



CARIBE EWS SEA LEVEL DATA AVAILABILITY

2019 Report

Abstract

Report of coastal sea level stations and DARTs contributing to the CARIBE EWS in 2019,
prepared by the Caribbean Tsunami Warning Program

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Acknowledgments

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Summary

Real-time sea level data are one of the essential data streams of a tsunami warning system. Tsunami Warning Centers use seismic data to establish the initial potential tsunami threat of an earthquake. Sea level data are used to confirm the tsunami generation, forecast its severity or to declare the threat is over. In the case of tsunamis generated by a non-seismic source, the sea level data will be the primary tool for the detection and evaluation of the threat. The main type of sea level data used to detect tsunamis are coastal sea-level stations and tsunameters (DARTs).

Since 2010, at the request of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions, (ICG/CARIBE EWS), the Caribbean Tsunami Warning Program (CTWP) has maintained an inventory of the sea level stations used for tsunami monitoring and warning in the region. It has produced monthly and annual reports on sea level data availability.

For previous reports, data availability was only reported for the IOC Sea Level Station Monitoring Facility (SLMF) for the coastal sea level stations and for the NOAA National Data Buoy Center in the case of the DARTs. Given the role of the Pacific Tsunami Warning Center as the designated Tsunami Service Provider for the CARIBE EWS, it was decided as of November 2019 to include data availability statistics for DARTs and Coastal sea level stations at this center.

Introduction

Since 2010 the Caribbean Tsunami Warning Program has been reviewing the status of seismic and sea level stations contributing to the CARIBE EWS. It prepares a monthly report on the status of coastal sea level stations and DARTs.

At its Fourteenth Session, the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions, (ICG/CARIBE EWS-XIV) in its Recommendation ICG/CARIBE-EWS-XIV.2 on Tsunami Monitoring and Detection Systems:

- Requested CTWP to continue producing up to date maps and data availability reports based on current sea level and seismic stations contributing to the CARIBE-EWS.
- Recommended that CTWP collaborates with UNAVCO to expand monthly reports to include status of GNSS stations that could contribute to tsunami early warning.
- Further recommended CTWP to work with the Incorporated Research Institutions for Seismology (IRIS) Data Management Center (DMC) to maintain the CARIBE-EWS virtual seismic list.

This report covers the status of the sea level stations.

Sea Level Stations Status Categories

In 2019, at the *Fourteenth Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions, (ICG/CARIBE EWS-XIV)* the status categories for sea level stations were updated to the following:

Contributing Real Time (Contributing RTX)	Also known as Active on the SLMF. Data from these stations have been available for the past month in real time or near real time thru FTP or GTS (GOES), are accessible to tsunami service providers and tsunami warning centers and can be accessed thru Tide Tool, IOC SLMF and other sites. For reports prepared thru 2018, once a station was contributing in real time, it always remained in this status, irrespective of its operational status. There were stations that had not been contributing data in real time for months or even years. These non-contributing stations are now classified as down, in consistency with the SLMF.
Existing	Stations that are understood to be operational through national reporting, GLOSS or other mechanisms, but whose data are not shared and are not available in real time or near real time.
Down	These stations at one point were Contributing in Real Time, but for a period of a month or longer have not been sharing data. There is the expectation that the data from the station will become available in the near future.
Planned	Stations that Member States or Network Operators have indicated they have funding for and are in the process of acquisition or installation.
Gap	Station locations that the CARIBE EWS has indicated are of high priority but for which no funding has been identified for their acquisition, installation and operation.
Removed	Stations which have been removed or relocated.
Unknown	Stations for which there is no data on its current operational status.

This classification was used for the 2019 monthly sea level reports. Figure 1 shows the status of all the stations in the inventory at the end of 2019. Graph 1 shows the monthly number of sea level stations from December 2018 (old definition) and then January through December 2019, using the new definition. While from December to January, there appears to have been no change, the number of stations that were moved to Down were compensated by 5 new Contributing Stations. The number of Contributing RTX stations changed month by month. Graph 2 shows all the status categories used for each month in 2019. The monthly

reports are also posted to the CTWP website (caribewave.info). Appendix 1 has a table with the status of all the stations as of December 2019.



Figure 1. December 2019 Sea Level Stations Status¹

For the Contributing Real Time stations, the performance ratio statistics per station are based on the data in the UNESCO IOC Sea Level Monitoring Facility² (SLMF) and for November and December, the data from the Pacific Tsunami Warning Center (PTWC) was also used.

UNESCO - Intergovernmental Oceanographic Commission (IOC) Sea Level Monitoring Facility (SMLF)

The objective of this service is

- to provide information about the operational status of global and regional networks of real time sea level stations,
- and to provide a display service for quick inspection of the raw data stream from individual stations.

This website initially focused on operational monitoring of sea level measuring stations in Africa and was developed from collaboration between Flanders Marine Institute (VLIZ) and the ODINAFRICA project of IODE. The site has since been expanded to a global station monitoring service for real time sea level measuring stations that are part of IOC programs, i.e. (i) the Global Sea Level Observing System Core

