community is first located 300m from the bay, but hotels, villas, and restaurants are located along/on the sandy coastline.

Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far (more than 2km)
Volume of sargassum during scoping assessment	Very low (27 March 2022)
Volume of sargassum historically (2011-present)	Medium
Is the beach heavily used by locals?	Yes NB: Locals use Shoal Bay East for picnicking, swimming, walking; locals also patronise Shoal Bay East restaurants and bars.
Is the beach heavily used for tourism?	Yes NB: Shoal Bay East is one of the main tourism-focused beaches on the eastern end of the island.
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	Yes NB: Hotels, villas, and restaurants primarily remove sargassum from the beach directly in front of their properties using rakes.
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	Yes, but limited NB: Used as fertliser within landscaped gardens, but very limited. Primarily buried on-site.

Overall Comments on Vulnerability and Resilience

Shoal Bay East is routinely impacted by sargassum influx events although inundations are relatively small when compared to other mainland Anguilla sites. Sargassum influxes are managed by property owners/managers with a vested interest in a maintaining the beauty of Shoal Bay East's white sand beaches for the benefit of their guests and customers. Sargassum that is left on the beach often becomes integrated into the beach and dune system. Sargassum remaining on the sand tends to swept back to sea during the winter and spring ground seas season, despite bordering patch reefs dissipating some wave energy. As a beach that is important to both locals and the tourism sector, but with current sargassum influxes being manageable, Shoal Bay East displays a **MODERATE vulnerability** to influx events and **HIGH resilience** so long as influxes remain at (or fall below) current levels. Potential social and ecological/biodiversity impacts should be monitored.

Photo credits:

Above left – sargassum accumulation around the point, east of Elodias Beach Bar & Restaurant (Susanne Quigley, July 2021));
Above right – sargassum accumulation between the point and Elodias Beach Bar & Restaurant (Susanne Quigley, July 2021);
Middle left – Upper Shoal Bay East (Anguilla Beaches, October 2011);
Middle right – dried sargassum raked to the top of the beach and left to dry, Lower Shoal Bay next to Tropical Sunset Restaurant & Bar (Farah Mukhida, March 2022);
Below left – eastern end of Lower Shoal Bay East, with Zemi Beach House at end of the beach (Farah Mukhida, March 2022);
Below right – western end of Lower Shoal By East with Manoah Boutique Hotel, Shoal Bay Villas, and Elodias Beach Bar & Restaurant in the distance (Farah Mukhida, March 2022)

6.2 ISLAND HARBOUR

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Vivian Vanterpool Primary School located on the western side of the bay, directly on coastline, with no significant setback from the vegetation line • One hotel located directly along the coastline on the western side of the bay, with no setback from the rocky shoreline (Arawak Beach Club). • Two restaurants located directly along the coastline, with no setback from the vegetation line (Falcon Nest Bar & Grill, Pelican Bar & Grill). • Site of Festival del Mar, held every Easter and drawing crowds of thousands of people. • Public washrooms available. • One of Anguilla's main fishing landing sites, with tens of boats mooring in the bay.	• 700m bay lined by white sand beach. • Bay and beach separated from the main road by limited coastal vegetation, including almost exclusively palm and seagrape trees. • Marine park extends from eastern end of bay west through to the western end of Shoal Bay East; Island Harbour and its extensive seagrass bed not included within marine park boundaries. • Indicator bay for monitoring foraging juvenile turtles (green). • Coral patch reef protects the bay although live coral cover is poor. • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES

Nov 2011	No sargassum present on beach[1]	No action required
Feb 2013	Medium volume of sargassum present on the beach[1]	Cleaned manually by individuals from the community using rakes
Dec 2013	No sargassum present on beach[1]	No action required
2016	Medium volume of sargassum present on the beach[2]	No information available
Jan 2015	High volume of sargassum present on the beach[1]	Cleaned manually by community group using rakes
Sept 2017	No sargassum present on beach[1]	No action required
Sept 2019	Light volume of sargassum present on beach[1]	Cleaned manually by community group using rakes
June 2019	High volume of sargassum present on the beach[1]	Cleaned manually by community group using rakes
Nov 2019	High volume of sargassum present on the beach[1]	Cleaned manually by community group using rakes
Dec 2019	Light volume of sargassum present on beach[1]	No information available
Mar 2020	Extremely high volume of sargassum present on the beach[1]	Cleaned manually by community group using rakes
Jan 2021	No sargassum present on beach[1]	No action required
Apr 2021	Extremely high volume of sargassum present on the beach[3]	Cleaned manually and mechanically by community group; sargassum removed and disposed of at Corito
Jul 2021	Extremely high volume of sargassum present on beach[1]	Cleaned manually by community group using rakes
Mar 2022	Very low volume of sargassum present on beach[4]	No action required

GENERAL RECORDED IMPACTS

- High volume of sargassum impacts Island Harbour with high levels of accumulation along entire stretch of beach and within nearshore waters.
- Sargassum accumulates on the sea rocks/iron shore on the western part of Island Harbour.
- Consistent manual cleaning using rakes and buckets undertaken by community members, sometimes on a daily basis when sargassum volume is high.
- Vivien Vanterpool Primary School children have been affected by the strong smell of decomposing sargassum, especially when the volume of sargassum on the beach is high; no action was taken by the school to address the odours – classes continued as normal.

NOTES

[1] From Google Earth historic images
[2] From Department of Natural Resources site assessment
[3] From media post
[4] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Eastern end of Island Harbour next to the jetty.	Paved main road.
Vehicular	Along the beach between buildings.	Paved main road.

NOTES

Beach access next to the jetty offers the best access to the beach. There is adequate space for the maneuvering of machinery. There is limited space for temporary storage of sargassum within the limited vegetation but sargassum should not remain on site for long due to high level of usage of area by both locals and visitors. Sargassum could be disposed of within the Corito landfill. Sargassum can be easily collected by contracted clean-up crews or community members. There is limited space for storage of sargassum due to narrowness of the beach and the close proximity of the main road.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes NB: Adequate access for mechanical and manual clean-up efforts.
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	Yes NB: Although Island Harbour is not used for fishing, it is one of Anguilla's main fish landing sites.
How close is the community to the Bay?	Very close (from 10m). NB: Residential community, hotel, and restaurants are located along/on the sandy coastline.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Vivien Vanterpool Primary School located on the western side of Island Harbour, setback from the beach by a narrow strip of grass.
Volume of sargassum during scoping assessment	Very low (27 March 2022)
Volume of sargassum historically (2011-present)	High
Is the beach heavily used by locals?	Yes NB: Locals use Island Harbour for landing fish and swimming; locals also patronise Island Harbour restaurants and bars. Island Harbour hosts the annual Festival del Mar, drawing thousands of people (locals and visitors).
Is the beach heavily used for tourism?	No NB: Island Harbour hosts the annual Festival del Mar, drawing thousands of people (locals and visitors).
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	Yes NB: Group of community members consistently conduct beach clean-ups, sometimes daily when sargassum volumes are high.
Is there evidence of community efforts to use sargassum	Yes NB: Collected by a limited number of community members for use in their backyard gardens.
Presence of church and community groups that advocate for government assistance?	No

Overall Comments on Vulnerability and Resilience

Island Harbour is routinely impacted by sargassum events, with inundations occurring year-round. Sargassum influxes are managed by the local community through routine beach clean-up activities. Mats of sargassum can stay on the surface of the water for days before being deposited on the beach, surrounding and impacting fishers' boats and engines as they attempt to the leave the bay. Island Harbour displays a **HIGH vulnerability** to influx events and **MODERATE resilience** as control of sargassum accumulation can be maintained with relatively high levels of resource investment. Potential social and ecological/biodiversity impacts should be monitored.


The Anguillian Newspaper


The Anguillian Newspap


The Anguillian Newspaper

Photo credits:

First row left– sargassum accumulation on Island Harbour beach (Department of Natural Resources, 2016);
First row right – sargassum inundation (The Anguillian, July 2021);
Second row left – sargassum accumulation on the sandy beach (The Anguillian, July 2021);
Second row right – community members using rakes and buckets to clear sargassum from the shoreline, with sargassum piled onto the coastal vegetation for temporary storage (The Anguillian, July 2021);
Third row left and right– fishers prepare to launch their boat from the Island Harbour shore amidst sargassum accumulation (The Anguillian, July 2021);
Fourth row left- Island Harbour beach and bay with Falcons Nest Bar & Grill in foreground and Vivien Vanterpool Primary School in the distance (Farah Mukhida, March 2022).

6.3 JUNK'S HOLE/SAVANNAH BAY

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• One restaurant located directly along the coastline, with no setback from the vegetation line (Nat's Place). • Popular site amongst kite surfers and surfers, especially during the ground seas season when sargassum accumulations/inundations are low. • Marine park within bay protects the Buen Consejo shipwreck and its few remaining artefacts.	• 1.3km bay lined by white sand beach and dune system. • Coastal vegetation along the coastline (in between development) along with dry shrubland to the interior. • Extensive sand mining activities compromising integrity of both the beach and sand dune. • Some sea turtle nesting activity (green and hawksbill). • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Nov 2011	Moderate volume of sargassum present on beach[1]	No action taken
Jan 2015	Moderate volume of sargassum present on beach[2]	No action taken
Aug 2016	High volume of sargassum present on beach[2, 4]	No action taken
Jan 2017	No sargassum present on beach[1]	No action required

Sep 2017	Moderate volume of sargassum present on beach[1]	No action taken
Jan 2018	Low volume of sargassum present on beach[1]	No action taken
Jun 2019	High volume of sargassum present on beach[1]	No action taken
Jul 2019	Moderate volume of sargassum present on beach[3]	No action taken
Dec 2019	Low volume of sargassum present on beach[1]	No action taken
Mar 2020	Moderate volume of sargassum present on beach[1]	No action taken
Apr 2020	Moderate volume of sargassum present on beach[1]	No action taken
Nov 2020	Moderate volume of sargassum present on beach[1]	No action taken
Mar 2022	Low volume of sargasso present on beach[4]	No action taken

GENERAL RECORDED IMPACTS

- High volume of sargassum impacts Junk's Hole/Savannah Bay with high levels of accumulation along entire stretch and width of beach.

NOTES

[1] From Google Earth historic images
[2] From ANT sea turtle monitoring records
[3] From media post
[4] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Eastern end of Junk's Hole next to Nat's Place.	Unpaved dirt/marl road.
Vehicular	Eastern end, east of Nat's Place. This access road was established to facilitate illegal sand mining activities and traverses through private property.	Unpaved dirt/marl road.
Vehicular	Middle of bay where Junk's Hole meets Savannah Bay. This access road is a part of a network of roads behind the back of the dune and traverses through private property. Permission to use access for this purpose would be required.	Unpaved dirt/marl road.

NOTES

Beach access next to Nat's Place and the illegal sand mining area offer the best access to beach. There is adequate space for the maneuvering of machinery. There is adequate space for storage of sargassum, including where sand has been mined, leaving pits and empty space on the beach and where the sand dune has been compromised; leaving sargassum in place would be beneficial as it would support natural beach and dune-building.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes NB: Adequate access for mechanical and manual clean-up efforts.

Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No
How close is the community to the Bay?	Very far (700m)
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far (1.5km)
Volume of sargassum during scoping assessment	Low (27 March 2022)
Volume of sargassum historically (2011-present)	Extremely high
Is the beach heavily used by locals?	No NB: A few locals use Junk's Hole/Savannah Bay for beach walking and surfing. Locals occasionally patronise Nat's Place. Illegal sand mining is rampant. Beach clean-ups are organised on occasion to remove flotsam and jetsam that often washes onshore.
Is the beach heavily used for tourism?	No NB: A few visitors use Junk's Hole/Savannah Bay for beach walking, beach combing, and surfing. Visitors occasionally patronise Nat's Place.
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	No NB: Community groups occasionally conduct beach clean-ups to remove flotsam and jetsam that washes onto the shore with source of pollution likely being from boats as well as from other islands within the region where land-based pollution enters the ocean.
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	No

Overall Comments on Vulnerability and Resilience

Junk's Hole/Savannah Bay is significantly and routinely impacted by sargassum events, with inundations being substantial particularly during the summer months. Sargassum influxes are not managed due to limited usage by locals and visitors, although sea turtles are affected by the extreme depth of sargassum accumulation which may prevent nesting activity as well as hatchlings' ability to successfully crawl to the ocean following nest emergence. Junk's Hole/Savannah Bay displays a **HIGH vulnerability** to influx events and **HIGH resilience** as it recovers naturally from regular sargassum influxes and may aid in the restoration of the beach and sand dune system. Potential ecological/biodiversity impacts should be monitored.

Photo credits:

Above left – significant sargassum accumulation on the shoreline (Stuart Wynne, August 2016);
Above right – sargassum beginning to accumulate on the sandy beach next to Nat's Place (Anonymous, July 2019);
Below – Junk's Hole/Savannah Bay (Farah Mukhida, March 2022).

6.4 SILE BAY

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Three houses within the close proximity to Sile Bay. • Residential community further east, above the bay.	• Short bay lined by white sand beach. • Low concrete breakwater constructed on western side of beach in attempt to control beach erosion following significant sand mining activities over four decades ago; large-scale sand mining no longer an issue although smaller amounts are occasionally removed. • Coastal vegetation set back from the coastline, with dry shrubland to the interior. • Wetland system behind the western side of the beach; identified as Important Bird and Biodiversity Area. • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Jan 2015	High level of sargassum present on beach and floating in bay[1]	No action taken
Jan 2017	Low level of sargassum present on beach[1]	No action taken
Sep 2017	Moderate level of sargassum present on beach and floating in bay[1]	No action taken
Jun 2019	Moderate level of sargassum present on beach and floating in bay[1]	No action taken
Dec 2019	Low level of sargassum present on beach[1]	No action taken
Mar 2020	Moderate to high volume of sargassum present on beach and floating in the bay[1]	No action taken
Apr 2020	Moderate volume of sargassum present on beach and floating in the bay[1]	No action taken
Apr 2022	Low volume of sargassum present on beach[2]	No action taken
GENERAL RECORDED IMPACTS		
• High volume of sargassum impacts Sile Bay with high levels of accumulation along entire stretch and width of beach.		
NOTES [1] From Google Earth historic images [2] From site visit		

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	From western side of beach to the eastern side of beach by infrequently used road. Direct access to the beach from the road, but requires driving over grass-covered sandy ground.	Unpaved sandy road.
NOTES There is adequate space for the maneuvering of machinery. There is adequate space for storage of sargassum. Sargassum should be allowed to dry to reduce the release of fumes produced while decomposing due the proximity of a few houses as well as houses downwind from bay. Sile Bay is an isolated beach and not frequently accessed or visited by those not living in the area. Removal of sargassum is not a priority; sargassum could remain *in situ*.		

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes NB: Adequate access for mechanical and manual clean-up efforts.
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No
How close is the community to the Bay?	Close
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far

Volume of sargassum during scoping assessment	Low
Volume of sargassum historically (2011-present)	Extremely high
Is the beach heavily used by locals?	No NB: Very few locals visit Sile Bay, except for those who live in the area.
Is the beach heavily used for tourism?	No
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	No
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	No

Overall Comments on Vulnerability and Resilience

Sile Bay is significantly and routinely impacted by sargassum events, with inundations being substantial particularly during the summer months. Sargassum influxes are not managed due to exceedingly limited usage by locals and visitors. Sile Bay displays a **HIGH vulnerability** to influx events and **HIGH resilience** as it recovers naturally from regular sargassum influxes. Potential ecological/biodiversity impacts should be monitored.

Photo credits:

Left – Sile Bay (Farah Mukhida, April 2022);
Right – Sile Bay (Farah Mukhida, April 2022)

6.5 MIMI BAY

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Limited use amongst locals, and primarily by community members, for bird watching and beachcombing. • Limited seine fishing.	• 400m bay lined by rocky and sandy beach. • Coastal vegetation along the coastline along with dry shrubland to the interior. • Extensive sand dune mining activities compromising the integrity of both the beach and sand dune. • Indicator beach for sea turtle nesting activity (green and hawksbill); represents one of Anguilla mainland's most important sea turtle nesting beaches. • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Nov 2011	Low volume of sargassum present on beach[1]	No action taken
Dec 2013	No sargassum present on beach[1]	No action required
Sep 2014	Moderate volume of sargassum present on beach[2]	No action taken
Oct 2014	Moderate volume of sargassum present on beach[2]	No action taken

Nov 2014	Low volume of sargassum present on beach[2]	No action taken
Jan 2015	Low-moderate volume of sargassum present on beach[1]	No action taken
May 2015	Low volume of sargassum present on beach[2]	No action taken
Oct 2015	Low volume of sargassum present on beach[2]	No action taken
Feb 2016	No sargassum present on beach[3]	No action required
Jan 2017	No sargassum present on beach[1]	No action required
Sep 2017	Low volume of sargassum present on beach[1]	No action taken
Jan 2018	Low volume of sargassum present on beach[1]	No action taken
Mar 2019	Low volume of sargassum present on beach[4]	No action taken
Jun 2019	Moderate-high volume of sargassum present on beach[1]	No action taken
Mar 2020	Moderate volume of sargassum present on beach[1]	No action taken
Apr 2020	Moderate volume of sargassum present on beach[1]	No action taken
Nov 2020	Moderate volume of sargassum present on beach[1]	No action taken
Mar 2022	Low volume of sargassum present on beach[5]	No action taken

GENERAL RECORDED IMPACTS

- Moderate volume of sargassum impacts Mimi Bay with accumulation along entire stretch and width of beach.
- Sargassum can get caught in seine nets used to catch bait fish in the nearshore.
- Sargassum has been cleared to create pathways for sea turtle hatchlings to crawl to the sea after excavation of nests by ANT personnel.

