Sargassum in the Atlantic Records and Forecasts (Specifically impacting Puerto Rico)

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Sargassum Stats for Puerto Rico – Now and Future

Puerto Rico Sargassum — Current Season & Next-Season Outlook

Compiled 2025-09-01 • Sources: NOAA/AOML Sargassum Inundation Risk (SIR), USF Optical Oceanography (SaWS)

Quick takeaways for Puerto Rico (PR):

- 2025 season saw near-record Sargassum in the Caribbean basin; PR experienced sustained beaching windows through mid-summer.
- Short-term coastal risk is best tracked on the weekly SIR maps; use these to schedule cleanup and inform hotel/marina operations.
- Next-season load signals are tracked in USF's monthly SaWS bulletin (watch the regional bars for E/W Atlantic → Caribbean transport).

Latest weekly coastal risk maps (NOAA/AOML SIR):

Zoomable weekly risk maps for the Caribbean & Gulf regions, including Puerto Rico. Open the page and select the latest week to view PR overlays and sub-panels.

Open: **https://cwcgom.aoml.noaa.gov/SIR/**

USF SaWS monthly bulletin & regional abundance chart:

Monthly bulletin with Atlantic-basin distribution map and region-by-region biomass bars (East/West Atlantic, Caribbean, Gulf). Use the newest bulletin for the current chart.

Bulletin index: **https://optics.marine.usf.edu/projects/saws.html**

July 31, 2025 bulletin (example with chart):
https://optics.marine.usf.edu/projects/SaWS/pdf/Sargassum_outlook_2025_bulletin07_USF.pdf

Puerto Rico / USVI near-coastal 7-day forecast (CARICOOS):

Fine-scale nearshore accumulation guidance to prioritize NEPR, SEPR, San Juan Bay, Ponce, Vieques/Culebra, etc.

Open: **https://www.caricoos.org/sargassum/SSOAccum/PRVI**

Note: These products are experimental/operational pre-release in some cases and should be paired with local observations and cleanup logistics.

Atlantic Ocean Sargassum Records and Forecasts

The record amount of sargassum in the Atlantic and Caribbean was approximately 38 million metric tons (37.5 million tons), observed in May 2025, according to reports from the University of South Florida's Optical Oceanography Laboratory. This record-breaking quantity significantly surpassed the previous high of about 22 million metric tons set in June 2022.

Key Details:

- Record Year: 2025
- Mass: Around 38 million metric tons (37.5 million tons)
- Previous Record: Approximately 22 million metric tons in June 2022
- Scope: The Great Atlantic Sargassum Belt, encompassing the Caribbean Sea, western and eastern Atlantic, and Gulf of Mexico**.**
- Source: University of South Florida's Optical Oceanography Laboratory reports.

What This Means:

- Scientists observed a significant increase in sargassum, marking a new peak for the annual blooms that began in 2011.
- This massive amount of seaweed is affecting coastlines, potentially impacting tourism, wildlife, and local ecosystems.

2025 season: what hit Puerto Rico

- **Status:** USF's June bulletin shows the Caribbean (east & west) at or near record highs, with widespread beaching around "most Caribbean nations and islands," explicitly including Puerto Rico. optics.marine.usf.edu
- **Scale:** The total Atlantic-basin sargassum load in June was ~37.5 million tons (USF estimate across all regions). Puerto Rico-specific tonnage isn't published, but the USF map and risk products show sustained exposure around the PR coastline through mid-summer. optics.marine.usf.edu
- **Real-time & short-term maps for PR:**
    - NOAA/AOML SIR (Sargassum Inundation Risk) heat maps—weekly composites for the Caribbean + Gulf (zoomable; PR visible). cwcgom.aoml.noaa.gov
    - CARICOOS PR/VI 7-day near-coastal forecast (grid points like NWPR, AREC, SJBAY, SEPR, etc.). If it shows "temporary offline," the tracker page still links to the latest regional products. Caricoos

Map sources

- USF June 2025 distribution map (Atlantic + Caribbean, regional bars w/ biomass): open the bulletin and scroll—great for presentations. optics.marine.usf.edu

- Weekly risk maps (NOAA/AOML SIR)—PDFs and live tiles showing likely coastal inundation bands across PR's coastlines. cwcgom.aoml.noaa.gov

- CARICOOS PR tracker—regional views and short-range forecasts centered on Puerto Rico & USVI. Caricoos

What to expect next season (drivers & early signals)