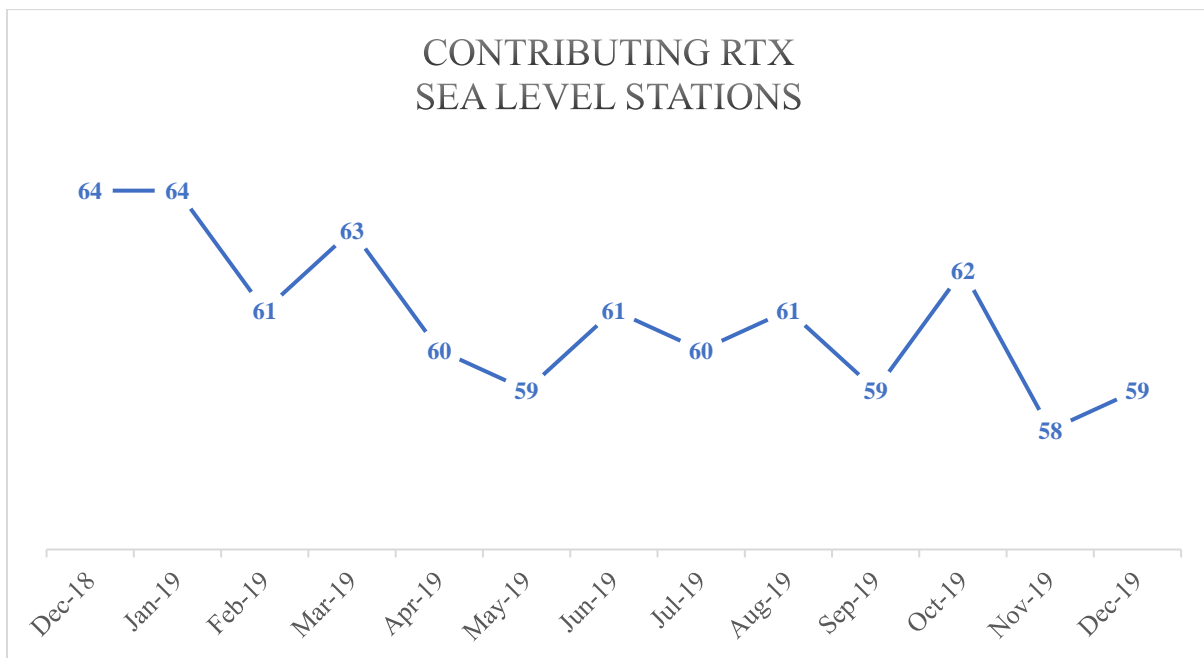
¹ Map by Marcos Gonzalez, NOAA Pathways student at CTWP office (2020)

² <http://www.ioc-sealevelmonitoring.org>

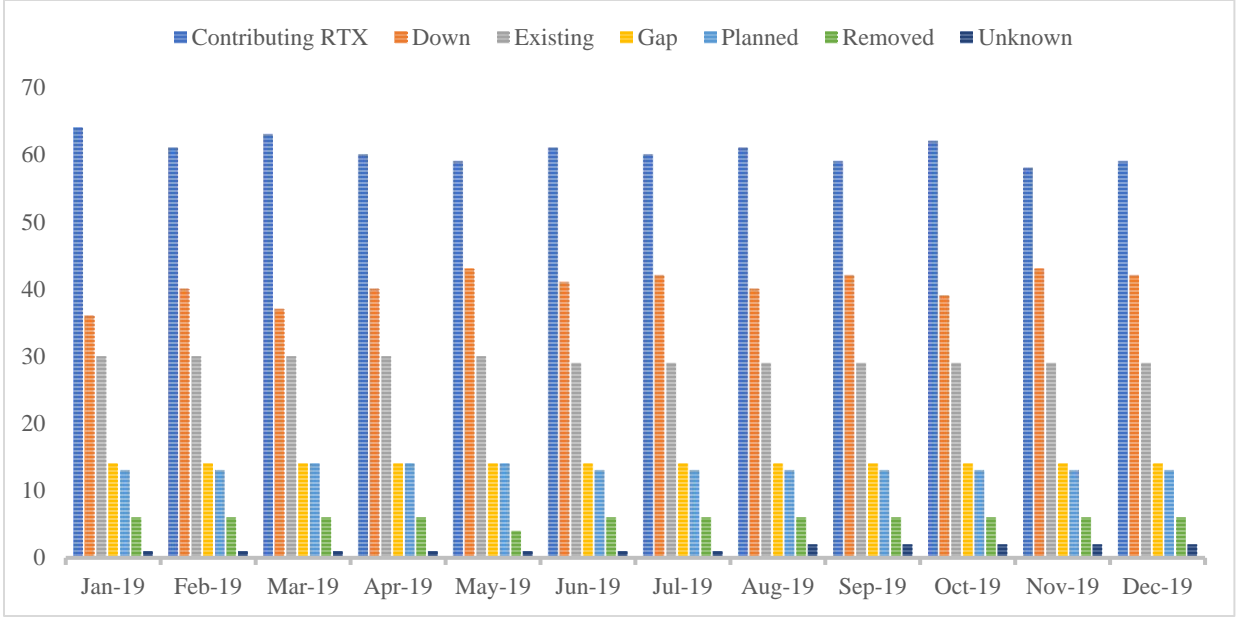
Network and (ii) the networks under the regional tsunami warning systems in the Indian Ocean (IOTWS), North East Atlantic & Mediterranean (NEAMTWS), Pacific (PTWS) and the Caribbean (CARIBE-EWS).

IN the case of the IOC SLMF, the data are fetched from the SLMF webpage using an IOC Sea Level Station Analyzer Python program developed at the CTWP. The program allows us to obtain the performance ratios of the desired stations for specific months and years. Once the data has been tabulated, a station can be analyzed independently to verify operational status and check inconsistent data. For example, if there is no sea level data, a station might appear as Contributing RTX on IOC SLMF if data on battery voltage is available. CTWP and the managers of the IOC SLMF are constantly comparing data.

A document with figures highlighting the variability of data availability per station and sensor in SLMF can also be accessed through the CTWP website. Figure 2 is a map of coastal sea level stations in the IOC SLMF data base on April 4, 2020. The SLMF does not include DARTs, these will be discussed in another section of this report.