NOTES

[1] From Google earth historic images
[2] From ANT sea turtle monitoring records
[3] From ANT after school programme records
[4] From ANT member activity records
[5] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Foot	Middle of bay, where main access road ends.	Rocky and sandy footpath.
Vehicular	Middle of bay where main access road ends and branches to a side road that leads to top of the dune and where extensive sand mining is occurring.	Unpaved sandy road.

NOTES

Only one main access to beach by vehicles which leads to an area where extensive sand mining is occurring. Direct access to the beach by vehicle is not possible. There is adequate space for the maneuvering of machinery at the bottom of the side sandy road leading to the beach. There is adequate space for storage of sargassum, including where sand has been mined, leaving pits and empty space at the top of the sand dune; leaving sargassum in place would be beneficial as it would support natural beach and dune-building.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes NB: Adequate access for manual clean-up efforts.
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No NB: Limited fishing for bait fish using seine nets.
How close is the community to the Bay?	Very far
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far
Volume of sargassum during scoping assessment	Low (27 March 2022)
Volume of sargassum historically (2011-present)	Medium-High
Is the beach heavily used by locals?	No NB: A few locals use Mimi Bay for beach walking, beachcombing, and illegal sand mining. Beach clean-ups are organised on occasion to remove flotsam and jetsam that often washes onshore.
Is the beach heavily used for tourism?	No
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	No NB: Community groups occasionally conduct beach clean-ups to remove flotsam and jetsam that washes onto the shore.
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	No

Overall Comments on Vulnerability and Resilience

Mimi Bay is routinely impacted by sargassum events, with inundations particularly occuring during the spring and summer months. Sargassum influxes are not managed due to limited usage by locals and visitors, although sea turtles are affected by the sargassum accumulation which may prevent nesting activity as well as hatchlings' ability to successfully crawl to the ocean following nest emergence. Mimi Bay displays a **MODERATE vulnerability** to influx events and **HIGH resilience** as it recovers naturally from regular sargassum influxes and may aid in the restoration of the beach and sand dune system. Potential ecological/biodiversity impacts should be monitored.







Photo credits:

First row left – sargassum accumulation on beach and within the nearshore waters (Farah Mukhida, September 2014);
First row right – sargassum accumulation (Farah Mukhida, October 2014);
Second row left – sargassum accumulation (Farah Mukhida, May 2015);

Second row right – sargassum accumulation along the width of the sandy beach (Farah Mukhida, September 2015);
Third row left – sargassum accumulation close to the vegetation line (Farah Mukhida, September 2015);
Third row right – sargassum accumulation along the extent of Mimi Bay beach (Farah Mukhida, March 2019);
Fourth row left – Mimi Bay (Farah Mukhida, March 2022)

6.6 SANDY HILL BAY

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Privately-owned beach, which has the potential impact beach access but not Government of Anguilla intervention to assist with sargassum influxes. • Landowners allow access to beach by locals and visitors. • Beach frequently used by Anguilla residents for recreational activities including picnics, beach walking, and swimming. • Dive operators use bay as site for in-water PADI certification training due to the bay's sheltered and calmer waters. • Some whelk collection from nearshore rocky outcropping to the western side of bay.	• 0.7km bay lined by sloping hills and iron shores to the east and west of the sandy beach. • Coastal vegetation severely impacted by Hurricane Irma in 2017 and slowly recovering. • Coastal vegetation representative of dry scrubland, including seagrape and buttonwood. • Small patch reef within and just outside of bay. • Some sea turtle nesting activity (green and hawksbill). • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Oct 2011	High volume of sargassum present on beach[1]	No action taken
Nov 2011	Low volume of sargassum present on beach[2]	No action taken

Jan 2015	Moderate level of sargassum within bay[2]	Cleaned manually by individuals from the community
Jul 2015	High level of sargassum present on beach[2]	Cleaned manually and mechanically by individuals from the community and heavy equipment providers, with sargassum disposed at White Ground, Sandy Hill; work overseen by Sargassum Taskforce and funding provided by the Government of Anguilla
Jan 2017	No sargassum present on beach[2]	No action required
Sep 2017	Low volume of sargassum present on beach[2]	Cleaned manually by individuals from the community using rakes
Jan 2018	No sargassum present on beach[2]	No action required
May 2018	Extremely high volume of sargassum present on beach and in nearshore waters[1]	No action taken
Jun 2018	Extremely high volume of sargassum present on beach and in nearshore waters[1]	Cleaned manually and mechanically by individuals from the community
Feb 2019	Very low volume of sargassum present on beach[2]	Cleaned manually by individuals from the community using rakes
Jun 2019	Extremely high volume of sargassum present on beach[2]	Cleaned manually by individuals from the community using rakes
Jul 2019	Extremely high volume of sargassum present on beach[1]	Cleaned manually and mechanically by individuals from the community
Mar 2020	Low volume of sargassum present on beach[2]	Cleaned manually by individuals from the community using rakes
Apr 2020	No sargassum present on beach[2]	No action required
Nov 2020	High volume of sargassum present on beach[2]	Cleaned manually by individuals from the community using rakes
Sep 2021	High volume of sargassum present on beach[2]	Cleaned manually by individuals from the community using rakes
Oct 2021	High volume of sargassum present on beach[2]	Cleaned manually by individuals from the community using rake
Mar 2022	Low volume of sargassum present on beach	No action taken

GENERAL RECORDED IMPACTS

- High volume of sargassum impacts Sandy Hill Bay with high levels of accumulation along entire stretch and width of beach.
- Strong smells from decomposing sargassum blow downwind from Sandy Hill Bay.
- Sargassum regularly cleared from beach by community group/s using primarily heavy equipment, with sargassum either being removed from the area or being stored within the vegetation line.
- Sargassum accumulating in the nearshore waters impacts swimming, snorkelling, and diving activities.
- Though not one of the main sea turtle nesting beaches, turtle nests are at times affected by sargassum inundation, with hatchlings struggling to escape.
- Use of heavy equipment could damage sea turtle nests.

NOTES

[1] From media post

[2] From Google Earth historic images

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Middle of bay where main access road ends. This access leads directly to the	Unpaved dirt/marl road.

	sand. Access is permitted by landowner.	

NOTES
Only one main access to beach by vehicles which leads to directly onto the sand. There is adequate space for the maneuvering of machinery at the bottom of the road. There is adequate space for temporary storage of sargassum, including within the vegetation behind the beach but sargassum should not remain on site for long due to high level of usage of area by both locals and visitors and the proximity of residential houses and villas. Sargassum can be easily collected by contracted clean-up crews or community members. During periods of exceedingly high inundations, sargassum should be removed from the site. When inundations are not as severe, sargassum could remain *in situ*.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes NB: Adequate access for manual and mechanical clean-up efforts.
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No NB: Limited collection of whelks and limited spearfishing for subsistence.
How close is the community to the Bay?	Very close (within 200m) NB: Residential community and villas restaurants are located behind the beach and to either side of the bay.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Far (more than 1km)
Volume of sargassum during scoping assessment	Low (27 March 2022)
Volume of sargassum historically (2011-present)	Extremely high
Is the beach heavily used by locals?	Yes NB: Locals use Sandy Hill Bay for beach walking, swimming, snorkeling, diving, and fishing.
Is the beach heavily used for tourism?	No
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	Yes NB: Community group regularly organises and conducts clean-ups to remove sargassum when volume of accumulation ranges from moderate to extremely high. Sargassum removed manually as well as with heavy equipment.
Is there evidence of community efforts to use sargassum	Yes NB: Collected by a limited number of community members for use in their backyard gardens.
Presence of church and community groups that advocate for government assistance?	Yes NB: Assistance requested in 2015. Community group now organised, funded, and conducted by the community, with permission granted by the Department of Lands and Surveys to use heavy equipment.

Overall Comments on Vulnerability and Resilience

Sandy Hill Bay is significantly and routinely impacted by sargassum events, with significant inundations occurring throughout the year. Sargassum influxes are managed by the Sandy Hill (and to some extent, Seafeathers and East End communities). Though not a main nesting sea turtle beach, sea turtles are affected by the extreme depth of sargassum accumulation which may prevent nesting activity as well as hatchlings' ability to successfully crawl to the ocean following nest emergence. Sandy Hill Bay displays a **HIGH vulnerability** to influx events and **MODERATE resilience** as the community has demonstrated a strong commitment to and willingness to address sargassum inundations; sustained clean-up efforts, however, require significant investment of resources. Potential social and ecological/biodiversity impacts should be monitored.

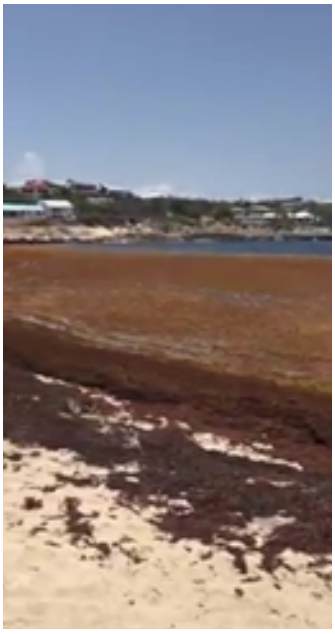


Photo credits:

First row left – sargassum accumulation on beach (Anguilla Beaches, October 2011);
First row middle and right– community sargassum clean-up effort (Anonymous, October 2015);

Second row left and right – extensive sargassum accumulation within the nearshore waters (The Anguillian, May 2018);
Third row left – sargassum accumulation within the nearshore waters (Matthew Billington, June 2018);
Third row right – community-led sargassum clean-up effort using heavy equipment (The Anguillian, July 2019);
Fourth row left – community-led sargassum clean-up effort, with sargassum piled into mounds (The Anguillian, July 2019);
Fourth row right – Sandy Hill Bay (Farah Mukhida, March 2022);
Fifth row left and right – Sandy Hill Bay (Farah Mukhida, March 2022);

6.7 LONG SALT BAY

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Two villas (Rum Punch Villa, Tequila Sunrise) west of bay. • Limited use amongst locals, and primarily by surrounding community members, for line fishing from the sea rocks.	• 400m bay lined by iron shores to the east and west of the sandy beach. • Wetland system behind the bay, with the breaching into the pond during strong ground seas and tropical storms. • Sand mining activities compromising the integrity of the beach. • Some sea turtle foraging activity (hawksbill) Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Feb 2013	Low volume of sargassum present on beach[1]	No action taken
Dec 2013	No sargassum present on beach[1]	No action required
Jan 2015	Extremely high volume of sargassum present on beach[1]	No action taken
Jul 2015	Extremely high volume of sargassum present on beach[1]	No action taken
Jan 2017	No sargassum present on beach[1]	No action required
Sep 2017	Moderate volume of sargassum present on beach[1]	No action taken

Jan 2018	Low volume of sargassum present on beach[1]	No action taken
2018	Extremely high volume of sargassum present on beach[2]	No action taken
Feb 2019	Moderate volume of sargassum present on beach[1]	No action taken
Apr 2019	No sargassum present on beach[3]	No action required
Jun 2018	High volume of sargassum present on beach[1]	No action taken
Mar 2020	Low-moderate volume of sargassum present on beach[1]	No action taken
April 2020	Low-moderate volume of sargassum present on beach[1]	No action taken
Nov 2020	Low volume of sargassum present on beach[1]	No action taken
Jul 2021	Extremely high volume of sargassum present on beach and in nearshore waters[4]	No action taken
Sep 2021	Moderate volume of sargassum present on beach[1]	No action taken
Oct 2021	Moderate volume of sargassum present on beach[1]	No action taken
Apr 2022	Moderate volume of sargassum present on beach[5]	No action taken

GENERAL RECORDED IMPACTS

- High volume of sargassum impacts Long Salt Bay with high levels of accumulation along entire stretch and width of beach.
- Strong smells from decomposing sargassum blow downwind and towards residential areas.
- Though not one of the main sea turtle foraging bays, turtles are at times affected by sargassum inundation, with at least one turtle being trapped within the sargassum floats in the nearshore – the turtle was found and rescued by a fisher and the Anguilla National Trust was called to assist; the turtle was released at a nearby by which was not affected by sargassum

NOTES

[1] From Google Earth historic images
[2] From Department of Natural Resources site assessment
[3] From ANT member activity records
[4] From ANT sea turtle monitoring records
[5] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Western side of bay where main access road leads to two villas.	Unpaved dirt/marl road.

NOTES

Single access point by unpaved road from the main paved road. Despite sand mining activities on the beach, there is adequate space for the maneuvering of machinery although care should be taken as the bay's vegetation line is being restored with seagrape and buttonwood trees. There is adequate space for temporary storage of sargassum, including within the pits created by illegal sand mining activities. Sargassum can be easily collected by contracted clean-up crews or community members although leaving it in place would be beneficial as it would support natural beach accretion.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes NB: Care should be taken to ensure that recently planted vegetation (and existing vegetation) is not disturbed.
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No NB: Limited subsistence level fishing from the sea rocks and iron shore.
How close is the community to the Bay?	Close (withing 300m) NB: Residential houses are located to the north of the bay as well as downwind from the bay.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Far (more than 1km)
Volume of sargassum during scoping assessment	Medium
Volume of sargassum historically (2011-present)	Extremely high
Is the beach heavily used by locals?	No NB: Locals use Long Salt Bay for subsistence-level fishing, experiential learning opportunities, and illegal sand mining.
Is the beach heavily used for tourism?	No
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	No
Is there evidence of community efforts to use sargassum	Yes NB: Collected by a limited number of community members for use in their backyard gardens.
Presence of church and community groups that advocate for government assistance?	No

Overall Comments on Vulnerability and Resilience

Long Salt Bay is significantly and routinely impacted by sargassum events, with inundations being substantial particularly during the summer months. Sargassum influxes are not managed due to limited usage by locals and visitors, although juvenile foraging sea turtles are affected by the significant accumulation of sargassum within the nearshore waters, potentially leading to death by suffocation or exhaustion. Long Salt Bay displays a **HIGH vulnerability** to influx events and **HIGH resilience** as it recovers naturally from regular sargassum influxes. Potential ecological/biodiversity impacts should be monitored.





Photo credits:

Above left –sargassum accumulation within the nearshore waters (The Anguillian, July 2015);
Above right – significant sargassum accumulation with Long Salt Bay's nearshore waters (Department of Natural Resources, 2018);
Middle left – Long Salt Bay (Farah Mukhida, April 2022);
Middle right – ruddy turnstones foraging amongst the washed up sargassum (Farah Mukhida, April 2022);
Below left – fresh sargassum washed ashore (Farah Mukhida, April 2022);
Below right – sargassum accumulation on the eastern end of Long Salt Bay (Farah Mukhida, April 2022)

6.8 FOREST BAY

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Limited use amongst locals, and primarily by community members, for beach walking. • Landing site for very limited number of fishing boats. • Identified as potential access site for smugglers. • Once the location of one of Anguilla's important Amerindian (Taino) settlements.	• 600m bay lined by sloping hills and iron shores to the east and west of the sandy beach. • Representative coastal vegetation along the coastline (in between development) along with dry forest and shrubland to the interior. • Wetland system behind the western side of the beach; identified as Important Bird and Biodiversity Area. • Rocky berm, constructed by the Amerindians, provides shelter for the bay. • Extensive sand mining activities compromising the integrity of the beach. • Some sea turtle foraging (green) and nesting activity (green and hawksbill). • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Feb 2013	Low volume of sargassum present on beach and within bay[1]	Cleaned manually by individuals from the community using rakes
Oct 2013	No sargassum present on beach[1]	No action required

Dec 2013	No sargassum present on beach[1]	No action required
Jan 2015	Extremely high volumes of sargassum present on beach and within bay[1]	Cleaned manually by individuals from the community using rakes
Jul 2015	High volume of sargassum present on beach and within bay[1]	Cleaned manually by individuals from the community using rakes
Nov 2015	High volume of sargassum present on beach[2]	Cleaned manually and mechanically by individuals from the community and heavy equipment providers, with sargassum disposed at Corito; work overseen by Sargassum Taskforce and funding provided by the Government of Anguilla
Aug 2016	Low volume of sargassum present on beach[1]	No action taken
Jan 2018	No sargassum present on beach[1]	No action required
Sep 2017	Moderate volume of sargassum present on beach[1]	No action taken
Jan 2018	Low volume of sargassum present on beach[1]	No action taken
Feb 2019	Low volume of sargassum present on beach[1]	No action taken
Apr 2019	Low volume of sargassum present on beach[1]	No action taken
Mar 2020	Moderate volume of sargassum present on beach[1]	No action taken
Apr 2020	Low volume of sargassum present on beach[1]	No action taken
Nov 2020	High volume of sargassum present on beach and in nearshore waters[2]	No action taken
Mar 2021	High volume of sargassum present on beach[3]	No action taken
Jul 2021	Extremely high volume of sargassum present on beach and in nearshore waters[2]	No action taken
Sep 2021	Extremely high volume of sargassum present on beach and in nearshore waters[2]	No action taken
Oct 2021	Extremely high volume of sargassum present on beach and in nearshore waters[2]	No action taken
Mar 2022	Low volume of sargassum present on beach[4]	No action taken

GENERAL RECORDED IMPACTS

- High volume of sargassum impacts Forest Bay with high levels of accumulation along entire stretch and width of beach.
- Strong smells from decomposing sargassum blow downwind and towards residential areas.
- Sargassum once regularly cleared from beach by community group/s both manually and using heavy equipment; community clean-up efforts no longer as frequent despite high accumulation levels.
- Sargassum accumulating in the nearshore waters impacts swimming activities.
- Though not one of the main sea turtle nesting beaches, turtle nests are at times affected by sargassum inundation, with hatchlings struggling to escape; when found, Anguilla National Trust assists by removing sargassum from their path to the sea.