- **Seasonal outlook basis:** USF's SaWS team updates monthly; June 2025 was a turning point in the tropical Atlantic with growth slowing there but Caribbean loads staying high due to transport, so beaching risk persists even as the far-east source relaxes. This transport dynamic is key for PR in early-to-mid season. optics.marine.usf.edu

- **Forecasting tools:** New seasonal models combine satellite AFAI, currents, and physiology to project next-season abundance and drift, useful for early procurement/cleanup planning. aviso.altimetry.fr

"Amazon River source" vs. Sargasso Sea—what the literature says

- Amazon plume hypothesis (nutrients): You'll see it referenced frequently, but recent reporting on new work cautions against naming Amazon runoff as the *primary* cause—blooms are multi-factor: warming, circulation changes, and broader nutrient enrichment (multiple basins) all matter. MongabayPulitzer Center

- **Source regions that feed PR:** The North Equatorial Recirculation Region (eastern/central Atlantic) and Caribbean transport corridor seed the east/west Caribbean; additional material can recirculate from the Sargasso Sea and be funneled west via currents and wind. USF's regional maps (East/West Atlantic → Caribbean) visualize that pathway clearly. optics.marine.usf.edu

- **Practical takeaway for PR:** Even if Amazon-adjacent waters see a dip, Caribbean beaching can stay high because transport moves existing mats westward—so local risk ≠ immediate proxy for far-source growth. optics.marine.usf.edu

How to track "next season" early (and get maps)

1. USF SaWS monthly bulletins & daily imagery—watch the East/West Atlantic bars each month (Nov–Apr is especially telling for the coming spring/summer). optics.marine.usf.edu

2. NOAA/AOML SIR—check weekly risk bands around PR to anticipate beaching windows and mobilize crews. cwcgom.aoml.noaa.gov

3. CARICOOS PR/VI 7-day forecast—fine-scale, near-shore accumulation guidance to prioritize San Juan Bay, NEPR, SEPR, Ponce, Vieques/Culebra, etc. Caricoos

4. NOAA Caribbean disaster guide addendum—good operational context for inundation events & planning. NOAA

Aerial photos & maps (Amazon delta + Africa)

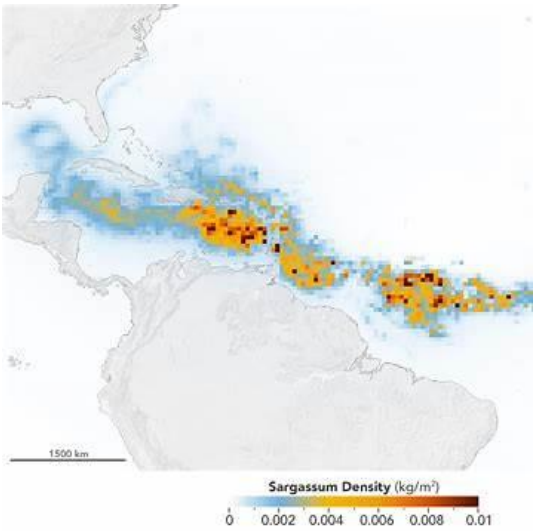
- Amazon River plume (Sentinel-3 "Earth from Space") — striking wide-area image right where the Amazon meets the Atlantic; useful to explain the freshwater/nutrient plume often discussed in Sargassum studies. European Space Agency
- NASA Earth Observatory — "Great Atlantic Sargassum Belt" (2011–2018) — map series and article that first popularized the belt stretching West Africa → Caribbean/Gulf; notes Amazon discharge (spring/summer) and West African upwelling (winter) as key nutrient inputs. Earth Observatory
- NASA Earth Observatory — "Massive Seaweed Bloom in the Atlantic" (Mar 2023) — updated density map across the tropical Atlantic/Caribbean. Earth Observatory
- Copernicus/EUMETSAT case pages — Sentinel-3 features with imagery from West Africa → Caribbean (includes 2025 season context and record loads). EUMETSAT User PortalCopernicus
- NOAA NESDIS "Orbiting Insights" — clean maps/animation frames of belt density (good for slides).