Graph 1. Contributing RTX stations 2018-2019



Graph 2. Status per month

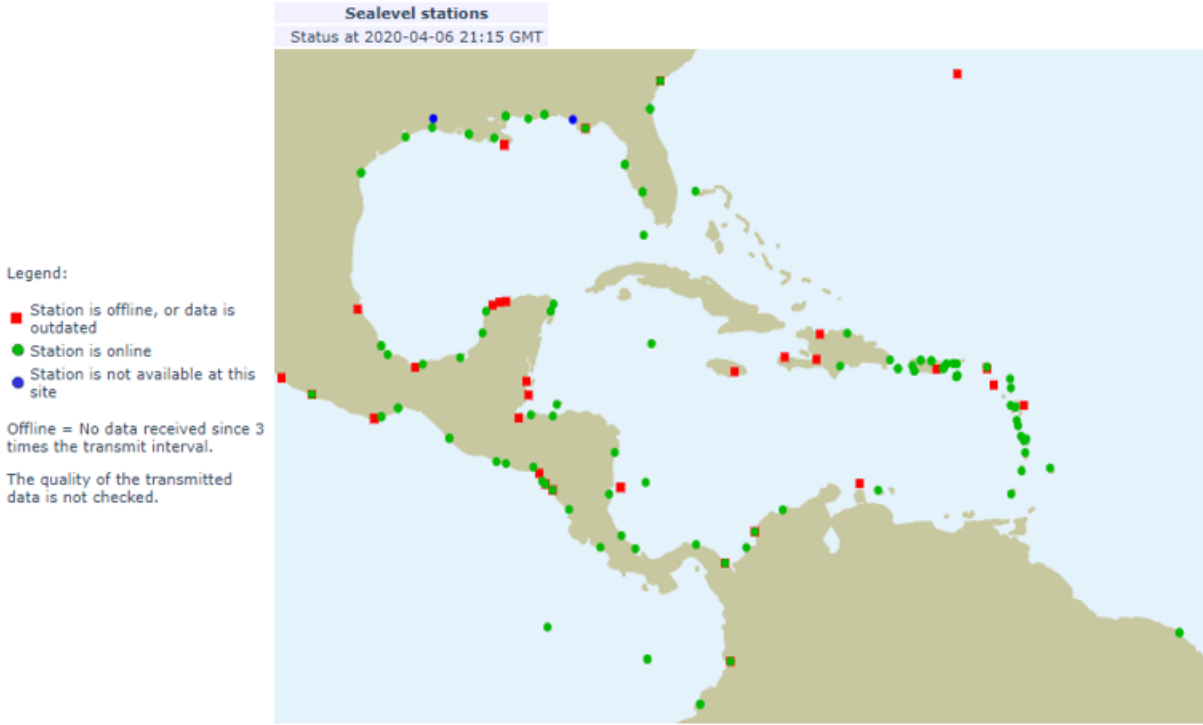


Figure 2. IOC Sea Level Monitoring Station Map

Pacific Tsunami Warning Center (PTWC)³

The Pacific Tsunami Warning Center (PTWC) operated by the United States National Weather Service served from 2005-2015 as the interim Tsunami Warning Center and since 2016 as the Tsunami Service Provider (TSP) for the Tsunami and Other Hazards Warning and Mitigation System for the Caribbean and Adjacent Seas (CARIBE-EWS), a subsidiary body of UNESCO's Intergovernmental Oceanographic Commission (IOC). Products issued by PTWC to countries around the Caribbean in support of this mission have evolved over time as supporting data, analysis methods, computational capabilities, and communications have all improved. The products developed by the PTWC are for only advisory. National authorities are responsible for determining the level of tsunami alert within each Member State.

On 1 March 2016, the US NOAA Pacific Tsunami Warning Center (PTWC) commenced issuance of new forecast-based Enhanced Tsunami Products for all Caribbean countries. The PTWC PTWS and CARIBE-EWS products use the same forecast methodologies and the same graphical formats to depict the tsunami threat for the basin and coastal polygons.

Since November 2019, the PTWC data has been incorporated into the CTWP Sea Level monthly reports to compare the data reported by the IOC SLMF with the data from PTWC. The PTWC generated map for December 2019 is shown on Figure 3. The color legend is attached to the map; sea level stations are represented as circles while the DART stations are represented by triangles. These maps show the ranges of percentage availability of the *Contributing RTX* stations. *Down* stations are reported in black. *Removed*, *Planned*, *Gap* and *Unknown* stations are not include in the PTWC reports, nor do they appear on this map.