• Sargassum accumulation within the shallow nearshore could be affecting sea turtle foraging behaviour. • Use of heavy equipment could damage sea turtle nests.
NOTES [1] From Google Earth historic images [2] From media post [3] From ANT sea turtle monitoring records [3] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Western side of bay where main access road leads to series of residential houses. Beach access through openings within the vegetation and between now-abandoned buildings.	Paved road.
Vehicular	Northern side of bay, directly adjacent to beach.	Unpaved dirt/marl road.
NOTES All access points have been heavily impacted by extensive sand mining. If vehicles can pass over the pits created by sand mining activities, there is adequate space for the maneuvering of machinery although caution should be taken as the bay's vegetation line (primarily at the northern access point) is being restored with seagrape and buttonwood trees. There is adequate space for storage of sargassum, including within the pits created by illegal sand mining activities. Sargassum can be easily collected by contracted clean-up crews or community members although leaving it in place would be beneficial as it would support natural beach and dune-building.		

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes – potentially NB: Potential access for manual and mechanical clean-up efforts from points currently being illegally sand mined. Care should be taken to ensure that recently planted vegetation (and existing vegetation) is not disturbed.
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No NB: Landing dock for limited number of fishing boats; limited collection of conchs to the east of Forest Bay.
How close is the community to the Bay?	Very close (within 30m) NB: Residential community are located behind the beach and to the west of the of the bay.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Far (more than 1km)
Volume of sargassum during scoping assessment	Low (27 March 2022)
Volume of sargassum historically (2011-present)	High
Is the beach heavily used by locals?	No NB: Locals use Forest Bay for beach walking, experiential learning opportunities, swimming on occasion, and illegal sand mining. Beach clean-ups are organised on occasion to remove flotsam and jetsam that often washes onshore.
Is the beach heavily used for tourism?	No

EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	Yes NB: Community members organised larger beach clean-ups in the past including the use of heavy equipment. More recently, beach clean-ups are smaller-scale with individuals using rakes and buckets. Community groups occasionally conduct beach clean-ups to remove flotsam and jetsam that wash onto the shore.
Is there evidence of community efforts to use sargassum	Yes NB: Collected by a limited number of community members for use in their backyard gardens.
Presence of church and community groups that advocate for government assistance?	Yes NB: Assistance requested in 2015.

Overall Comments on Vulnerability and Resilience

Forest Bay is significantly and routinely impacted by sargassum events, with inundations being substantial throughout the year, but lasting for longer during the summer months. Sargassum influxes are managed at very small scale by Forest Bay community members. Though not a main nesting sea turtle beach, sea turtles are affected by the extreme depth of sargassum accumulation which may prevent nesting activity as well as hatchlings' ability to successfully crawl to the ocean following nest emergence. Forest Bay displays a **HIGH vulnerability** to influx events and **LOW resilience** as the community cannot sustain clean-up efforts despite significant impacts on quality of life due to the gas emissions of decomposing sargassum and inundations impacting use of the nearshore waters. Potential social and ecological/biodiversity impacts should be monitored.

Photo credits:

Above left – community sargassum clean-up effort (The Anguillian, November 2015);
Above right – hawksbill sea turtle hatchling encountering fresh sargassum on the beach as it makes its way to the sea (Farah Mukhida, March 2021);
Below left – extensive sargassum accumulation within the nearshore waters (The Anguillian, July 2021);
Below right – Forest Bay (Farah Mukhida, March 2022)

6.9 BLOWING POINT

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• One of three official ports of entry into Anguilla (Blowing Point Ferry Terminal). • One inn set back from the vegetation line, east of Blowing Point Ferry Terminal (Ferryboat Inn). • Dolphinarium (closed since Hurricane Irma in 2017) located just west of Blowing Point Ferry Terminal. • Residential house and villas located along the coastline west of Blowing Point Ferry Terminal. • Landing site for limited number of fishing boats.	• 800m bay lined by representative coastal vegetation (in between development). • Wetland system behind the eastern side of the beach. • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Feb 2013	No sargassum present on beach[1]	No action required
Oct 2013	Very low volume of sargassum present on beach[1]	No action taken
Dec 2013	No sargassum present on beach[1]	No action required
Jan 2015	No sargassum present on beach[1]	No action required

July 2015	Very low volume of sargassum present on beach[1]	No action required
Aug 2016	Very low volume of sargassum present on beach[1]	No action required
Jan 2017	Very low volume of sargassum present on beach[1]	No action required
May 2017	Very low volume of sargassum present on beach[1]	No action required
Jul 2017	Extremely high volume of sargassum present on beach and in nearshore waters[2, 3]	No action taken
Sep 2017	Moderate volume of sargassum present on beach[1]	No action taken
Mar 2018	No sargassum present on beach[1]	No action required
Jul 2018	Extremely high volume of sargassum present on beach and in nearshore waters[3]	Cleaned manually and mechanically by individuals from the community and heavy equipment providers, with sargassum disposed at Corito; work overseen by Sargassum Taskforce and funding provided by the Government of Anguilla
Feb 2019	Very low volume of sargassum present on beach[1]	No action taken
Apr 2019	No sargassum present on beach[1]	No action required
Mar 2020	Very low volume of sargassum present on beach[1]	No action required
Nov 2020	Low volume of sargassum present on beach[1]	No action taken
Apr 2021	No sargassum present on beach[1]	No action required
Sep 2021	Low volume of sargassum present on beach[1]	No action required
Oct 2021	Low volume of sargassum present on beach[1]	No action taken
Mar 2022	Low volume of sargassum present on beach[4]	No action taken

GENERAL RECORDED IMPACTS

- High volume of sargassum impacts Blowing Point with high levels of accumulation along entire stretch of beach and within the nearshore waters.
- Strong smells from decomposing sargassum blow downwind and towards residential areas.
- Limited use amongst locals, and primarily by community members, as well as guests staying at Ferryboat Inn, for swimming.
- Sargassum accumulating in the nearshore waters impacts swimming activities.
- Sargassum accumulating in the nearshore waters surrounds and impacts boats and engines as they attempt to the leave the bay.

NOTES

[1] From Google Earth historic images Reported by a local community member
[2] Reported by a local community member
[1] From media post
[3] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Eastern side of bay through Blowing Point Ferry Terminal parking area, between Blowing Point Bay and	Unpaved dirt/marl road.

	Blowing Point Pond. Sandy beach east of Blowing Point Ferry Terminal directly accessible.	
Vehicular	Eastern side of bay, by road that leads to dolphinarium.	Paved road.
NOTES Both access points allow adequate space for the maneuvering of machinery. There is adequate space for storage of sargassum. Sargassum should be allowed to dry to reduce the release of fumes produced while decomposing due the proximity of residential ferry terminal, houses, inn, and villas. Sargassum can be easily collected by publicly- or privately-contracted clean-up crews or community members although leaving it in place would be likely be beneficial as it would support natural beach accretion.		

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No
How close is the community to the Bay?	Very close NB: Residential community is located behind the beach, but particularly to the west of Blowing Point Ferry Terminal.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Far
Volume of sargassum during scoping assessment	None (27 March 2022)
Volume of sargassum historically (2011-present)	Extremely high
Is the beach heavily used by locals?	Yes NB: Locals use Blowing Point Bay for beach walking and swimming. Beach clean-ups are organised on occasion to remove flotsam and jetsam that often washes onshore.
Is the beach heavily used for tourism?	Yes NB: Site was heavily used when dolphinarium was in operation; dolphinarium has been closed since the passage of Hurricane Irma in 2017. Proprietors in discussion for re-starting the operations.
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	Yes – in collaboration with Sargassum Management Taskforce
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	Yes NB: Assistance requested in 2019.

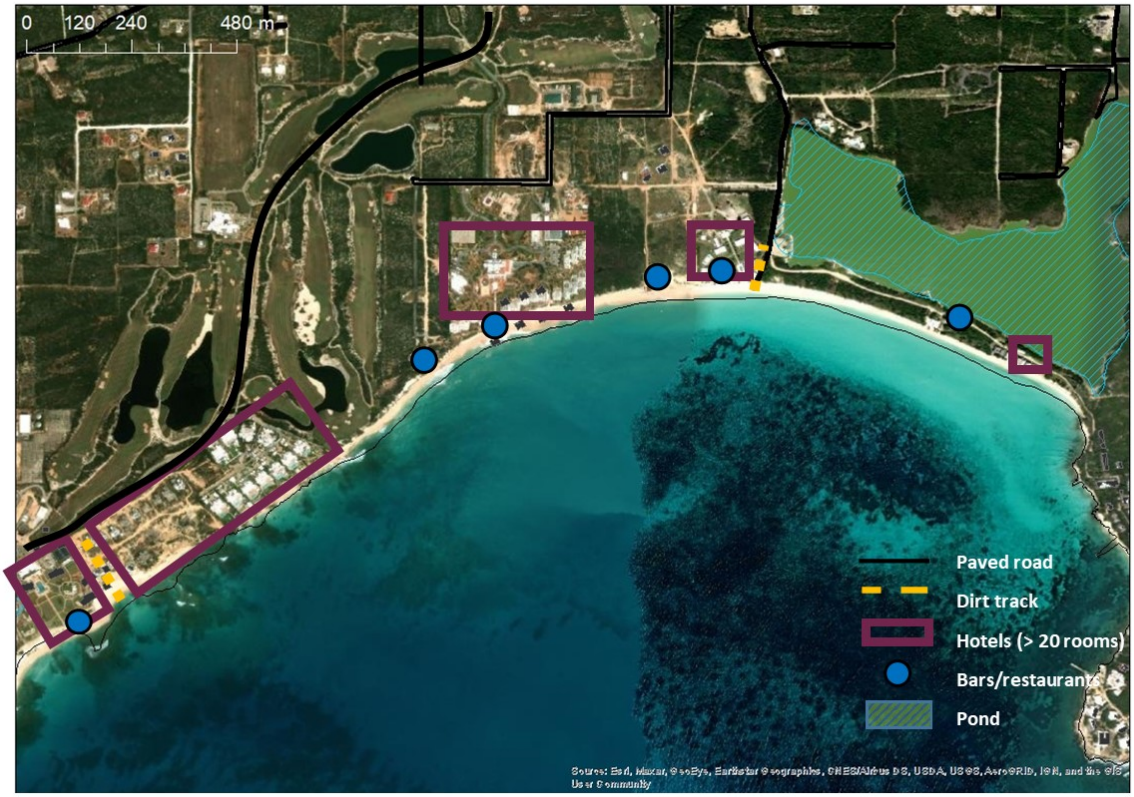
Overall Comments on Vulnerability and Resilience

Blowing Point Bay is significantly and routinely impacted by sargassum events, with inundations being substantial particularly during the summer months. Sargassum influxes have so far been managed by the Sargassum Management Taskforce which has overseen the use of heavy equipment to remove sargassum that has accumulated on the beach in 2018. Blowing Point Bay displays a **HIGH vulnerability** to influx events and **MODERATE resilience** as cost of clean-up efforts is necessary but substantial. Potential social impacts should be monitored.

Photo credits:

Above left – extensive sargassum accumulation within the nearshore waters (Simone Vogel, July 2017);
Above right – extensive sargassum accumulation within the nearshore waters (The Anguillian, July 2018);
Below left – extensive sargassum accumulation within nearshore waters around Blowing Point Ferry Terminal jetty (The Anguillian, July 2018);
Below right – Blowing Point (Farah Mukhida, April 2022)

6.10 RENDEZVOUS BAY



SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Three hotels located directly along the coastline, with no setback from the vegetation line (Aurora Resort & Golf Club, Anguilla Great House, Rendezvous Bay Hotel). • Four restaurants located directly along the coastline, with no setback from the vegetation line (The Dune, Sunshine Shack, Coconuts, The Place). • Beach extensively used by Anguilla residents for recreational activities including picnics and swimming.	• 2.2km bay lined by representative coastal vegetation (in between development). • Wetland system behind the eastern side of the beach (Rendezvous Bay Pond). • Rendezvous Bay Pond identified as Important Bird and Biodiversity Area. • Extensive seagrass bed to the eastern side of bay. • Some sea turtle nesting activity (green and hawksbill). • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Feb 2013	No sargassum present on beach[1]	No action required
Oct 2013	Low volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment

Dec 2013	No sargassum present on beach[1]	No action required
Jul 2015	Low volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Aug 2016	Low to moderate volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Jan 2017	Low to moderate volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
May 2017	Low volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Sep 2017	Moderate volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Mar 2018	No sargassum present on beach[1]	No action required
Feb 2018	Low-moderate volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Apl 2019	Low-moderate volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Mar 2019	Low volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Aug 2019	High volume on beach and floating in bay on beach[2]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Nov 2020	Low volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Apr 2021	Very low volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation,

		using combination of rakes and heavy equipment
Oct 2021	Moderate volume of sargassum present on beach[1]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment
Apr 2022	Very low volume of sargassum present on beach[3]	Clean-ups led by beach-side hotels and restaurants, with businesses cleaning in front of their own places of operation, using combination of rakes and heavy equipment

GENERAL RECORDED IMPACTS

- Relatively high volume of sargassum impacts Rendezvous Bay with high levels of accumulation along entire stretch of beach and within the nearshore waters.
- Sargassum accumulating in the nearshore waters impacts swimming activities.
- Consistent mechanical and manual cleaning using rakes particularly in front of hotels, villas, and restaurants, with sargassum buried into the sand or left to decompose naturally along the vegetation line or completely removed from the site.

NOTES

[1] From Google Earth historic images Reported by a local community member
[2] From media post
[3] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Middle of beach, just east of Anguilla Great House (main public access point).	Unpaved dirt/marl road.
Vehicular	Middle of beach, next to Sunshine Shack	Unpaved dirt/marl road.

NOTES

This public access points allows adequate space for the maneuvering of machinery. There is adequate space for storage of sargassum either within the vegetation just east of Anguilla Great House or between Anguilla Great House and Sunshine Shack. Sargassum should be allowed to dry to reduce the release of fumes produced while decomposing due the proximity of hotels and restaurants and high level of use by both locals and tourists. Sargassum can be easily collected by contracted clean-up crews or community members although leaving it in place would be beneficial as it would support natural beach accretion.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No
How close is the community to the Bay?	Close NB: Residential community is located behind the beach and Rendezvous Bay Pond.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far

Volume of sargassum during scoping assessment	None (10 April 2022)
Volume of sargassum historically (2011-present)	High
Is the beach heavily used by locals?	Yes NB: Locals use Rendezvous for beach walking, swimming, and picnicking; it is one of Anguilla's most popular beaches amongst locals.
Is the beach heavily used for tourism?	Yes NB: Three hotels line the beach along with four beach-side restaurants.
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	No
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	No

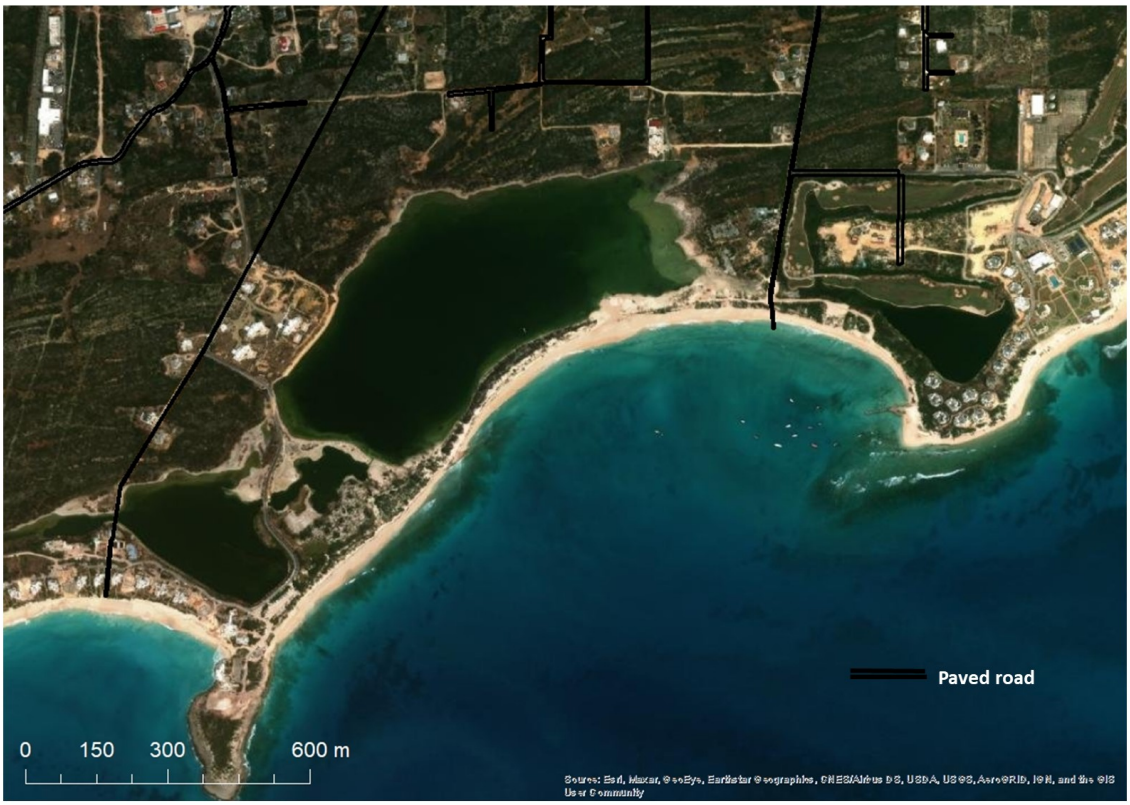
Overall Comments on Vulnerability and Resilience

Rendezvous is routinely impacted by sargassum events, with inundations being substantial particularly during the summer months. Sargassum influxes have so far been managed by the beachfront hotels and restaurant owners, using a combination of manual and heavy equipment. Though not a main nesting sea turtle beach, sea turtles are affected by sargassum accumulation which may prevent nesting activity as well as hatchlings' ability to successfully crawl to the ocean following nest emergence. Turtle nests are, however, at a greater risk of being crushed by heavy equipment usage to clean sargassum from the beach. Rendezvous Bay displays a **HIGH vulnerability** to influx events and **HIGH resilience** as clean-up efforts are necessary and are absorbed by hotel and restaurant operators operating on the beach. Potential social impacts should be monitored.