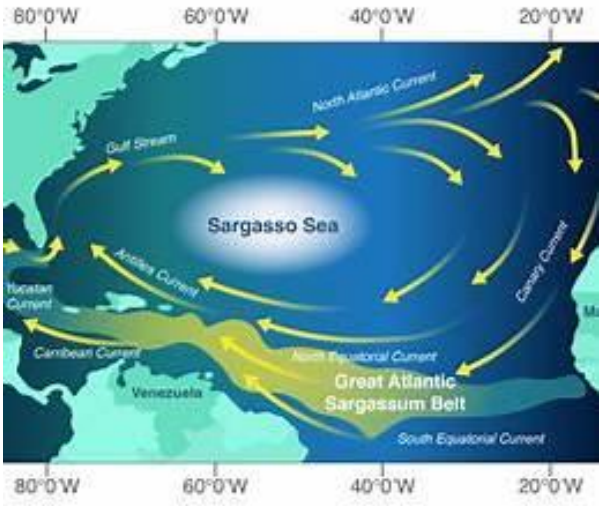
Where it starts & how it gets to Puerto Rico (clear pathway visuals)

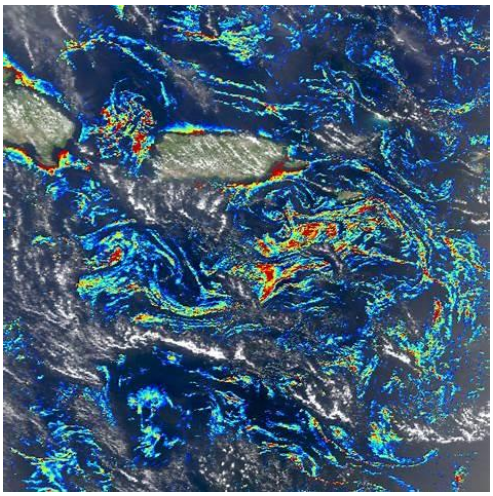
- Concept & drivers: Belt formation tied to West African upwelling (winter) and Amazon River nutrient inputs (spring/summer), then shaped by prevailing currents. (Good explainer + figures.) Earth Observatory
- Transport corridors: North Brazil Current / Rings → Guiana Current → Caribbean Current (then Yucatán/Loop Current). Nice pathway diagrams & particle-tracking work. NOAA Institutional RepositoryAOML
- NOAA/AOML pathway map ("Chasing Sargassum") — one-page visual of routes from the Sargasso Sea and Equatorial Atlantic into the Caribbean. AOML
- USF SaWS regional maps — clickable regions (East/Central Atlantic → Eastern/Western Caribbean) to watch sources feed the Caribbean over time. Optical Oceanography Laboratory

Live trackers (for PR planning)

- NOAA/AOML SIR — weekly inundation risk maps (PR coastline panels) for near-term operations. CWC-GOM
- USF SaWS monthly bulletins — basin-wide abundance bars + distribution maps (good for next-season signals). Optical Oceanography Laboratory
- CARICOOS PR/USVI — near-coastal 7-day accumulation guidance around PR & USVI. CARICOOS







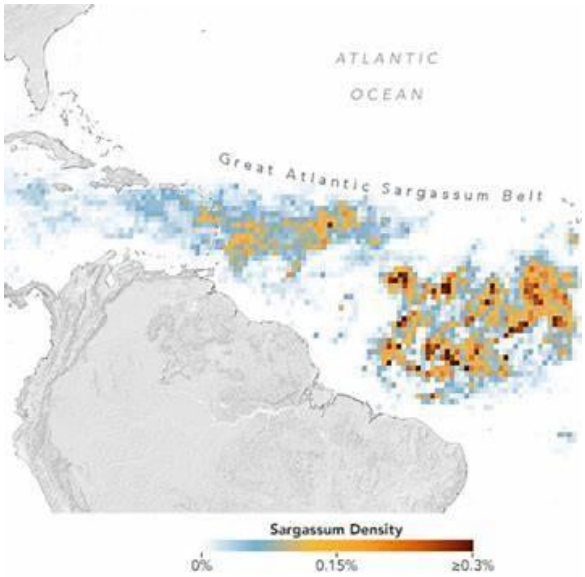
1. **The Great Atlantic Sargassum Belt Pathways** — a schematic showing ocean currents like the North Equatorial, Caribbean, and Gulf Stream that propel Sargassum from West Africa across the Atlantic into the Caribbean. larissawmerl.pages.dev US EPA
2. **Sargassum Density Map (July 2018)** — heat-map illustrating Sargassum density emanating from the Amazon and Orinoco river region, spanning the Caribbean—highlighting how strong river plume-associated blooms feed the belt. InfoAmazonia
3. **Conceptual Pathway Diagram** — migratory routes from the Sargasso Sea and equatorial regions into the tropical Atlantic and Caribbean; great for explaining multi-source contributions. seaweedgeneration.com
4. **Satellite Detection Example (MODIS AFAI)** — actual imagery showing surface mats detected via remote sensing (June 2018), ideal to validate real-world observations. icare.univ-lille.fr