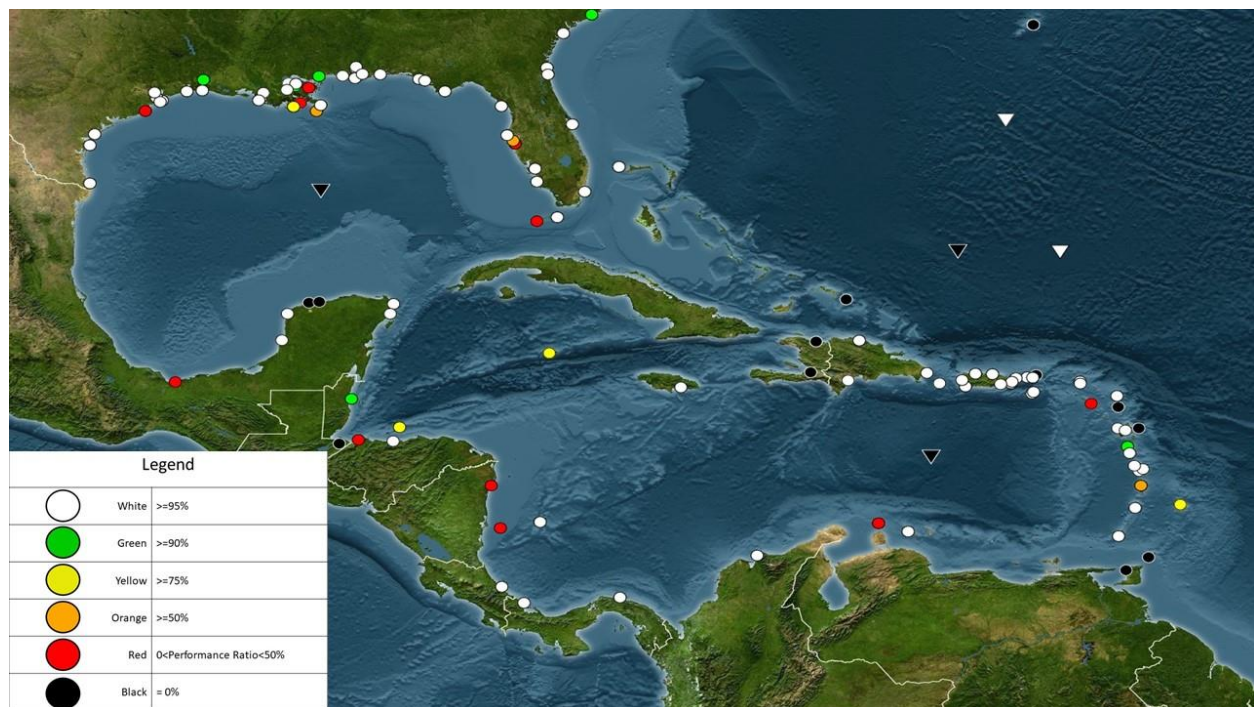


Figure 3. December 2019 Sea Level & DART Stations - PTWC data

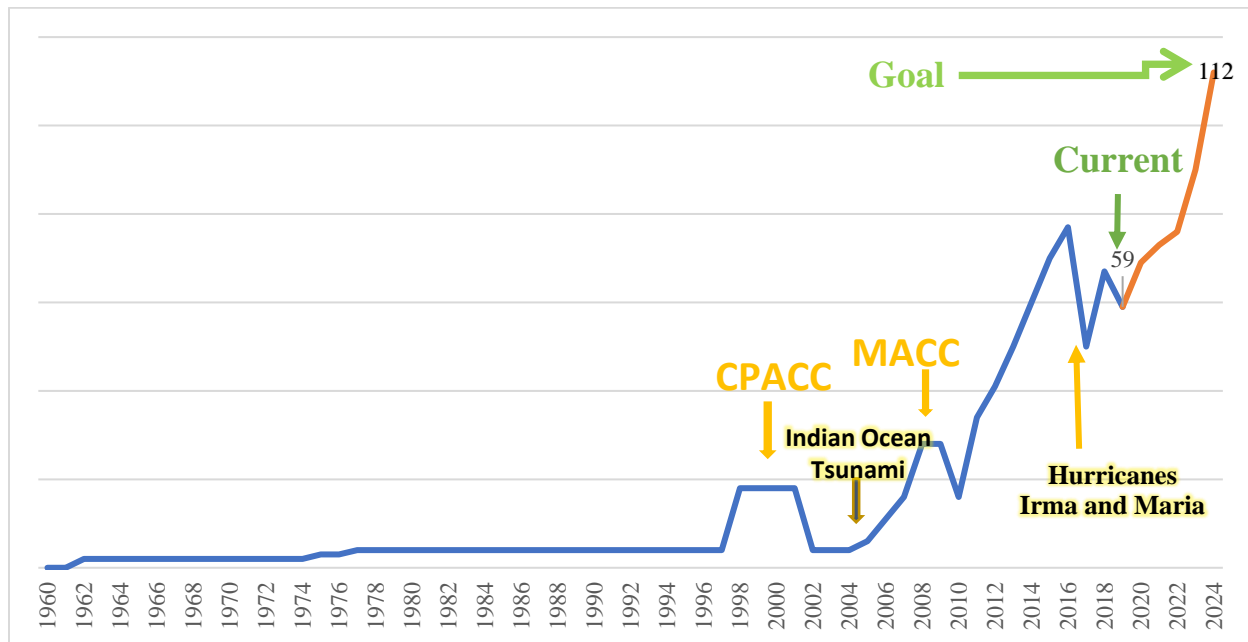
³ http://itic.ioc-unesco.org/index.php?option=com_content&view=category&layout=blog&id=1303&Itemid=1303&lang=en

Contributing RTX Sea Level Stations

Throughout the year, the number of Contributing RTX stations per month changed little, with a minimum of 58 stations in October 2019 and a peak of 64 in January 2019. Table 1 shows how the status changed month by month. Note that the usual change goes from *Contributing RTX* to *Down* and vice versa. There was one station that changed from *Down* to *Planned* to *Contributing RTX*, highlighted in yellow on Table 1: Blowing Point station in Anguilla. This station was originally destroyed by Hurricane Maria in September 2017 and around March 2019 United Kingdom provided funding for its reinstallation. Finally, in June 2019 the station was reinstalled, and the status is now Contributing RTX.

Status by Month												
	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Contributing RTX	64	61	63	60	59	61	60	61	59	62	58	59
Down	36	40	37	40	43	41	42	40	42	39	43	42
Existing	30	30	30	30	30	29	29	29	29	29	29	29
Gap	14	14	14	14	14	14	14	14	14	14	14	14
Planned	13	13	14	14	14	13	13	13	13	13	13	13
Removed	6	6	6	6	4	6	6	6	6	6	6	6
Unknown	1	1	1	1	1	1	1	2	2	2	2	2