Photo credits:

Above left – sargassum accumulation on the beach (Charles Voudouris, August 2019);
Above right – sargassum accumulation on the beach (Department of Natural Resources, 2020);
Middle left – Rendezvous Bay (Louise Soanes, April 2022);
Middle right and below left and right– tracks left on the sand following the removal of sargassum by heavy equipment on Rendezvous Bay (Louise Soanes, April 2022)

6.11 COVE BAY



SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Private villas under construction (part of Aurora Anguilla Resort & Golf Club). • One abandoned restaurant located directly on coastline (Smokey's Restaurant). • Use amongst locals, and primarily by community members, as well as visitors, for beach walking and swimming. • Landing site for fishing boats from the western end of the island.	• 2km bay lined by representative coastal vegetation (in between development). • Sand dune system on western half of beach. • Wetland system behind the eastern side of the beach (Merrywing Pond) and western side of beach (Cove Pond). • Cove Pond identified as Important Bird and Biodiversity Area. • Significant coastal erosion, particularly along eastern half of beach where more than one-metre of sand has been lost (in profile). • Cove Bay, beach, sand dune, and wetland system identified as potential protected areas. • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Feb 2013	Low volume of sargassum on beach[1]	No action taken
Oct 2013	Moderate volume of sargassum on beach[1]	No action taken
Aug 2016	Low volume of sargassum present on beach[1]	No action taken

May 2017	Moderate volume of sargassum on beach[1]	No action taken
Sep 2017	Moderate volume of sargassum on beach[1]	No action taken
Mar 2018	No sargassum present on beach[1]	No action required
Feb 2019	Moderate volume of sargassum present on beach[1]	No action taken
Apr 2019	Moderate volume of sargassum present on beach[1]	No action taken
Jun 2018	Moderate volume of sargassum present on beach[2]	No action taken
Jul 2018	High volume of sargassum present on beach[2]	No action taken
Mar 2021	Low volume of sargassum present on beach[1]	No action taken
Apr 2021	Low volume of sargassum present on beach[1]	No action taken
Oct 2021	Moderate volume of sargassum present on beach[1]	No action taken
Mar 2022	No sargassum present on beach[3]	No action required
Apr 2022	Low-moderate volume of sargassum present on beach[3]	No action taken

GENERAL RECORDED IMPACTS

- Moderate-High volume of sargassum impacts Cove Bay along entire stretch of beach and within the nearshore waters, higher concentrations appear to aggregate more towards the western end of the beach.
- Sargassum accumulating in the nearshore waters impacts swimming activities.
- Sargassum accumulating in the nearshore waters surrounds and impacts boats and engines as they attempt to the leave the bay.

NOTES

[1] From Google Earth historic images Reported by a local community member
[2] From media post
[3] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Eastern side of bay through road leading to Cove Bay jetty. No access to beach from the eastern side of beach from the jetty due to coastal erosion. Access road to jetty beyond Smokey's Restaurant is private.	Unpaved dirt/marl and sandy road.
Vehicular	Middle of bay at end of main road. Direct access to both sides of the beach.	Paved road.
Footpath	Western side of bay, from side road off of the main road. Vehicular access to beach from this access point prevented from extensive illegal sand mining activities. Was previously the access road to Maundays Bay.	Unpaved sandy road.

NOTES

Access point from middle of beach is only viable access point that allows for adequate space for the maneuvering of machinery. There is adequate space for storage of sargassum, including in area where sand has been mined, behind beach/dune, just west of this access point. At the same time, care should

be taken as the bay's vegetation line is being restored with seagrape and buttonwood trees. Sargassum can be easily collected by contracted clean-up crews or community members although leaving it in place would be beneficial as it would support natural beach and dune-building.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No
How close is the community to the Bay?	Far (500m) NB: Residential community are located behind the beach and pond.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far (more than 1km)
Volume of sargassum during scoping assessment	Low-medium (10 April 2022)
Volume of sargassum historically (2011-present)	High
Is the beach heavily used by locals?	Yes NB: Locals use Cove Bay for beach walking and swimming. Blowing Point Bay for beach walking and swimming. Charter boats and fishing boats launched from Cove Bay jetty.
Is the beach heavily used for tourism?	No NB: Site occasionally visited by guests staying at Belmond Cap Juluca (Maundays Bay) and Aurora Anguilla Resort & Beach Club (Rendezvous Bay and Merrywing Bay).
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	No
Is there evidence of community efforts to use sargassum	Yes NB: Collected by a limited number of community members for use in their backyard gardens.
Presence of church and community groups that advocate for government assistance?	No

Overall Comments on Vulnerability and Resilience

Cove Bay is routinely impacted by sargassum events, with inundations being more significant particularly during the summer months. Sargassum influxes are not managed due to relatively limited usage by locals and visitors. Cove Bay displays a **HIGH vulnerability** to influx events and **HIGH resilience** as it recovers naturally from regular sargassum influxes; remaining sargassum is likely assisting with maintaining and enhancing dune stability. Potential ecological/biodiversity impacts should be monitored.




Photo credits:

Above left – sargassum accumulation on the beach (Anonymous, June 2018);
Above right – extensive sargassum accumulation along the length of the beach (Anonymous, July 2018);
Below left – beach free of sargassum but showing extensive erosion (Farah Mukhida, March 2022);
Below right – Sargassum accumulation towards the western end of the beach (Louise Soanes, April 2022)

6.12 MAUNDAYS BAY

SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• One hotel located on the coastline, without setbacks (Belmond Cap Juluca), includes three beach side restaurants/beach bars.	• 1km bay lined by limited coastal vegetation. • Wetland system behind the beach (Cove Pond). • Cove Pond identified as Important Bird and Biodiversity Area. • Significant coastal erosion, particularly along eastern half of beach where more than one-metre of sand has been lost (in profile). • Some sea turtle nesting activity (green and hawksbill). • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Oct 2013	Low-moderate volume of sargassum on beach[1]	Cleaned manually by Belmond Cap Juluca beach maintenance staff
Aug 2016	Low volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
May 2017	Very low volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff

Sep 2017	Moderate volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
Mar 2018	No sargassum present on beach[1]	No action required
Jul 2018	High volume of sargassum present on beach[2]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
Feb 2019	Low-moderate volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
Apr 2019	Low volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
Mar 2020	No sargassum on beach[1]	No action required
2020	High volume of sargassum present on beach[3]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
May 2021	Low volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
Aug 2021	Low volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
Oct 2021	Low volume of sargassum present on beach[1]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff
Apr 2022	Very low volume of sargassum present on beach[4]	Cleaned mechanically using a beach groomer by Belmond Cap Juluca maintenance staff

GENERAL RECORDED IMPACTS

- Generally medium volume of sargassum impacts Maundays Bay along entire stretch of beach and within the nearshore waters.
- Sargassum accumulating in the nearshore waters impacts swimming and snorkelling activities.
- Though not one of the main sea turtle nesting beaches, turtle nests are at times affected by sargassum inundation, with hatchlings struggling to escape.
- Use of heavy equipment to mechanically remove sargassum could damage sea turtle nests.

NOTES

[1] From Google Earth historic images Reported by a local community member
[2] From DNaR report
[3] From Department of Natural Resources site assessment
[4] From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Eastern side of bay by causeway road leading to Cove Bay jetty, leads to parking area for Belmond Cap Juluca staff and guests. Access to beach by footpath.	Paved road.
Vehicular	Western side of bay by road leading to back of house facilities, public access point, and Cap Shack beach Direct access to the beach.	Unpaved dirt/marl road.

NOTES

Access point to western side of beach is only viable access point that allows for adequate space for the maneuvering of machinery. There is adequate space for storage of sargassum. Sargassum can be

easily collected by contracted clean-up crews or community members although sargassum is being deposited in the area already and is supporting dune-building.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No
How close is the community to the Bay?	Far (some houses within 400m) NB: Residential community are located behind the beach and pond.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far (more than 1 km)
Volume of sargassum during scoping assessment	Low (10 April 2022)
Volume of sargassum historically (2011-present)	High
Is the beach heavily used by locals?	No NB: Locals rarely visit Maundays Bay to swim at the beach but do go to the restaurants/beach bars.
Is the beach heavily used for tourism?	Yes
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	Yes NB: Clean-up efforts organised, financed, and conducted by staff of Belmond Cap Juluca.
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	No

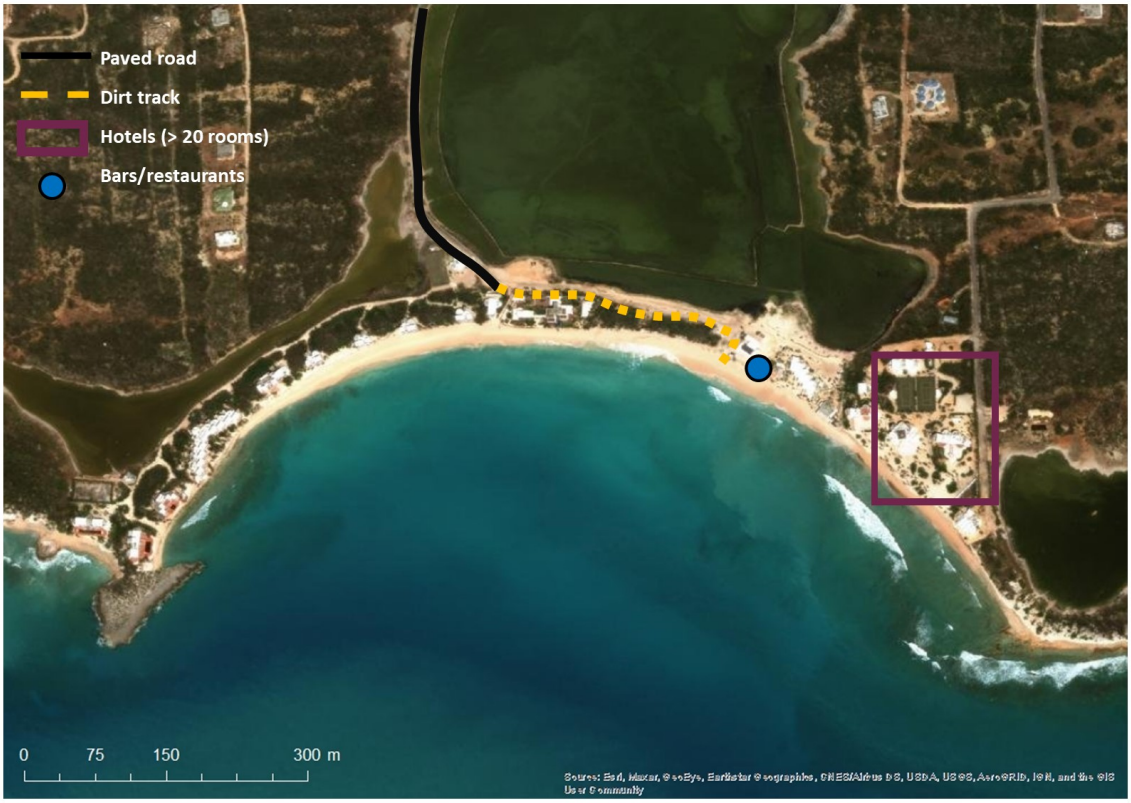
Overall Comments on Vulnerability and Resilience

Maundays Bay is significantly and routinely impacted by sargassum events, with inundations throughout the year. Sargassum influxes are managed by Belmond Cap Juluca. Though not a main nesting sea turtle beach, sea turtles are affected by sargassum accumulation which may prevent nesting activity as well as hatchlings' ability to successfully crawl to the ocean following nest emergence. Turtle nests are, however, at a greater risk of being crushed by heavy equipment usage to clean sargassum from the beach. Maundays Bay displays a **HIGH vulnerability** to influx events and **HIGH resilience** as Belmond Cap Juluca has demonstrated a strong commitment to and willingness to address sargassum inundations; sustained clean-up efforts, however, require significant investment of resources. Potential social and ecological/biodiversity impacts should be monitored.

Photo credits:

Left – extensive sargassum accumulation on the beach (Jeanene Wilson, July 2018);
Right – Maundays Bay (Louise Soanes, April 2022)

6.13 SHOAL BAY WEST



SELECT SOCIAL KEY FEATURES	SELECT ECOLOGICAL KEY FEATURES
• Privately-owned beach, which has the potential impact beach access but not Government of Anguilla intervention to assist with sargassum influxes • Landowners allow access to beach by locals and visitors. • One inn located on the coastline, without setbacks (Blue Waters Inn). • One hotel no longer in operation (Cove Castles). • One villa on the coastline, without setbacks. • One restaurant on the coastline, without setbacks (Trattoria Tramonto)	• 0.9km bay lined by limited coastal vegetation. • Wetland system behind the beach (West End Pond). • West End Pond identified as Important Bird and Biodiversity Area. • Some sea turtle nesting activity (green and hawksbill). • Foraging shore birds and seabirds present.

DATE	SUMMARY OF INNUNDATIONS	SUMMARY OF RESPONSES
Oct 2013	Low-moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes

June2014	Low volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Aug 2016	Low-moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
May 2017	Moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Sep 2017	Moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Mar 2018	No sargassum present on the beach[1]	No action required
Feb 2019	Low-moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Apr 2019	Low-moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Mar 2020	Moderate-high volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Apr 2021	Low volume of sargassum on the beach	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
May 2021	Moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Aug 2021	Moderate volume of sargassum present on the beach[1]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes
Apr 2022	Low volume of sargassum present on beach[2]	Cleaned manually using rakes Blue Water Beach Apartments landscaping/ maintenance staff using rakes

GENERAL RECORDED IMPACTS

- High volume of sargassum impacts Shoal Bay West along entire stretch of beach and within the nearshore waters.
- Sargassum accumulating in the nearshore waters impacts swimming and snorkelling activities.
- Though not one of the main sea turtle nesting beaches, turtle nests are at times affected by sargassum inundation, with hatchlings struggling to escape; when found, Anguilla National Trust assists by removing sargassum from their path to the sea.
-

NOTES

[1] From Google Earth historic images

[2]From site visit

BEACH ACCESS	LOCATION	TERRAIN
Vehicular	Middle of bay, across from infilled parking area opposite Cove Castles entrance. Director access to the beach.	Sandy road (off of paved main road).
Vehicular	Western side of bay by road leading to Blue Waters Inn, between Blue Waters Inn and Trattoria Tramonto Restaurant. Direct access to the beach.	Unpaved dirt/marl road.

NOTES
Access point to the either the middle or western side of the bay would allow for adequate space for the maneuvering of machinery. There is adequate space for the storage of sargassum. Sargassum can be easily collected by contracted clean-up crews or community members although leaving it in place would be beneficial as it would support natural beach and dune-building; this is especially important as Shoal Bay West is experiencing significant beach and dune erosion.

VULNERABILITY FACTORS	
Geophysical features	Presence of bay with circulation currents that may retain sargassum during summer months. Sargassum naturally removed during the winter/spring ground seas season.
Is there adequate access to the bay to facilitate clean-up efforts	Yes
Is the area important for fishing? (presence of fish market and other infrastructure e.g. jetty)?	No
How close is the community to the Bay?	Far NB: Residential community is located behind the beach and pond.
Proximity of bay to schools and other infrastructure (e.g. polyclinics)	Very far
Volume of sargassum during scoping assessment	Low (10 April 2022)
Volume of sargassum historically (2011-present)	Low-medium
Is the beach heavily used by locals?	No NB: Locals rarely visit Shoal Bay West to swim at the beach but do go to the restaurant.
Is the beach heavily used for tourism?	Yes
EVIDENCE OF RESILIENCE	
Is there evidence of community efforts to clean-up?	Yes NB: Clean-up efforts organised, financed, and conducted by staff of Blue Waters Inn.
Is there evidence of community efforts to use sargassum	No
Presence of church and community groups that advocate for government assistance?	No

Overall Comments on Vulnerability and Resilience

Shoal Bay West is significantly and routinely impacted by sargassum events, with inundations being substantial particularly during the summer months. Sargassum influxes are managed by Blue Waters Inn manually through use of rakes. Though not a main nesting sea turtle beach, sea turtles are affected by sargassum accumulation which may prevent nesting activity as well as hatchlings' ability to successfully crawl to the ocean following nest emergence. Shoal Bay West displays a **HIGH vulnerability** to influx events and **MODERATE resilience** as Blue Waters Inn has demonstrated a strong commitment to and willingness to address sargassum inundations but sustained clean-up efforts especially during substantial inundations is burdensome given the relatively small size of the Inn's operations. Potential social and ecological/biodiversity impacts should be monitored.