Scientific & Modeling Support

- **Pathways & Transport Dynamics:** Studies show Sargassum in the equatorial Atlantic (west of ~50°W) often flows into the Caribbean, driven by currents like the North Brazil Current, Guiana Current, and North Equatorial Current. ScienceDirect AOMLInfoAmazonia
- **Amazon Shelf Transport Mechanism:** Observations suggest Sargassum accumulates on the Amazon continental shelf (Pará–Amapá) and, through the North Brazil Current and shelf recirculations, travels upward to the Caribbean ResearchGate.
- **Two Transport Pathways Identified:** A recent Markov model analysis revealed two primary routes into the Caribbean: one along the Great Atlantic Sargassum Belt, and the other a slower southern path via the Gulf of Guinea — Amazon corridor. arXiv.
- **NAO Influence & Vertical Mixing:** An atmospheric "tipping point" linked to changes in the North Atlantic Oscillation has likely intensified vertical nutrient mixing—fueling belt production more than river runoff alone The Guardian.

Impact of Sargassum in the Caribbean, Gulf Coasts, Brazil, West Africa, and South America

The following describes regions where sargassum is an invading menace, including the Caribbean, Gulf Coasts, Amazon River Mouth in Brazil, Gulf of Guinea in West Africa, and Guyana in South America.



Those maps show the **Great Atlantic Sargassum Belt**—a massive, shifting band of floating seaweed stretching thousands of miles across the tropical Atlantic. Let's break down where else it's impacting coastlines beyond Puerto Rico, Florida, and the Caribbean:

Where Else Is Sargassum Showing Up?

West Africa (Gulf of Guinea Region)

- The Sargassum belt originates off West Africa and frequently drives blooms along the Gulf of Guinea's coastline. Fondriest Environmental
- Coastal nations here—including areas near the mouth of the Congo River—see regular influxes, fueled by nutrient-rich outflows. Fondriest Environmental

Amazon River Mouth & Northern South America

- The ocean currents funnel Sargassum toward the Amazon estuary, delivering it to parts of northern Brazil. Fondriest Environmental
- This enriches the bloom and supports the belt's westward expansion.

Gulf of Mexico & Central America Coasts

- Sargassum frequently washes up along the entire Gulf coast—including Mexico's Yucatán Peninsula and Texas. College of Natural Resources US EPA School of Business AFAR MediaAP News
- This has become a regular issue for Central American coastlines, notably along Mexico's Caribbean coast. pbs.org

Northern South American Shoreline (e.g., Guyana)

- Reports confirm Sargassum making landfall from **Puerto Rico to Guyana**—so the northern littoral of South America is also affected. AP News

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Summary Snapshot

Region	Sargassum Impact Summary
West Africa (Gulf of Guinea)	Frequent blooms driven by nutrient runoff and currents
Amazon River Mouth, Brazil	Blooms grow stronger with nutrient influx from Amazon waters
Gulf of Mexico & Mexico's Coasts	Regular inundations, affecting beaches and tourism
Northern South America (e.g., Guyana)	Increasing reports of heavy beach cover
Caribbean & Florida (Context)	Well-known hotspots—your reference regions still heavily impacted

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Why All This Spread?

Since around 2011, scientists have documented the explosive growth of the Great Atlantic Sargassum Belt, driven by:

- **Nutrient-rich runoff** from major rivers like the Amazon and Congo
- Rising **sea surface temperatures** and shifting ocean currents
- Likely contributions from global **climate change** and altered atmospheric patterns seaweedgeneration.com AP News ScienceDirect EarthSky

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Tourists swim in Playa del Carmen in Quintana Roo, Mexico. The leisure industry has been massively affected by the invasion of the seaweed. Photograph: Gladys Serrano/El País

Toxic gas, livelihoods under threat and power outages: how a seaweed causes chaos in Caribbean

Apr 11, 2024

Mark Nedd, left, who fishes for a living, has had to cope with the sargassum invasion since he was a little kid. Lindon Marast, right, says the seaweed clogs the engine of his boat

March 25, 2024

From Grenada

Forecasting & Early-Warning (who to watch, how to use)