Table 1. Status of Sea Level Stations through 2019

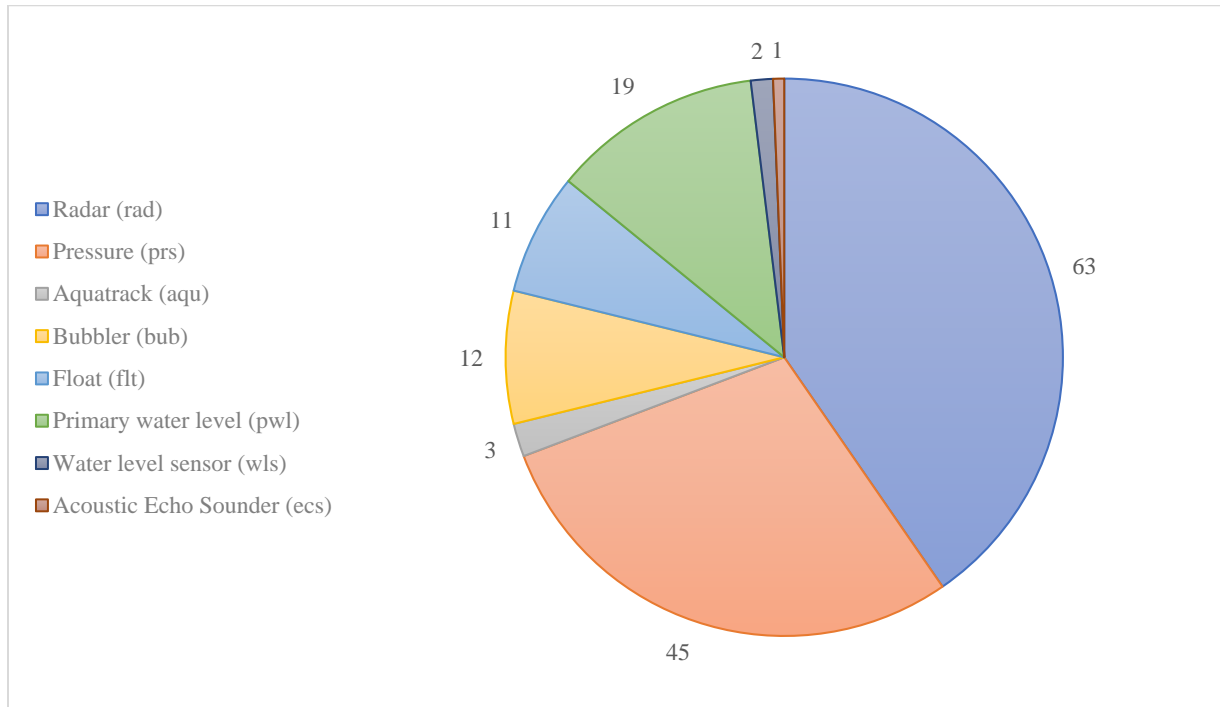


Graph 3. Historical projection of coastal sea level stations 1960 to present (2019) and the projection to the goal of stations into 2024

Of the 165 stations being reported, 158 stations are coastal sea level stations and 7 of them are DART. The DARTs are going to be discussed in another section of this report. For the coastal Sea Level stations, each station has one or more sensors: radars (rad, ra1, ra2), pressure (prs, pr1, pr2), float (flt) or Aquatrack (aqu) sensors. Graph 5 shows the distribution of types of sensors. Sometimes the sensors are described as primary water level sensor (pwl) or backup water level sensor (bwl). Usually the pwl are

Aquatrack sensors that calculate true average level, even in the presence of waves and surging liquid surfaces and bwl sensors are bubblers or pressure sensors.

On average, 61 stations were contributing RTX while 41 stations were down per month. The other 43 stations are planned, non-operational or represent gaps in monitoring.



Graph 4. Types of sensors

DART

To ensure early detection of tsunamis and to acquire data critical to real-time forecasts, NOAA has placed Deep-ocean Assessment and Reporting of Tsunami (DART®) stations at sites in regions with a history of generating destructive tsunamis. NOAA completed the original 6-buoy operational array (map of original six stations) in 2001 and expanded to a full network of 39 stations in March 2008.

Originally developed by NOAAs, as part of the U.S. National Tsunami Hazard Mitigation Program (NTHMP), the DART® Project was an effort to maintain and improve the capability for the early detection and real-time reporting of tsunamis in the open ocean. See [DART® development](#) for more info.

DART® presently constitutes a critical element of the [NOAA Tsunami Program](#). The Tsunami Program is part of a cooperative effort to save lives and protect property through hazard assessment, warning guidance, mitigation, research capabilities, and international coordination. NOAA's National Weather Service (NWS) is responsible for the overall execution of the Tsunami Program. This includes operation of the U.S. Tsunami Warning Centers (TWC) as well as leadership of the National Tsunami Hazard Mitigation Program. It also includes the acquisition, operations and maintenance of observation systems required in support of tsunami warning such as DART®, local seismic networks, coastal, and coastal flooding detectors. NWS also supports observations and data management through the National Data Buoy Center (NDBC).

The DART buoys reported on the sea level reports are: Northeast Castle Rock Seamount ([DART 44401](#)), Southeast Block Canyon ([DART 44402](#)), Southwest Bermuda ([DART 41425](#)), South of Puerto Rico ([DART 42407](#)), Gulf of Mexico ([DART 42409](#)), Dart Wave Glider Station, West Florida Area ([DART 42429](#)), North of St. Thomas ([DART 41421](#)) and North of Santo Domingo ([DART 41420](#)). Of these 8 stations, just 4 of them were contributing data in real time at the end of 2019. Graph 4 shows the status of the DARTS at the end of each month of 2019.