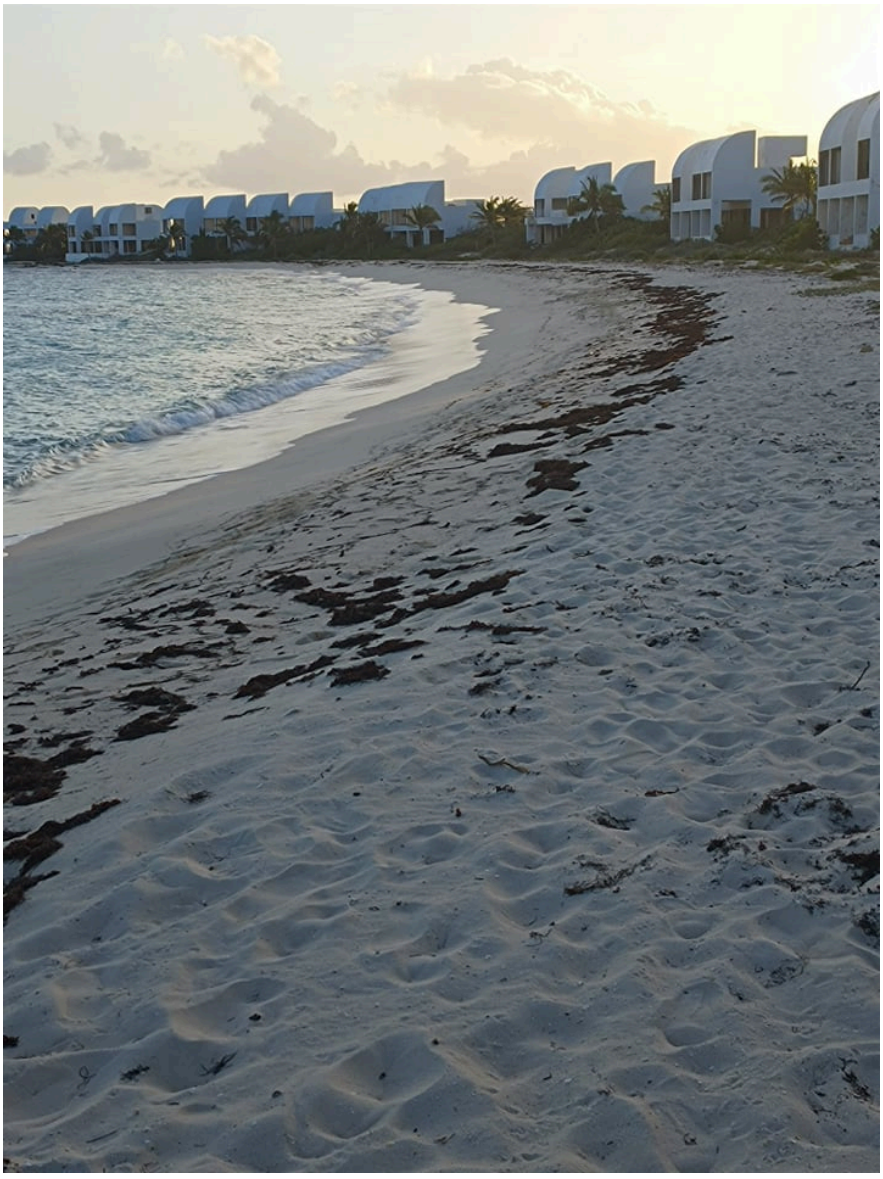


Photo credit: Shoal Bay West (Louise Soanes, April 2022)

7 REFERENCES

Part A of this Appendices was primarily informed by the Scoping Report on Sargassum Influxes in Anguilla. Please refer to this document for further information. Other sources consulted include:
Anguilla Statistics Department, 2015. *Anguilla Population and Housing Census 2011,* s.l.: s.n.

Anguilla Statistics Department, 2022. Agriculture: Series, s.l: s.n.

Connor, R., 2021. *Sargassum Management in Anguilla. Presentation at the Virtual Launch of the Sustainable Sargassum Management in Anguilla, British Virgin Islands and Montserrat Project, December 1, 2021*.

de Bettencourt, J. & Imminga-Berends, H., 2015. *Overseas Countries and Territories: Environmental Profiles,* s.l.: s.n.

Department of Fisheries and Marine Resources, 2015. *Anguilla Fisheries Development Plan 2015-2025,* s.l.: s.n.

Government of Anguilla, 2021. 2021 Estimates of Recurrent Revenue, Expenditure and Capital, s.l: s.n

Government of Anguilla, 2011. *Sustainable Tourism Master Plan, 2010-2020. Final Report for the Government of Anguilla,* s.l.: CHL Consulting Ltd..

Granderson, A., Ramkissoon, C., Jehu, A. & Phillips, T., 2018. *Report on the assessment of vulnerability to climate change in the Anguilla and Montserrat fisheries sector,* Port of Spain: CANARI.

Hodge, K., Connor, R. & de Berdt Romilly, G., 2011. *Transforming to a Climate-Resilient, Energy Efficient and Low Carbon Economy - Anguilla's Climate Change Policy (Draft),* s.l.: s.n.

The Anguillan, 2021. The Government/Public should preserve our pristine beaches. *The Anguillan*, 19 July.

United Nations Environment Programme-Caribbean Environment Programme, 2021. *Sargasssum White Paper – Turning the crisis into an opportunity,* Kingston, Jamaica: s.n.

University of South Florida, 2021. *Satellite-based Sargassum Watch System (SaWS).* [Online] Available at: https://optics.marine.usf.edu/projects/saws.html [Accessed 21 January 2021].

Van der Plank, S. et al., 2020. *Management of Sargassum influxes in the Caribbean: national and regional governance of transboundary marine species,* s.l.: s.n.

PART B:
CARIBBEAN GENERAL

8 LOCAL LEVEL SARGASSUM MANAGEMENT PLANS

Context

An adaptive management strategy, rather than a more site-specific management plan, is needed at the national level. This is due to the many uncertainties associated with sargassum and responses to it at the geographic, ecological, social and institutional scales of an entire island. However, at the local or site level, it is usually possible and desirable to specify management plans at much finer detail. People will usually seek and depend on this plan first for guidance.

Coherence

In order for a national strategy to be coherent, local management plans must be closely linked to each other and to the strategy for ease of rep and execution. Thus, plans contribute to the strategy by using a similar layout, but with detailed content relevant to specific locations. If most of the response and use is scaled to be nationally decided and implemented, then there may be limited or no need for local level plans. Avoid making local plans that are unnecessary.

Management unit

What is considered “local” will differ, even within the same country. The planning unit could be a single bay with its one community, or perhaps a stretch of well-connected villages that form a cluster. For sargassum, the main aim is for the local unit to be practical. It need not coincide with other units such as village or town boundaries, watersheds, parishes, enumeration districts or other national divisions. However, there are often benefits to using well accepted functional boundaries, and associated resources, to take advantage of harnessing what is already working.

Annotated outline

The following is an annotated outline of a generic local sargassum management plan. It has to be customised and evolves like, and with, the national strategy. Stakeholders and others may prefer to put the plan on paper or use in electronic form, rather than as a website. The plan should be updated annually, or more often if there have been changes that affect responses to the sargassum hazard or opportunities for its use. As with the national strategy, the content below is not intended to be prescriptive. Hence the annotations are general suggestions. Local formal (documented) and informal (people just know) knowledge will provide specific content. Matters such as literacy and language, formatting preferences (text, tables, charts, diagrams, maps), print size and font, colours, overall length, bound or loose leaf etc. may influence use.

INTRODUCTION

- Remind the reader how the plan is set out, will be kept updated, and how to use it
- Don’t repeat the adaptive approaches unless some are very site critical, e.g. DRM

PURPOSE AND PRINCIPLES

- Mainly to align the plan with the national strategy and any critical local initiatives
- Highlight any local social or ecological considerations critical to sargassum such as protected areas, highly valuable or vulnerable assets or sargassum opportunities

SCOPE

- Clearly identify the geographic or spatial scope of the plan, including demarcation of boundaries covering the terrestrial, coastal and marine areas addressed in the plan
- Boundaries can be 'fuzzy' if they are functional (e.g. "to just beyond the reef" or to "where farmland turns into forest in the hills") rather than specifying precise areas
- Identify the key sargassum-related features within the area in a broad profile, noting intersections with other bounded areas and the agencies that have jurisdiction within

AUTHORITY

- Identify authority linkages to the national strategy, describing what powers for decisions and action have been formally delegated so that there can be no misunderstanding of who the leader is, and with what authority to do what. This is key for conflict management.
- If there is legislation, a policy or another plan that impacts sargassum operations, then these should be listed with the operative extracts from them extracted for reference, e.g. laws or regulations for a specific protected area, economic activity area or beach.

INSTITUTIONAL ARRANGEMENTS

- A detailed, downscaled counterpart to the national strategy including making links to the strategy and its actors so there is a clear chain of accountability and responsibility
- Fit the leader(s) of the management plan, identified in the authority section, into the institutional arrangements of the strategy as such leaders cannot operate in isolation
- Chains of command for different aspects of local sargassum operations must be clear
- List local contact information along with expected roles and responsibilities (in a table)
- Similarly set out resources (e.g. labour, equipment, expertise) available at local level

MONETARY MATTERS

- Set out the local estimated budget elements, sources of funds and likely main expenses
- Include not only cash (e.g. funds transfer, subventions) but values of in-kind resources
- Estimate the limits of local support for both the hazard responses and sargassum uses
- Identify financing available locally for innovation, technical assistance, entrepreneurship

LOCAL MAP AND PROFILE

- Build on the site profile map and other content in the appendix of the national strategy
- Use the same content categories, but add as much site-level detail as practically useful
- Focus on the vulnerabilities and responsible responses, including for sargassum uses
- There should be no large contradictions between information in the strategy and plan
- Provide accurate plan information to update the national strategy as situations change
- Consider this section as requiring the most investment in accuracy to prioritise action

ACTIONS AND OPERATIONS

- Set out only the details of pre-impact, impact and post-impact specific to the local level
- Set out practical ecosystem measures for nearshore marine habitats, shoreline vegetation and wildlife
- To avoid being overwhelmingly extensive refer to guidance in the strategy or elsewhere
- Consider limitations in local capacity to manage and adapt, including building capacity

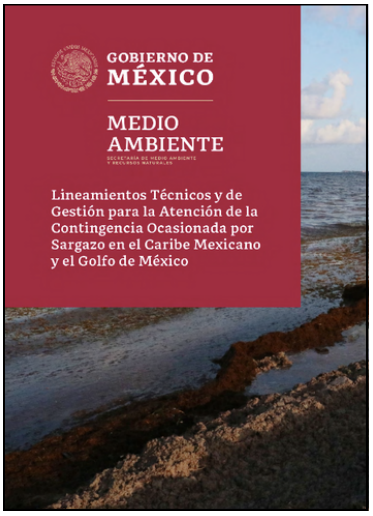
9 ACTIONS AND OPERATIONS

Several diverse types of knowledge products have been developed and made accessible throughout the years, mostly related to sargassum monitoring, management, coping and adaptive mechanisms for key sectors, removal and uses. Post 2021, the number of protocols and guidelines on sargassum-related actions and operations continues to grow slowly. Most territories in the Caribbean have sargassum management strategies in place, however, few have a publicly available policy institutionalised by national government. This section highlights some of the resources for responsible responses.

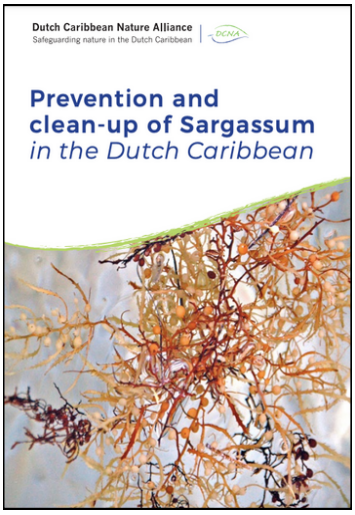
9.1 Resources For Responsible Responses

Guidance documents on **sargassum removal** have been produced at the national and regional levels. Click on the images below to peruse the documents!

Tags: good practices, onshore and in-water collection, containment barriers

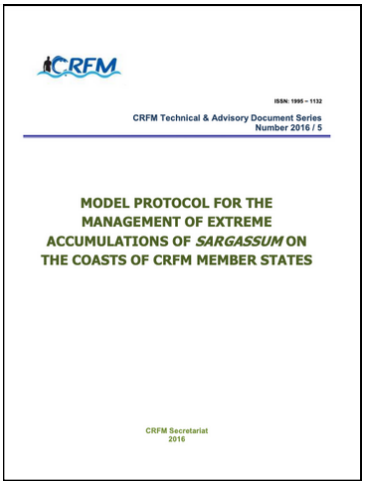


Tags: onshore and in-water collection, containment barriers, turtle nesting beaches, disposal, health and safety, monitoring, uses



Tags: good practices, onshore and in-water collection, containment barriers, disposal, health and safety

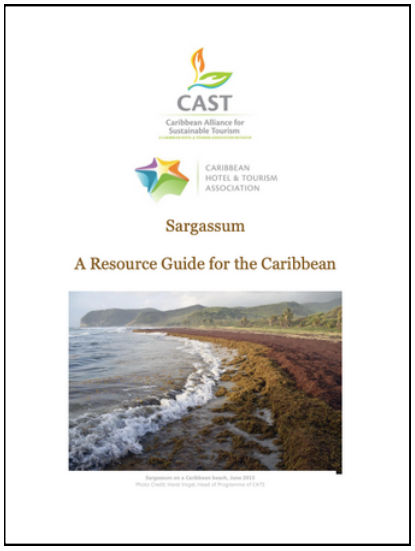
Tags: good practices, onshore and in-water collection, public awareness, uses



Tags: template, national-level management plans

Tags: good practices, public awareness, onshore and in-water collection, disposal

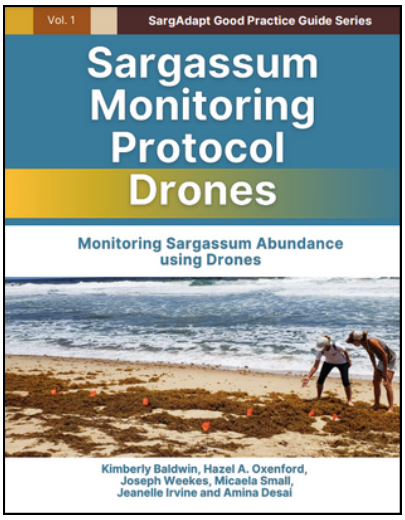
A few of the **sector specific** guidance resources are shown below. Click on the image to visit the website!

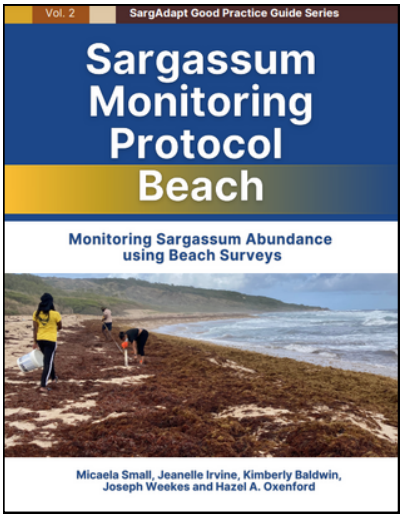


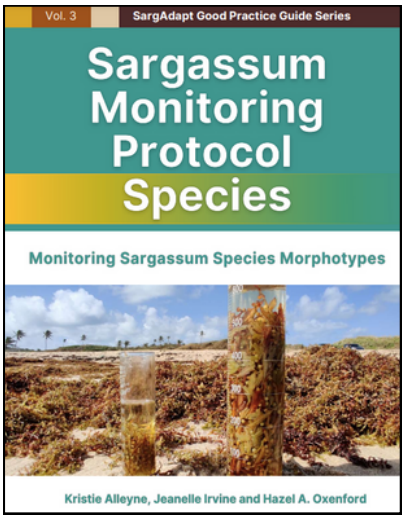
Tags: tourism, public awareness, impacts, good practices, onshore collection

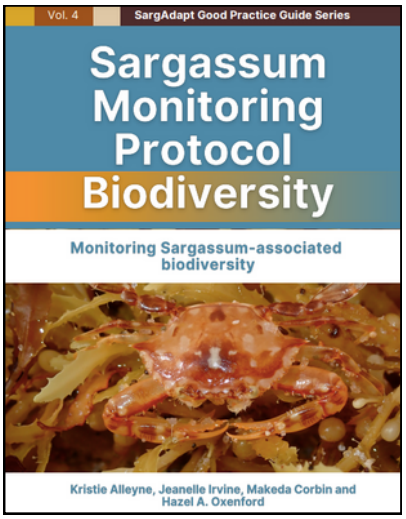
Tags: good practices, impacts, small-scale fishers, coping mechanisms

UWI-CERMES has developed a range of protocols on **sargassum monitoring**. Check out the [UWI-CERMES Good Practice Guide Series] for more information!