- **USF SaWS (Satellite-based Sargassum Watch System)** – the gold-standard monthly outlooks + daily imagery; shows basin-scale biomass and where the next waves are likely headed. Subscribe + pull the latest PDF each month. optics.marine.usf.edu
- **NOAA AOML – Weekly Sargassum Inundation Risk (SIR)** – coastal, near-term (weekly) "risk of beaching" layers for the **Caribbean + Gulf**; great for 1–2 week ops planning. cwcgom.aoml.noaa.gov coastwatch.noaa.gov
- **CERMES/UWI – Sub-regional 3-month Outlook (Eastern Caribbean)** – medium-range, island-level forecasts; good to frame staffing, barriers, and disposal capacity. Home
- **CARICOOS Sargassum Tracker (PR region)** – pulls USF/AOML content into a single regional dashboard; handy for PR coastal ops. caricoos.org
- **JSEAS (Jamaica Sargassum Early Advisory System)** – country-level alerts blending satellites, drones, and field reports (template worth emulating elsewhere). jseas.monagis.com
- **Citizen networks (Mexico & region)** – real-time beach reports/maps that often beat official posts for *arrival timing*:
    - Red de Monitoreo del Sargazo (Quintana Roo) and Sargazo.info. Sargazo.info
- **West Africa / Brazil coverage** – no single national bulletin yet, but **Copernicus/CLS** runs operational detection & **drift forecasts** across the **equatorial Atlantic**, plus research groups now publishing **Amazon-coast stranding studies**. Use these to anticipate Gulf of Guinea/Amapá events. marine.copernicus.eu ScienceDirect

How to read them quickly: Use **USF SaWS** for *what's building offshore (monthly)*, then **NOAA SIR** for *where it likely beaches next (weekly)*. Local networks (e.g., **Red de Monitoreo**) help with *day-of* ground truth.

Mitigation: what actually works (and the caveats)

Offshore interception (best-case for odors & sand loss)

- Deploy **floating barriers** + **skimmer/collection boats** in fair weather; Mexico's navy (SEMAR) publishes barrier lengths/tonnage removed as an operational benchmark. Gob.mx Noticias de turismo REPORTURLJA.MX Noticias México
- EPA best-practice: **collect at sea** before mats die/sink; minimize sand take; check for marine life (turtles). US EPA

Nearshore & beach management

- **Mechanized removal** with sand-saving attachments; obey **turtle-season** constraints and dune buffers (Florida examples). FDEPdeerfield-beach.com FWC
- **Staging**: keep piles aerated and away from residences; plan for leachate control.

Worker & public health (critical)

- Decomposing sargassum releases **H_2S + NH_3** within ~48 hours; monitor & PPE for crews; sensitive groups should avoid exposure. (PAHO/EPA clinical notes; recent H_2S field studies.) Pan American Health Organization USEPA PMC ScienceDirect

Valorization (use with caution)

- Options include **biogas/biomethane, compost (washed), biochar, WtE**. But heavy metals (notably **arsenic**) and salts demand **pre-treatment & testing**; treat feedstock as potentially contaminated. US EPA Environmental Health Perspectives

Policy/coordination

- Regional toolkits & briefs (UWI-CERMES "Golden Tides", FAO/CC4FISH) summarize operational do's/don'ts; an **International Action Plan (2025)** now links **Caribbean + West Africa** responses. repository.oceanbestpractices.org Open Knowledge FAO Home France Diplomacy

Fast operational playbook for your projects

1. **Subscribe** to **USF SaWS** monthly + check **NOAA SIR** each Monday; log expected arrivals for your target coasts (PR, MX, W. Africa/Brazil as needed). optics.marine.usf.edu cwcgom.aoml.noaa.gov
2. **Trigger levels**: when SIR shows *High* for your coast segment, pre-position barriers, boats, and beach equipment; alert hotels/municipal crews. cwcgom.aoml.noaa.gov
3. **Health safety**: if beaching >24–48h, start **H_2S spot checks**, PPE for crews, and public notices. US EPA
4. **Disposal/valorization route** pre-cleared (permits + lab tests) before peak season.

If you want, I can assemble a one-page **weekly watch brief** (pulls SaWS + SIR + local feeds) for any coastline you choose.

Recent sargassum developments (2025)

El País

México se prepara para una temporada récord de sargazo en el Caribe

Jun 11, 2025

A giant sargassum bloom in the Caribbean Sea. Photograph: Jean-Philippe Maréchal/University of South Florida/USF College of Marine Science