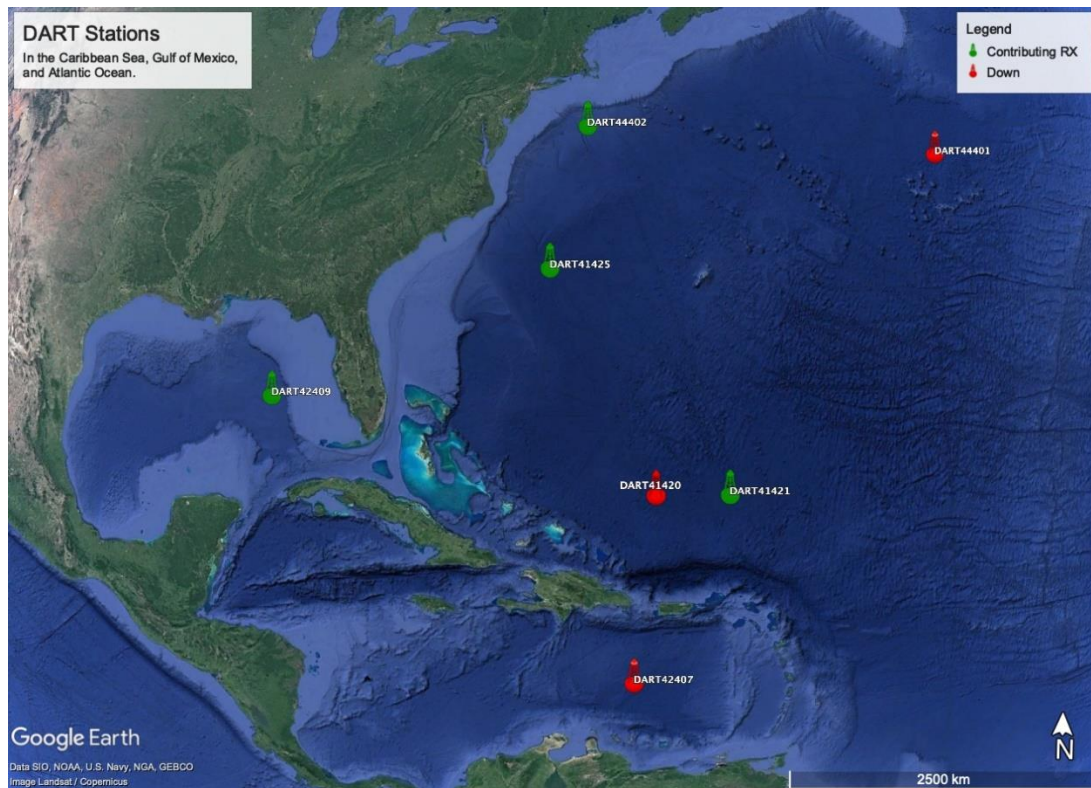


Figure 4. Maps of DART for December 2019

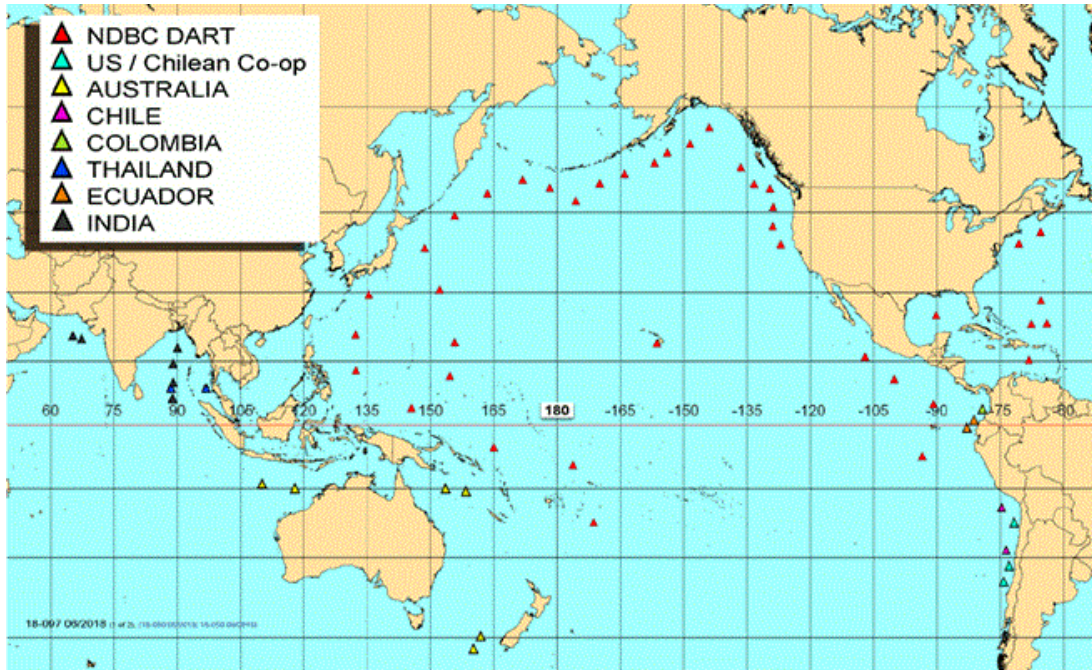
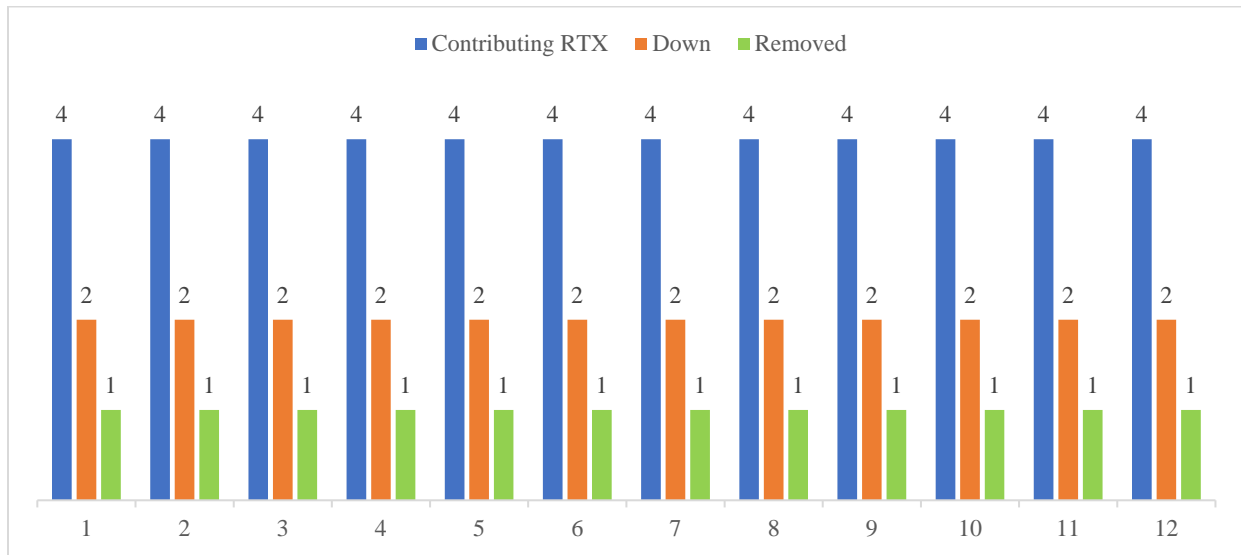


Figure 5. Originally developed by NOAA, as part of the U.S. National Tsunami Hazard Mitigation Program (NTHMP), the DART® Project was an effort to maintain and improve the capability for the early detection and real-time reporting of tsunamis in the open ocean.⁴



Graph 5. DART Buoys status per month, 2019

⁴ <https://www.ndbc.noaa.gov/dart/dart.shtml>

Appendix List

- [Appendix A: Sea Level Station List and Status 2018](#)
- [Appendix B: Sea Level Station List and Status 2019](#)