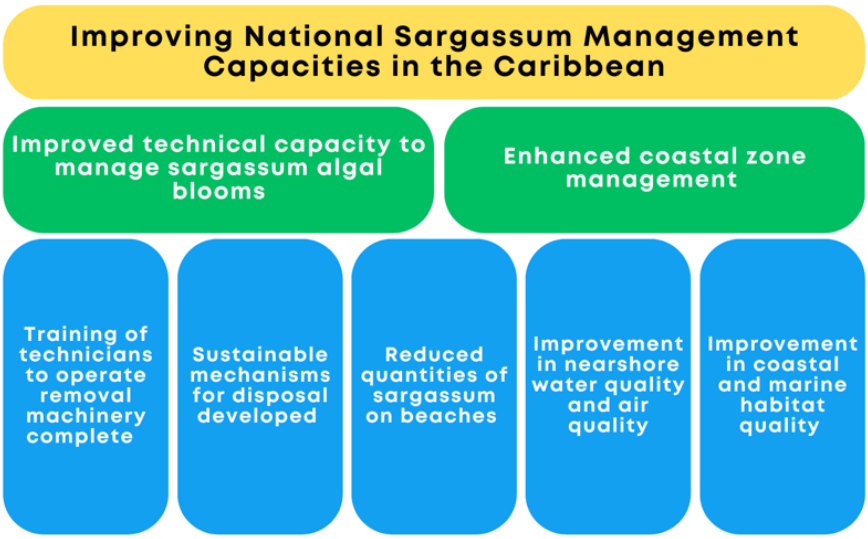






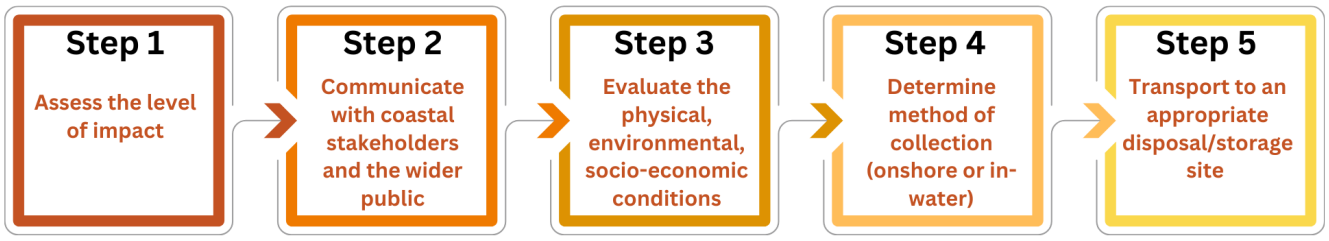
9.2 MANAGEMENT OF SARGASSUM INFLUXES

Over the years various collection techniques were tried and tested, with many lessons learned, as highlighted in the various guidance documents presented in the previous section. A systems approach is essential for improving national capacities for sargassum management. It is assumed that if mechanisms to support the effective and continuous collection of sargassum seaweed are implemented, and the technical capacity for sargassum removal is increased, then the resilience of coastal areas will be improved[4]. The figure below illustrates further.



Source: UNDP. 2022. Project Document- Improving National Sargassum Management Capacities in the Caribbean.

It is important to note that there is not a "one-size-fits-all-solution" and best practice will require site-specific solutions, but general guidance for removal of sargassum is as follows:



[4] United Nations Development Programme. 2022. Project Document- The Project for Improving National Sargassum Management Capacities in the Caribbean.

STEP 1: Assess the level of impact first to determine if conditions are:

Minor- just a small amount of sargassum. Sparse, less than 2 inches in depth. Faint seaweed odor.

Moderate – About 6 – 9 inches in depth. Strong odor, several insects.

Massive – more than 10 inches in depth. Pungent odour, significant impairment of movement of vessels and use of beachfront.

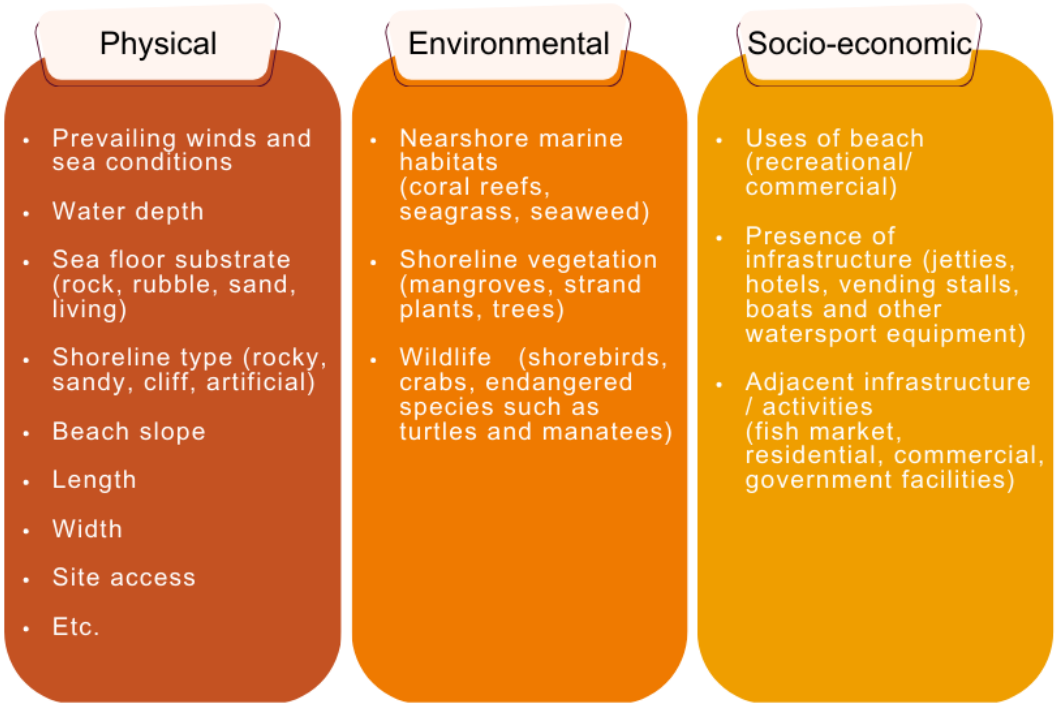
STEP 2: Communicate with coastal stakeholders and the wider public

Communication is key! Stakeholder collaboration and engagement is critical to ensure the continued success and support of clean-up initiatives.

- Stakeholders should be informed of interventions both at the local and national levels, to manage their expectations.
- They should know who the lead agency is for executing clean-ups and other partners that will be involved.
- Each stakeholder group will have distinct concerns, therefore a range of media targeted to the specific needs of the various groups is needed.
- Use effective methods of communication to ensure the intended messages are received.
- Encourage public participation in clean-up initiatives. It is acknowledged that each affected community will require equipment support, some training, assistance in removing and transporting aggregated material from the beaches.

STEP 3: Consider the physical, environmental, socio-economic conditions:

It may not always be necessary to collect or clear up after all sargassum beaching events. Physical, environmental, socio-economic conditions vary at any given site which should inform the appropriate response.



(Adapted from the CERMES SargAdapt Good Practice Guide Series: *Managing Sargassum Shoreline Inundations: A Toolbox*)

STEP 4: Determine method of collection (onshore or in-water)

Onshore collection

Removal can either be manual using rakes, wheelbarrows and buckets, or mechanized using machinery such as surf rakes, excavators and other heavy machinery. While manual removal is a preferred method, mass strandings will require the use of mechanical equipment, or a combination of both.

Belize (2018). Credit: Caribbean Press Releases

The Barber Surf Rake at Playa Paraiso, Tulum, Mexico (2018). Credit: Marc Bruxelle

Bath Beach, St. John, Barbados (2018). Credit: The Barbados Advocate

The table below provides further guidance and considerations on the removal methods.

	Manual onshore collection	Mechanised onshore collection (mechanised rake)	Mechanised onshore collection (excavator & other heavy machinery)
Suitable conditions	Volume is moderate to high (very high volumes require a combination of manual and mechanised methods) Beach with high ecological sensitivity	Volume is moderate to high Manual collection is not feasible (very high volumes require a combination of manual and mechanised methods) Beach with low ecological sensitivity	Great to extraordinary volumes where other onshore methods are initially impractical Sediment that can bear weight of heavy machinery Medium to high beach use Beach with low ecological sensitivity
Unsuitable conditions	Great to extraordinary amounts of beached sargassum	Great to extraordinary amounts of beached sargassum	Narrow beach, low to moderate amounts of seaweed, greater chance of erosion, indiscriminate use on beach with known ecological sensitivity
Considerations	While on the beach, workers will likely contend with natural elements and possibly toxic gases from decomposing seaweed which will affect productivity	Works best on beaches with low relief, and when sargassum volume is moderate. Sand collection is low so it is suitable for regular cleaups	Works best on beaches with low relief, and when sargassum volume is moderate Sand collection is low so it is suitable for regular cleaups
Operating costs	Low (rakes, wheelbarrows, buckets)	High (cost to rent and purchase, workers needed to operate machinery, transport and disposal)	High (cost to rent and purchase, workers needed to operate machinery, transport and disposal, wildlife monitor for biodiversity checks)

(Adapted from the CERMES SargAdapt Good Practice Guide Series: *Managing Sargassum Shoreline Inundations: A Toolbox*)

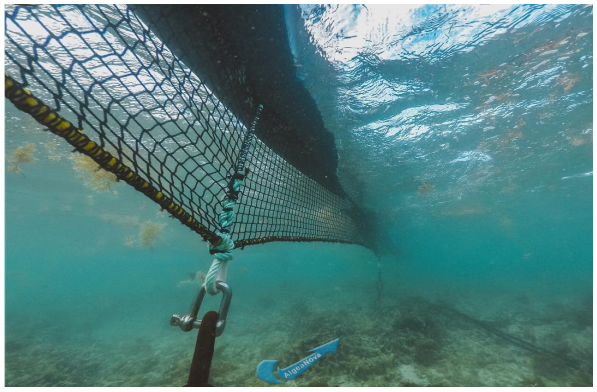
The Barber Company is a distributor of the surf rake, with three models, Optimized for different-sized beaches. The largest rake cleans sand up to nine acres an hour. The three cubic yard hopper can hydraulically lift up to 4,500 pounds of material to a clearance height of nine (9) feet and dump its contents. For more information visit The Barber Company webpage.

To see the surf rake in operation in Mexico click here.

In-water collection

In-water collection close to shore, where possible and permitted, is often preferable to beach collection as it avoids removal of sand and damage to coastal vegetation. It may also prevent sargassum from rotting in the water (Hinds et al. 2016). Offshore barriers and boat harvesters are the methods commonly used for in-water collection. A combination of the offshore barrier and harvest barge yield optimal results.

Offshore barriers work either through diversion away from sensitive areas or through storage and containment.



Source: Algeanova- Offshore barriers designed and deployed by Algeanova in the Dominican republic.

Boat harvesters are motorised vessels (often barges) which harvests sargassum mats offshore (close to the coast) on a tilted conveyor belt as the barge moves through the water (Chereau 2019).

Source: Algeanova- Custom built Algeanova boat harvester operating in Dominica Republic

Source: The Ocean Cleaner- Custom built boat harvester operating in Mexico, designed by The Ocean Cleaner

The table below provides further guidance and considerations for in-water collection.

		
Suitable conditions	Calm and relatively shallow waters, good accessibility at sea, medium to high beach use	Calm, semi-enclosed bays, ideally used in tandem with the barrier
Unsuitable conditions	Prevailing rough and deep water, strong current, very deep water column, pocket beach, known sea turtle beach nearby	Prevailing rough seas, strong current, known turtle nesting beach nearby, no adjacent onshore offloading mechanism or facility
Considerations	An appropriately sized anchoring system Bathymetry, sea floor substrate A clear plan of where the sargassum will be directed to or regular removal of the built-up sargassum along the barrier	Works best in tandem with barrier to aggregate the material and reduce the surface area to be cleaned
Operating costs	Variable Depending on tier of equipment, (handmade or improvised), more workers needed for collection during inundation events, maintenance and cleaning of barrier (by hand or mechanised equipment)	Likely high Maintenance, fuel costs, skilled operators and others required to operate collecting system

(Adapted from the CERMES SargAdapt Good Practice Guide Series: *Managing Sargassum Shoreline Inundations: A Toolbox*)

AlgaeNova is a distributor of both offshore barriers and boat harvesters. The offshore barriers (ProjiNova patent) have been successful in retaining sargassum at sea in the Dominican Republic and Mexico. The AlgaeNova boat harvesters can collect approx. 200 tons of fresh seaweed per day and sail in the open sea as well as shallow water.

For more information visit the AlgaeNova webpage.
To see videos of the AlgaeNova offshore barrier and boat harvester in operation click here.

The Ocean Cleaner is another distributer of offshore barriers and boat harvesters. The patented 'Sargaboat' works with the Sargabarrier to collect sargassum seaweed. One Sargaboat can harvest about 500m³ of sargassum in 8 hours and the autonomous Sargatrailer has a capacity of 8m³. For more information visit The Ocean Cleaner webpage.

To see The Ocean Cleaner offshore barrier and boat harvester in operation click here.

STEP 5: Transport to an appropriate disposal/storage site

Collected sargassum must be transported to an appropriate disposal or storage site. This is likely to require the selection of a suitable temporary or permanent on-site location and/or some kind of transport mechanism to move it directly from the collection site. Where possible, the costs of routine transportation of the sargassum to the dump sites should be incorporated into contracts created between the SSA and the Waste Removal Company. This may be the most cost-efficient way to manage routine transportation to the dump site.

Storage sites must:

- ☑ Allow sargassum to dry out to prevent anaerobic decomposition and production of toxic hydrogen sulphide and ammonia gases.

Disposal sites must:

- ☑ Ensure that sargassum leachates do not contaminate the environment including the freshwater supply since they are likely to contain various toxins, especially high levels or arsenic.

Note: In- country inundation removal responses and results vary

There is no "one size fits all" solution and sometimes equipment may not function as anticipated. For example, in Barbados the seaweed harvester and offshore barrier were deployed, however, due to prevailing ocean conditions including rough waters and strong currents, the desired results were not achieved.

Lessons learned

- Can be costly
- Highly repetitive
- Often ineffective
- Sometimes futile
- Needs a system

Factors to be considered

- Environment
- Technology
- Ecology
- Humans
- Funding

Seaweed harvester

Crane Hotel's offshore barrier

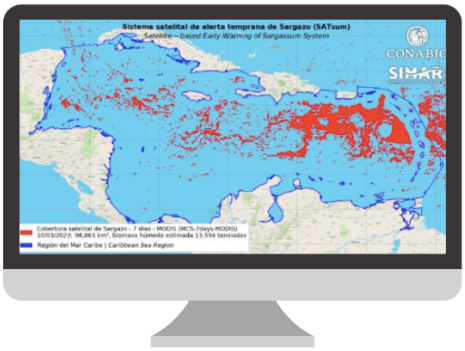
9.3 SARGASSUM FORECASTING AND MONITORING

Sargassum monitoring has been gaining much attention, especially at the regional and international levels. Below features a few platforms that monitor sargassum influx events and collect reports of sargassum strandings. Click on the images to visit the websites for more information!