Appendix A: Sea Level Station List and Status 2018

Station name	Country	Status
<i>Blowing Point</i>	Anguilla	Planned
<i>Barbuda</i>	Antigua and Barbuda	Contributing RTX
<i>Parham (Camp Blizard), Antigua</i>	Antigua and Barbuda	Down
<i>Oranjestad</i>	Aruba	Contributing RTX
<i>DART 44401</i>	Atlantic NE Connecticut, USA - Northeast Castle Rock Seamount	Down
<i>DART 44402</i>	Atlantic off New York, USA - Southeast Block Canyon, NY	Contributing RTX
<i>DART 41425</i>	Atlantic off South Carolina, USA - East Charleston, SC	Contributing RTX
<i>Settlement Point</i>	Bahamas	Contributing RTX
<i>Bridgetown Port</i>	Barbados	Down
<i>Port St. Charles</i>	Barbados	Contributing RTX
<i>Carrie Bow Cay</i>	Belize	Contributing RTX
<i>Port of Belize</i>	Belize	Contributing RTX
<i>St. Georges Island / Esso Pier</i>	Bermuda	Contributing RTX
<i>Road Town Harbor, Tortola</i>	British Virgin Islands	Down
<i>DART 42407</i>	Caribbean Sea	Down
<i>George Town</i>	Cayman Islands	Contributing RTX
<i>Cartagena</i>	Colombia	Down
<i>San Andres</i>	Colombia	Contributing RTX
<i>Santa Marta</i>	Colombia	Contributing RTX
<i>Sapzurro</i>	Colombia	Contributing RTX
<i>Isla Naval</i>	Colombia	Contributing RTX
<i>Coveñas</i>	Colombia	Down
<i>Puerto Estrella</i>	Colombia	Down
<i>Limón</i>	Costa Rica	Contributing RTX
<i>Bullen Bay (Replaces Willemstad)</i>	Curacao	Contributing RTX

<i>Marigot</i>	Dominica	Down
<i>Portsmouth</i>	Dominica	Contributing RTX
<i>Roseau</i>	Dominica	Contributing RTX
<i>Barahona</i>	Dominican Republic	Contributing RTX
<i>Puerto Caucedo/San Andres/Santo Domingo</i>	Dominican Republic	Down
<i>Puerto Plata</i>	Dominican Republic	Contributing RTX
<i>Punta Cana</i>	Dominican Republic	Contributing RTX
<i>Ile Royale</i>	French Guiana	Contributing RTX
<i>Prickly Bay</i>	Grenada	Contributing RTX
<i>Pointe à Pitre</i>	Guadeloupe	Contributing RTX
<i>Deshaies Harbour</i>	Guadeloupe	Contributing RTX
<i>La Désirade Island, Grande Anse Marina Harbour</i>	Guadeloupe	Contributing RTX
<i>Puerto Barrios</i>	Guatemala	Contributing RTX
<i>DART 42409</i>	Gulf of Mexico	Contributing RTX
<i>DART 42429</i>	Gulf of Mexico	Removed
<i>Harbour Master Boathouse</i>	Guyana	Existing
<i>Cap Haitien</i>	Haiti	Contributing RTX
<i>Jacmel</i>	Haiti	Down
<i>Port au Prince</i>	Haiti	Down
<i>Puerto Cortes</i>	Honduras	Contributing RTX
<i>Punta Gorda Harbor, Roatan S</i>	Honduras	Contributing RTX
<i>Tela Harbor</i>	Honduras	Down
<i>Cabotaje Harbor, La Ceiba</i>	Honduras	Contributing RTX
<i>Port Royal</i>	Jamaica	Contributing RTX
<i>Fort de France Harbour</i>	Martinique	Contributing RTX
<i>Le Precheur Harbour</i>	Martinique	Contributing RTX
<i>Le Robert</i>	Martinique	Contributing RTX
<i>Celestun</i>	Mexico	Contributing RTX
<i>Ciudad del Carmen</i>	Mexico	Contributing RTX
<i>Lerma Campeche</i>	Mexico	Contributing RTX
<i>Frontera</i>	Mexico	Contributing RTX
<i>Isla Mujeres</i>	Mexico	Contributing RTX
<i>Progreso</i>	Mexico	Contributing RTX
<i>Puerto Morelos, Q. R.</i>	Mexico	Contributing RTX
<i>Tuxpan</i>	Mexico	Contributing RTX
<i>Veracruz</i>	Mexico	Contributing RTX
<i>Corn Island</i>	Nicaragua	Contributing RTX
<i>El Porvenir</i>	Panama	Contributing RTX
<i>Bocas del Toro</i>	Panama	Contributing RTX

<i>Aguadilla</i>	Puerto Rico	Down
<i>Arecibo</i>	Puerto Rico	Contributing RTX
<i>Culebra Island</i>	Puerto Rico	Contributing RTX
<i>Fajardo</i>	Puerto Rico	Down
<i>Isabel II, Vieques</i>	Puerto Rico	Contributing RTX
<i>La Esperanza, Vieques</i>	Puerto Rico	Contributing RTX
<i>Magueyes Island</i>	Puerto Rico	Contributing RTX
<i>Mayagüez</i>	Puerto Rico	Contributing RTX
<i>Mona Island</i>	Puerto Rico	Contributing RTX
<i>San Juan</i>	Puerto Rico	Contributing RTX
<i>Yabucoa</i>	Puerto Rico	Contributing RTX
<i>Peñuelas</i>	Puerto Rico	Removed, relocated equipment to Caja de Muertos (2014)
<i>Caja de Muertos</i>	Puerto Rico	Down
<i>DART 41421</i>	Puerto Rico Trench East - North St Thomas	Contributing RTX
<i>DART 41420</i>	Puerto Rico Trench West - North Santo Domingo	Down
<i>Baseterre (Coast Guard Base)</i>	St. Kitts & Nevis	Contributing RTX
<i>Ganter's Bay</i>	St. Lucia	Contributing RTX
<i>Saint Martin Island</i>	St. Martin	Contributing RTX
<i>Calliaqua (Coast Guard Base)</i>	St. Vincent & the Grenadines	Down
<i>Cedros Bay</i>	Trinidad and Tobago	Down
<i>Charlotteville</i>	Trinidad and Tobago	Down
<i>Point Fortin</i>	Trinidad and Tobago	Down
<i>Port Of Spain</i>	Trinidad and Tobago	Contributing RTX
<i>Scarborough</i>	Trinidad and Tobago	Contributing RTX
<i>Grand Turk</i>	Turks and Caicos	Gap
<i>Charlotte Amalie, St. Thomas</i>	USVI	Contributing RTX
<i>Christiansted Harbor, St. Croix</i>	USVI	Contributing RTX
<i>Lameshur Bay, St. John</i>	USVI	Contributing RTX
<i>Lime Tree Bay, St. Croix</i>	USVI	Contributing RTX