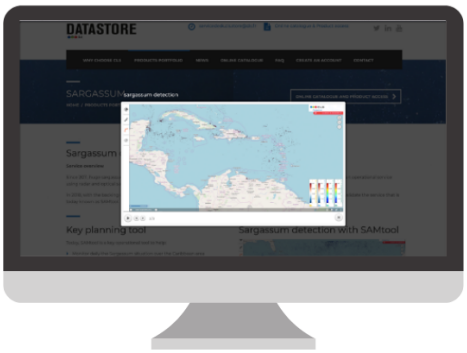
Sargassum Monitoring- Detection using on satellite imagery

NOAA Coastwatch Oceanviewer

Caribbean Coastal Ocean Observing System (CariCOOS)



Sargassum Satellite Early Warning System (SATsum)

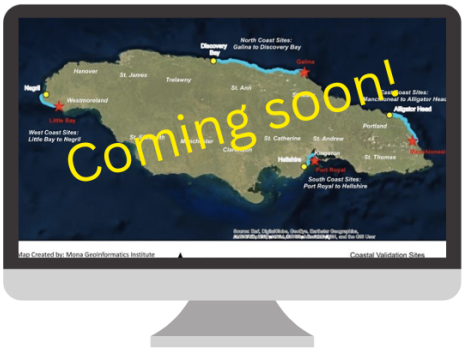


CLS Sargassum Detection and Monitoring Tool

Sargassum Watch System (SAWS)

Sargassum Monitoring

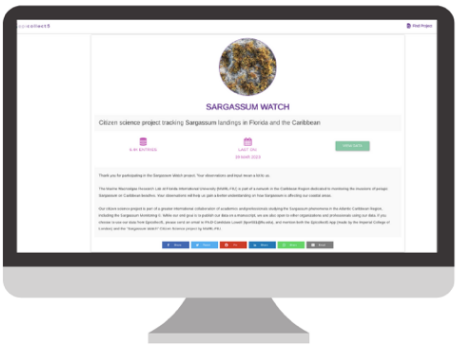
Sargassum Operational Detection Algorithms (SODA)



SARTRAC Sargassum Detection Algorithm

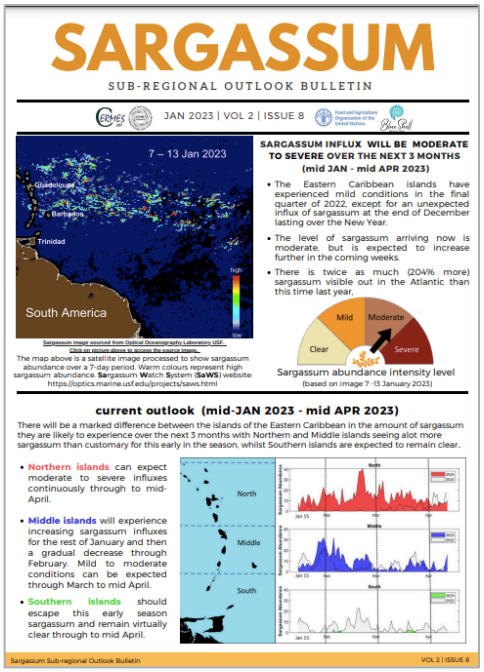
Sargassum Monitoring- Citizens Science

SargSNAP

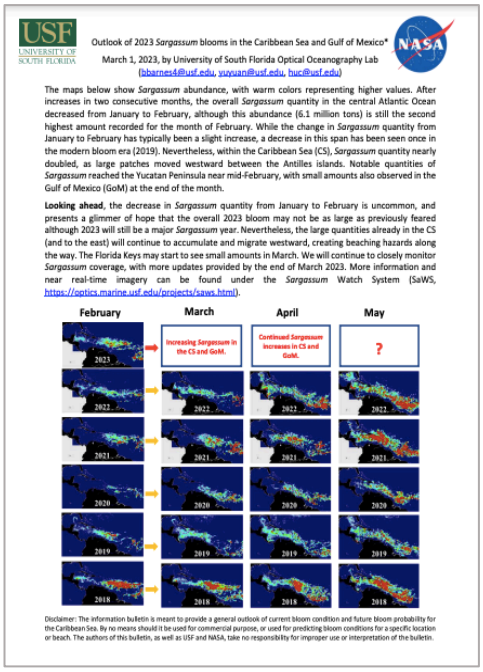


Epicollect Sargassum Watch

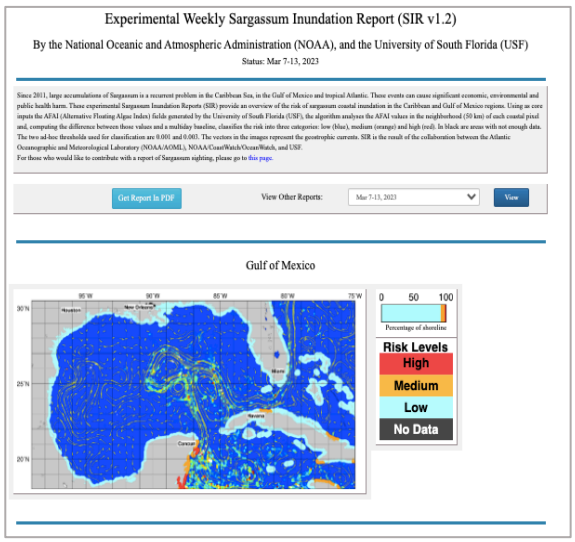
Sargassum Reporting- Bulletins and Reports



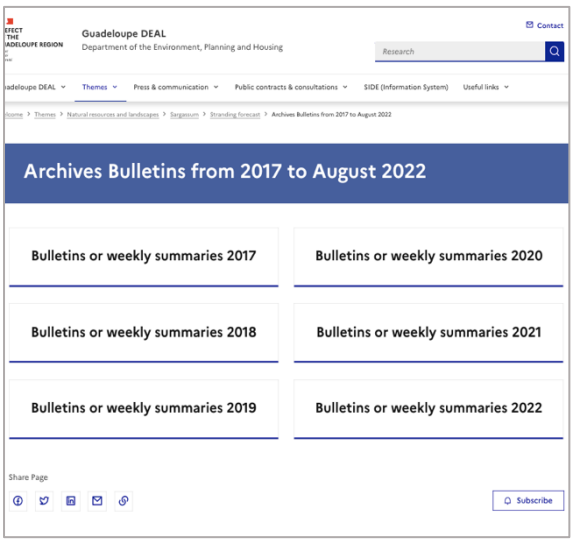
UWI-CERMES Sub-regional Sargassum Outlook Bulletin



USF Sargassum Outlook Bulletin

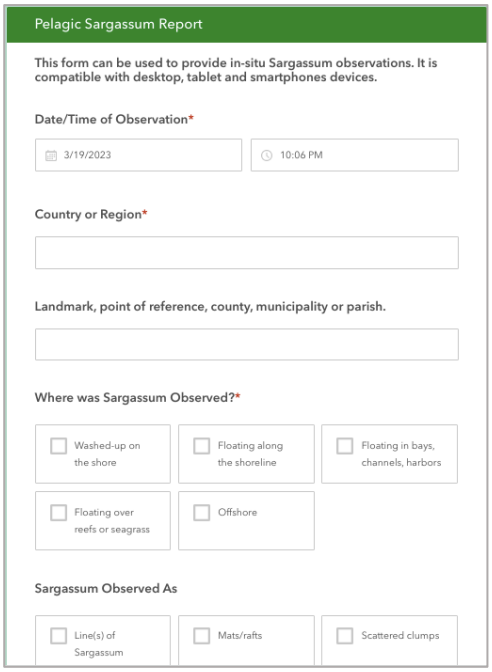


NOAA Experimental Weekly Sargassum Inundation Report

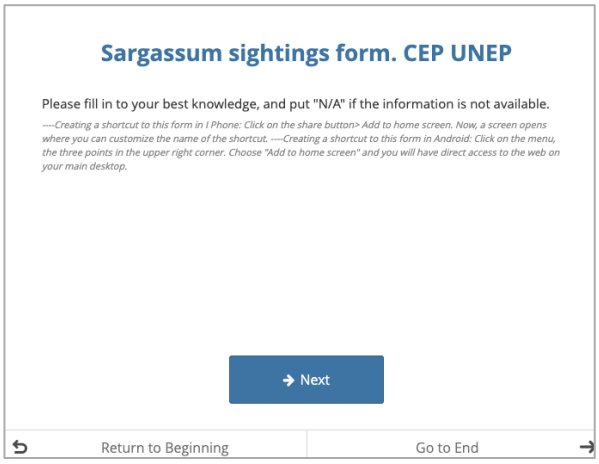


Sargassum Surveillance Bulletin for Guadeloupe

Sargassum Reporting- Citizens Science



Sargassum Pelagic Report



Sargassum Sightings Form

9.4 RECOMMENDED ACTIONS FOR KEY SECTORS

HEALTH

Impacts

1) Hydrogen sulphide (H_2S) can **affect the air quality** for individuals, especially those with asthma or other respiratory conditions.

Recommended Actions

1) **H_2S Detection Equipment** should be carefully positioned in communities, to prevent high exposure of H_2S taking into consideration wind levels, humidity and temperature. Emergency plans should be set in place if levels exceed acceptable standards.

2) **Installation of Wi-Fi video camera – CCTV** across beaches, bays and coastlines commonly affected by sargassum. Surveillance equipment should include night-time surveillance capabilities, operation without infrastructure support, long range and resistance motors for resistance to harsh weather.

3) **Prioritising removal of sargassum seaweed** in high-risk areas using data from surveillance and H_2S equipment. This will guide & increase the effectiveness in determining areas for frequent collection of the seaweed from the various beaches.

4) **More bioprocessing sites** should be identified for composing of seaweed. Locations should not be located close to human settlements and have adequate areas of unused land with soil properties useful in leaching heavy metals in the seaweed. Sites should also be rotated.

5) Beaches and bays should be classified as high and low risk areas of seaweed exposure. This can be done through **public notification and risk communication** using easy to read signs for beaches.

Capacity and Resource Needs

- Procurement of monitoring equipment including H_2S detectors a
- Wi-Fi video cameras.
- Dedicated funding to develop/support consistent monitoring.
- More technical personnel to carry out monitoring measures.
- Training of workers in the use & maintenance of H_2S
- equipment.
- Engagement with community representatives, fisherfolk and
- tourism operators.
- Development of a clear health early warning and reporting system.
- Procurement of drying or ensiling technology/equipment, materials needed for treatment of biomass.
- Dedicated funding to facilitate operation of the bioprocessing sites.
- Procurement and training of workers to operate in the bioprocessing facility.
- Structured public education and communication plan.

TOURISM

Impacts

1) The main impact on tourism is caused by **negative guest perception** and reaction to sargassum. In addition to the **visual impact** on beaches, there is also the **unpleasant smell** (caused by decaying organisms trapped in the seaweed) that is generated as it decomposes in the sun.

2) Large sargassum influxes can lead to a **lack of beach access** and a **decline in ocean and beach-based activities and business**. In severe cases, it can also lead to **vacation cancellations**, **closure of beachfront accommodations and businesses**, with a rollover effect on staff layoffs and reduced economic activity.

Recommended Actions

1) **Provide guests with as much educational material as possible.** Forecasting websites can help with predicting where and when the sargassum will be located. This is bolstered by the placement of signage along beaches and frequented coastal areas with quick fact sheets on sargassum and the country's commitment to removing the seaweed quickly & safely.

2) Where there are low to moderate influxes, beachgoers can be provided with buckets and fact sheets to go on **"sargassum scavenger hunts".** This strategy was employed in Galveston, Texas where it was popular with guests and positively changed perceptions of the sargassum.

3) **Develop a comprehensive beach cleaning programme** to be enacted at the national level during heavy influxes. This involves partnering with hotels, the tourism associations, other beach front businesses and local communities to have appropriate sargassum removal equipment and agreement on regular cleaning and maintenance schedules.

Capacity and Resource Needs

- Better engagement of tourism and hotel operators as well as other related enterprises in adaptation planning.
- Improved communication and data sharing from Sargassum Management Authorities to the tourism sector, e.g. increased use of The Sargassum Outlook Bulletin.
- Capacity building programme for hotel staff, lifeguards and tourism operators.
- Sargassum public education programme.
- Communication through both print and electronic mediums.
- Greater use of social media and/or the development of an easy platform for sharing information (e.g., through a mobile application).
- Procurement of appropriate clean-up equipment.

FISHERIES

Impacts

At landing sites fishers battle with impeded access, difficulty maneuvering vessels through bays and the unpleasant smell as sargassum decomposes. Challenges encountered at sea include engine overheating, loss of steerage, entangled fishing gear, poor visibility and skin irritation**.** In addition to disrupted fishing operations, fishers have reported that the behaviour of target species e.g. flyingfish in Barbados.

The impacts to the harvest sector also extend to those working in the post-harvest sector and beyond, e.g. fish vendors & processors, restauranteurs and general consumers.

Recommended Actions

1) **Removal of severe onshore and nearshore sargassum mats** mitigates against loss of access to boats for fisherfolk.

2) **Public education on the availability of new fish stocks** will lessen the impact of reduced fish sales. For example, almaco jacks are plentiful and viable for sale in the Barbados market and have begun to replace flying fish and the usual dolphinfish catches during acute sargassum events.

3) **Ensuring boat insurance policies cover damage** caused by sargassum entanglement gives boat owners some financial coverage during large sargassum events.

4) **Promote citizen science.**

Capacity and Resource Needs

- Budget for sargassum clean-up and management.
- Financial support for an Early Warning System (EWS) at the national level to mobilise resources and equipment before influx arrives.
- Improved communication and engagement between Fisheries Management Authorities and fishers to support monitoring and early warning.
- Greater use and sharing of free or inexpensive early detection, warning and forecasting data on influxes, e.g. increased use of The Sargassum Outlook Bulletin. Also, more guidance on risk mitigation.
- Marketing strategy to maximise the economic opportunities associated with increased catches of species such as the almaco jack.
- Better loss and damage data collection on fishing gear, loss of revenue/fishing days.
- Risk insurance for fisherfolk for sargassum.

Environment

Impacts

In addition to the strong odour from sargassum onshore, high quantities of sargassum impact **biodiversity** which can lead to:

- **Loss of some marine species** – some countries have seen a near depletion of some marine life such as its seasonal flying fish and dolphin
- **Key processes become affected** – large quantities of sargassum can hinder light from reaching marine plants
- **Eutrophication** – excessive quantities of nutrients such as nitrogen are brought to marine ecosystems resulting in large growth within these areas.
- **Entangled marine life**

Recommended Actions

1) The environmental impact of removing sargassum must always be considered. **Where it is possible, it is always best to leave the sargassum on the beaches**.

2) When removal is necessary, it must be done in a way that **preserves the coastline and the does the least damage to marine life.** Mechanical removal poses the highest risk in this regard, and so **removal should be done manually whenever possible.** Mechanical rakes and cranes that remove sand can disturb sand dwelling critters, nests, sea turtles and sea turtle nests. Consult sargassum removal guidance documents for appropriate responses.

3) **Avoid burying sargassum** on turtle nesting beaches. Transport sargassum away from these sites.

Capacity and Resource Needs

- A management framework for systematic monitoring of the turtle nesting beaches is needed.
- Greater public awareness of safe removal and disposal practices on turtle nesting beaches.

9.5 SARGASSUM PROJECTS IN THE WIDER CARIBBEAN

In order to keep abreast of sargassum initiatives, and develop an effective SAMS, there must be dedicated persons and agencies networking online to make contacts and obtain the most current and appropriate information. It is possible to do some of this networking through subscription mail, podcasts and webinars, but reaching out to key contacts in person will be necessary if resources are to be mobilised sufficient to keep the country in the forefront.

	Sargassum Caribbean Projects, Programmes and Initiatives	Brief Description	Organisation/agency	Start Year
1.	**Sargassum hub** Click here to visit website!	Website that integrates information from multiple sources. Items featured include monitoring systems, in-situ observations, bulletins issued and best practices for management & use.	Geoplanet, IOCaribe, Atlantos, Air Centre	2020
2.	**SargNet** Click here to visit website!	A listserv and online network of sargassum stakeholders hosted by Florida International University (FIU).	Florida International University (FIU)	2019
3.	**SPAW-RAC/UNEP-CEP Sargassum on-line forum** Click here to visit website!	Online forum that provides easy access to relevant documents on awareness, management and research about the Sargassum influx, as well as direct exchanges between stakeholders to share their experiences.	UNEP-CEP	2015
4.	**Caribbean Cooperation Programme against Sargassum (SARG'COOP)** Click here to visit website!	The Caribbean cooperation programme for the monitoring of sargassum seaweed' is bringing together regional partners to share knowledge and expertise and foster collaboration across language barriers.	Regional Council of Guadeloupe	2019

5.	**SargAdapt** (Adapting to a new reality: Managing responses to influxes of sargassum seaweed in the Eastern Caribbean as ecosystem hazards and opportunities) Click here to visit website!	The ultimate goal of SargAdapt is to reduce the impacts of and improve adaptation to sargassum influxes in the Eastern Caribbean with emphasis on converting a climate-linked ecosystem hazard into an asset that supports opportunities for socio-economic development.	UWI-CERMES, Caribbean Natural Resources Institute (CANARI)	2019 - 2022
6.	**SARTRAC** (Teleconnected SARgassum risks across the Atlantic: building capacity for TRansformational adaptation in the Caribbean and West Africa) Click here to visit website!	SARTRAC identifies new transformational developmental opportunities that build resilience equitably, for people affected by changing biomes/ecosystems in developing countries.	University of Southamptom, UWI-CERMES, University of Ghana, University of York	2019 - 2022
7.	Climate Change Adaptation in the Eastern Caribbean Fisheries Sector **(CC4FISH)** Sargassum Subproject Click here to visit website!	This sub-project aims to increase resilience and reduce vulnerability to climate change impacts including sargassum influx events in the Eastern Caribbean fisheries sector.	FAO, UWI-CERMES, USM	2017-2021
8.	**SASAMS** (SAtellite SArgassum Monitoring System) Click here to visit website!	This project aims to develop a near real-time service for monitoring pelagic sargassum seaweed beaching, initially aimed at Mexico's Caribbean Coast	University of Nottingham, Specto Natura Ltd, Triple Line Consulting Ltd. CONABIO, UNAM, CentroGeo, Planet Inc.	2020
9.	**Sargassum Products for Climate Resilience in the Caribbean** Click here to visit website!	The overall aim of the project is to mitigate the environmental and economic impacts of Sargassum seaweed influxes in affected Caribbean countries through the creation of inclusive value chains for Sargassum seaweed.	CRFM, Plant and Food Research, A New Zealand Crown Research Institute	2020 - 2023
10.	**Activated Carbon: A successful multi-lateral and multi-national research project**	This research project is investigating different activation methods and different pyrolysis temperatures (600 – 900 °C) to obtain activated carbon using sargassum.	Université des Antilles (Guadeloupe) (COVACHIMM2E laboratory), Instituto Tecnológico de Santo Domingo (INTEC)	2019

			(Dominican Republic), Institut National de la Recherche Agronomique (INRA) (Guadeloupe & Nancy, France), Queen Mary University (UK), Instituto Superior de Tecnologías y Ciencias Aplicadas (InSTEC) (Cuba), Centre Inter-universitaire de Recherche et d'Ingénierie des Matériaux (CIRIMAT) (Toulouse, France), Université d'État d'Haïti (Haiti), Université Quisqueya, NBC (French Guiana), TECMALAB (Dominican Republic), NUM SMO Technologies (NST) and Phytobokaz (Guadeloupe)	
11.	**CESAR** (Coastal environment under sargassum crisis) Click here to visit website!	This project seeks to develop tools and methods to manage sargassum influxes in the Caribbean, particularly in the French West Indies.	Coordinator and collaborators can be found here	2019
12.	**CORSAiR** (Atmospheric and marine corrosions) Click here to visit website!	The main aim of this project to investigate the corrosion rate of exposure sites and modelling the phenomenon of corrosion and its natural inhibitory solution. It also seeks to characterize of biofilms and compile legal tools	Coordinator and collaborators can be found here	2019
13.	**FORESEA** (Forecasting of sargassum stranding in the Tropical Atlantic) Click here to visit website!	The purpose of the FORESEA research proposal is to advance the current understanding of Sargassum bloom and drift in the open and coastal ocean and help transfer this understanding into a seasonal forecast of the quantity	Coordinator and collaborators can be found here	2019

		of Sargassum and probability of stranding at the coast.		
14.	**PYROSAR** (Valorisation of sargassum by pyrolosis-application for food safety) Click here to visit website!	This project aims to optimize the production of biochar and activated carbon from sargassum at laboratory and industrial scale using the solar microwave process of NST	Coordinator and collaborators can be found here	2019
15.	**Sarg As Cld** (Environmental impacts of sargassum leachate due to arsenic and chlordecone: quantification) Click here to visit website!	The initiative seeks to improve knowledge on sargassum contamination by arsenic (marine origin) and chlordecone (terrestrial origin).	Coordinator and collaborators can be found here	2019
16.	**SARGACARE** (Human health effects of chronic exposure to gaseous fumes from decomposing brown algae in the French West Indies) Click here to visit website!	Goal: Conduct a detailed study of the clinical, biological, functional and socio-anthropological consequences of gaseous emissions produced by decomposing sargassum in the Caribbean.	Coordinator and collaborators can be found here	2019
17.	**SARGASSUM ORIGINS** (Identity and origins of pelagic sargassum) Click here to visit website!	This project aims to identify sargassum species growing in the North Atlantic (co-occurrence) by studying the connectivity of sargassum at the Atlantic scale.	Coordinator and collaborators can be found here	2019
18.	**SARGOOD** (Holistic approach to sargassum valorisation) Click here to visit website!	The project will conduct an assessment of the sargassum life cycle and develop innovative materials and technologies	Coordinator and collaborators can be found here	2019
19.	**SARGSCREEN** (Pharmaco-toxicological screening of molecules extracted from Caribbean sargassum: highlighting their impact on certain pathologies widespread in the Caribbean) Click here to visit website!	The project aims to detect pharmacological potential of sargassum extracts against pathologies spread over the Caribbean	Coordinator and collaborators can be found here	2019

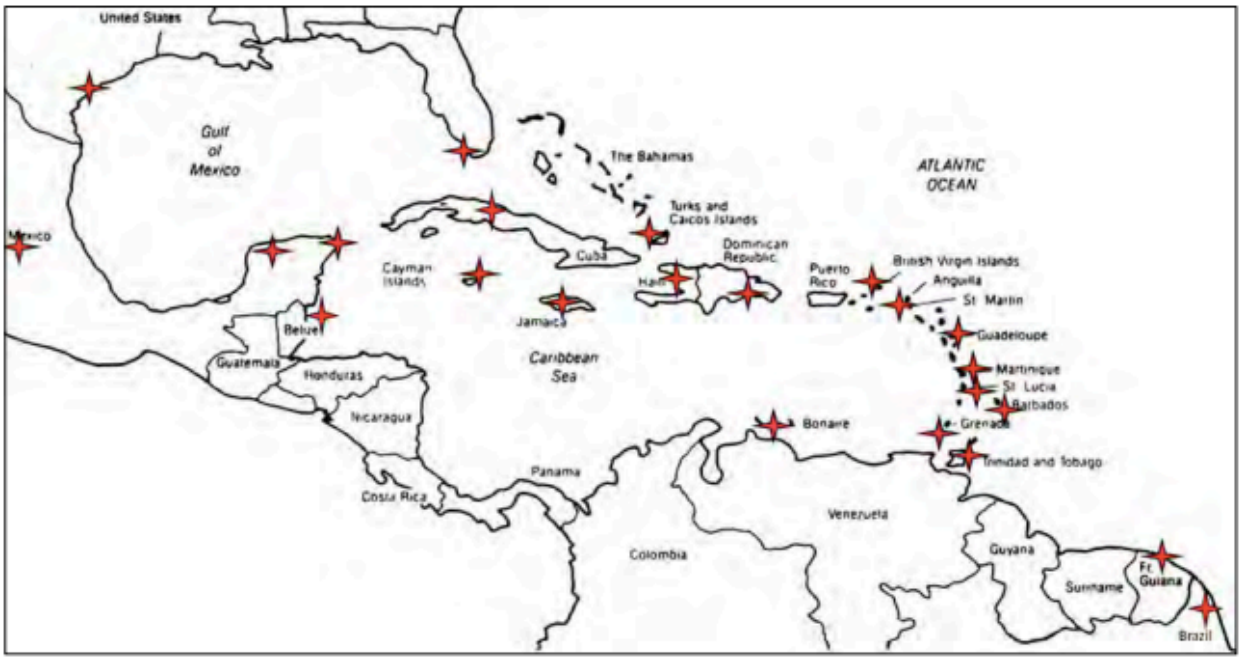
20.	**SARtrib** (Tribological and electrochemical valorisation of sargassum) Click here to visit website!	Aim: Valorisation of vacuum pyrolysis by-products of sargassum: electrodes for lithium batteries and new generation of lubricant	Coordinator and collaborators can be found here	2019
21.	**SAVE** (Sargassum agricultural valorisation and energy production) Click here to visit website!	This project seeks to identify non-destructive sargassum harvest methods and develop a social and environmental approach to integrating the treatment of sargassum and local bio wastes.	Coordinator and collaborators can be found here	2019
22.	**SAVE-C** (Study of holopelagic sargassum responsible of massive beachings: valorisation and ecology on Caribbean Coasts) Click here to visit website!	This project aims to better understand the diversity and the functioning of pelagic sargassum, from the drifting rafts until their beaching	Coordinator and collaborators can be found here	2019
23.	**Developing a sustainable sargassum value chain**	Research project seeking to identify sustainable business opportunities utilizing sargassum seaweed that could lead to the development of a sustainable sargassum value chain, easy to replicate and scaled- up in other areas or countries	Polytechnic University in Quintana Roo (UPQRoo)	2019
24	**SOS** (Sargassum Ocean Sequestration) of Carbon Click here to visit website!	This project supports the production of a specialized machine used as an alternative way to manage pelagic sargassum strandings. The machine pumps sargassum to a critical depth where it becomes negatively buoyant. Also exploring carbon credit or carbon trading opportunities.	Massachusetts Institute of Technology (MIT)	2019
25	**EnergYAlgae** Click here to visit website!	Multi-sectoral and multi-national initiative developing sustainable sargassum uses with a focus on bioenergy.	AlgaeNova, Grupo Puntacana, University APEC (UNAPEC), Y.A. MAOF Holdings & Management Ltd.	2019
26.	**Closing the Circle Programme**	Exploring challenges and advancing potential solutions to marine debris, Sargassum threats	World Maritime University	2020

	Click here to visit website!	and marine spatial planning in Small Island Developing States with a particular focus on the Eastern Caribbean region.		
27.	**Sargassum Podcast** Click here to visit website!	A podcast hosted by marine educators and scientists with a range of expertise in Sargassum and Coastal Communities. The podcasts interviews a variety of stakeholders about how they experience Sargassum, a floating algae that has caused severe problems when beaching in the wider Caribbean and West Africa.	Marine conservation without borders	2021
28.	**Sustainable Sargassum Management in Anguilla, British Virgin Islands, and Montserrat** Click here to visit website!	The project aims to enhance the knowledge, institutional frameworks, experience and commitment of coastal and marine resource managers and users in Anguilla, BVI and Montserrat to manage the ecological and socio-economic risks from sargassum influxes.	CANARI, UWI-CERMES and OECS Commission	2021-2024
29.	The Project for Improving **National Sargassum Management Capacities in The Caribbean** Click here to visit website!	This project aims to support the enhancement of the national capacity for the management of sargassum inundations by providing five small island developing states in the Eastern Caribbean with equipment, expertise, and technical knowledge to collect, remove, transport, and dispose of sargassum accumulated on shore and/or in the nearshore.	Government of Japan and UNDP	2022-2025
30.	**Sargasse Project** Click here to visit website!	This project involves converting sargassum into a useful, ecological biomaterial, which will become an ecological packaging product of the future.	Coordinator and collaborators can be found here	

31.	Building capacity to monitor and manage sargassum seaweed inundations in Western Africa **(SARCAP)** Click here to visit website!	This project aims to build capacity within West African schools, local communities, research institutes and environmental management organisations to monitor, manage and use sargassum.	Tecnológico de Monterrey, the University of Ghana, the University of Southampton and the University of York	
32.	Monitoring a large Sargassum bloom subject to a major volcanic eruption **(MONISARG)** Click here to visit website!	This project aims at understanding variations in Sargassum inundation within the Caribbean region following the eruption of the La Soufrière volcano in St. Vincent.	The Mona Geoinformatics Institute (MGI), the University of Southampton (UoS) and CERMES	
33.	**Half Moon Bay (HMB) Sargassum Project** Click here to visit website!	This project aims to mitigate the environmental damage caused by sargassum influxes through the construction and deployment of an offshore barrier outside the reef of Half Moon Bay, Mexico.	Mexican Secretariat of the Environment & Natural Resources (The Yucatan Environmental Fund (YEF) and Ecoproteccion Akumal (EPA)	2021

10 SARGASSUM USES

There continues to be a rapidly growing interest across the Caribbean region in utilizing sargassum as a primary resource for developing value-added compounds for varied industries, to help to mitigate damage caused by repeated strandings. Below is a map showing the sargassum entrepreneurs and researchers across the Wider Caribbean (last update was 2020).



(Extracted from The Sargassum Uses Guide (2020))

There have been reports of persons in Anguilla using sargassum as fertilizer, especially for coconut trees as it does not require any additional washing to remove excess salt. Other potential uses or applications of sargassum have not been explored by individuals, companies, or the Government of Anguilla.

10.1 KEY RESOURCES

The Sargassum Uses Guide remains the most comprehensive and authoritative resource on potential applications of sargassum biomass. Potential uses were identified across 14 different sectors, including agriculture, biofuels, cosmetics, bioplastics, construction, pharmaceutical, among others. Below shows Sargassum Biomass Index, illustrating the relative product yields that could potentially be produced from one metric tonne (1000 kg) of fresh sargassum. Click here to access the full document.

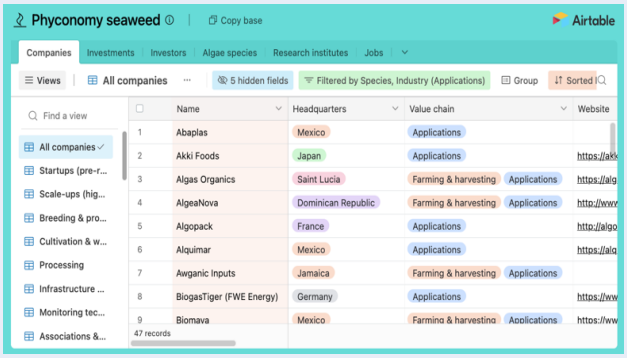
Other highlights of the document include:

In addition to the Sargassum Uses Guide, below are some useful open access (free) seaweed databases and a podcast on sargassum uses ranging from micro, small and medium sized enterprises (MSMEs) to larger scale ventures.

The Phyconomy Seaweed Database

This database contains extensive information about over 1000 organisations in the global seaweed industry. Of these, 50 focus particularly on sargassum in the Wider Caribbean region and beyond (at the time of writing). The database also tracks investments in the seaweed economy, as well as information on algae species, harvesting volumes and more.

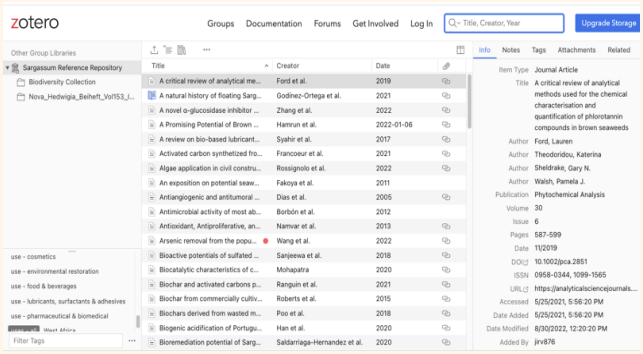
Click here to visit the database!



The UWI-CERMES Sargassum Reference Repository

This is a living and growing collection of scientific works related to the biology, impacts and uses of sargassum within the Wider Caribbean Region and beyond. The references are organised and searchable based on a predetermined set of tags, including uses. At the time of writing, 92 entries were compiled under the uses tag.

Click here to visit the database!



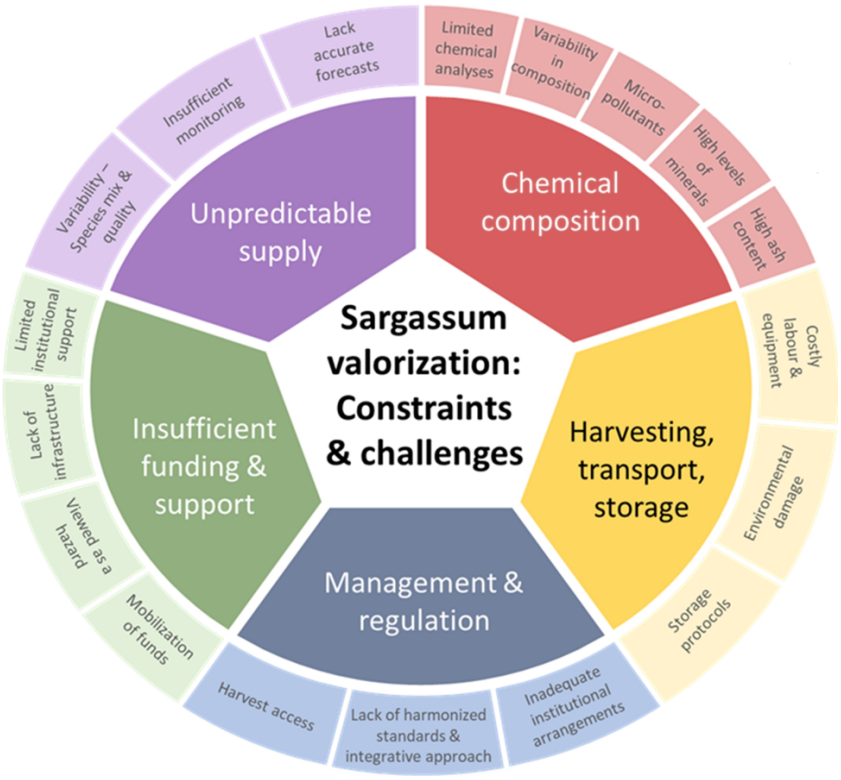
The Sargassum Podcast

The podcast is hosted by marine educators and scientists with vast expertise in sargassum and coastal communities. The sargassum podcast hosts interviews with a wide range of stakeholders including scientists and innovators with information exchange on where the science is headed based on new emerging information, including uses.

Click here to visit the website!

10.2 CHALLENGES AND CONSIDERATIONS

Although strides have been made in exploring ways to valorize this feedstock, converting sargassum biomass into value-added does not come without its constraints and challenges. Oxenford et al. (2021) conducted a comprehensive investigation of the challenges and constraints to starting up, expanding, and scaling-up existing sargassum-related ventures, as summarized in the following image. Click here to access the publication.



Source: Oxenford et. al (2021)

Due to the widespread use of sargassum in agriculture, the chemical composition of sargassum, in particular the concentration of heavy metals, has drawn more and more attention over time. Emerging studies cautioned its use in animal feed and fertilizer for consumables due to **elevated levels of arsenic and cadmium**, which can be toxic to humans and animals. Notably, some companies e.g. Algas Organics have reportedly found successful methods of extracting heavy metals during their production process.

Notwithstanding, more research is needed to understand impacts of these higher levels of heavy metals and the long -term effects when ingested. The door is open for sargassum to be used as building material, biofuel or perhaps fertilizer for decorative plants or construction material, such as bamboo.

Click in the links below to view some of the studies on heavy metal concentration in sargassum:

- Element concentrations in pelagic Sargassum along the Mexican Caribbean coast in 2018-2019
- Sargassum Fertilizer Transfers Heavy Metals to Vegetables
- Opportunities for Valorisation of Pelagic Sargassum in the Dutch Caribbean