Appendix B: Sea Level Stations 2019

Station name	Country	Status
<i>Blowing Point</i>	Anguilla	Contributing RTX
<i>Barbuda</i>	Antigua and Barbuda	Contributing RTX
<i>Parham (Camp Blizzard), Antigua</i>	Antigua and Barbuda	Down
<i>Oranjestad</i>	Aruba	Contributing RTX
<i>Settlement Point</i>	Bahamas	Contributing RTX
<i>Lee Stocking Island, Exuma</i>	Bahamas	Existing
<i>Matthew Town, Inagua</i>	Bahamas	Existing
<i>Nassau Harbour, New Providence</i>	Bahamas	Existing
<i>Treasure Cay, Abaco</i>	Bahamas	Existing
<i>Bridgetown Port</i>	Barbados	Down
<i>Port St. Charles</i>	Barbados	Contributing RTX
<i>Pelican Fort</i>	Barbados	Existing
<i>Conset Bay</i>	Barbados	Removed
<i>Speightstown</i>	Barbados	Removed
<i>Carrie Bow Cay</i>	Belize	Down
<i>Belize City</i>	Belize	Planned
<i>Belize</i>	Belize	Down
<i>Port of Belize</i>	Belize	Contributing RTX
<i>St. Georges Island / Ezzo Pier</i>	Bermuda	Down
<i>Road Town Harbor, Tortola</i>	British Virgin Islands	Down
<i>George Town</i>	Cayman Islands	Contributing RTX
<i>Cartagena</i>	Colombia	Down
<i>San Andres</i>	Colombia	Contributing RTX
<i>Santa Marta</i>	Colombia	Contributing RTX
<i>Capurganá</i>	Colombia	Down
<i>Sapzurro</i>	Colombia	Contributing RTX
<i>Islas del Rosario</i>	Colombia	Down
<i>Isla Naval</i>	Colombia	Contributing RTX
<i>Coveñas</i>	Colombia	Contributing RTX
<i>Puerto Estrella</i>	Colombia	Down
<i>Limón</i>	Costa Rica	Contributing RTX
<i>Cabo Cruz</i>	Cuba	Existing
<i>Cabo San Antonio - Morros de Piedra</i>	Cuba	Existing
<i>Gibara</i>	Cuba	Existing
<i>Isabela de Sagua</i>	Cuba	Existing
<i>Manzanillo</i>	Cuba	Down
<i>Guantanamo</i>	Cuba	Gap
<i>Casilda</i>	Cuba	Existing
<i>Maisí</i>	Cuba	Down
<i>Mariel Boca</i>	Cuba	Existing
<i>Bahia de la Habana</i>	Cuba	Existing

<i>Nuevitas Punta de Practicos</i>	Cuba	Existing
<i>Puerto Padre</i>	Cuba	Existing
<i>Nuevitas Bufaderos</i>	Cuba	Down
<i>Siboney</i>	Cuba	Existing
<i>Santiago de Cuba</i>	Cuba	Down
<i>Santa Cruz del Sur</i>	Cuba	Existing
<i>Carapachibey</i>	Cuba	Down
<i>Cayo Loco</i>	Cuba	Existing
<i>Cayo Largo</i>	Cuba	Down
<i>La Coloma</i>	Cuba	Existing
<i>Willemstad</i>	Curacao	Removed
<i>Bullen Bay (Replaces Willemstad)</i>	Curacao	Contributing RTX
<i>Portsmouth</i>	Dominica	Planned
<i>Marigot</i>	Dominica	Down
<i>Roseau</i>	Dominica	Contributing RTX
<i>Portsmouth</i>	Dominica	Contributing RTX
<i>Barahona</i>	Dominican Republic	Contributing RTX
<i>Puerto Caucedo/San Andres/Santo Domingo</i>	Dominican Republic	Down
<i>Puerto Plata</i>	Dominican Republic	Contributing RTX
<i>Punta Cana</i>	Dominican Republic	Contributing RTX
<i>Bahía de Luperón</i>	Dominican Republic	Gap
<i>Bahía de Samaná</i>	Dominican Republic	Gap
<i>Bayahibe</i>	Dominican Republic	Gap
<i>Pedernales</i>	Dominican Republic	Gap
<i>Puerto de Santo Domingo</i>	Dominican Republic	Removed
<i>Ile Royale</i>	French Guiana	Contributing RTX
<i>Prickly Bay</i>	Grenada	Contributing RTX
<i>Sauteurs</i>	Grenada	Planned
<i>The Sisters Island</i>	Grenada	Planned
<i>Pointe à Pitre</i>	Guadeloupe	Contributing RTX
<i>Deshaies Harbour</i>	Guadeloupe	Contributing RTX
<i>La Désirade Island, Grande Anse Marina Harbour</i>	Guadeloupe	Down
<i>Puerto Barrios</i>	Guatemala	Down
<i>Harbour Master Boathouse</i>	Guyana	Existing
<i>Market Place Georgetown</i>	Guyana	Existing
<i>Rosignol</i>	Guyana	Down
<i>Parika</i>	Guyana	Unknown
<i>Cap Haitien</i>	Haiti	Down
<i>Jacmel</i>	Haiti	Down
<i>Port au Prince</i>	Haiti	Down
<i>Gonaïves</i>	Haiti	Planned

<i>Port de Paix</i>	Haiti	Planned
<i>Jeremie</i>	Haiti	Planned
<i>St. Louis du Sud</i>	Haiti	Planned
<i>Guanaja Island</i>	Honduras	Existing
<i>Omoa</i>	Honduras	Existing
<i>Puerto Cortes</i>	Honduras	Contributing RTX
<i>Puerto De Castilla, Trujillo</i>	Honduras	Existing
<i>Roatan N</i>	Honduras	Existing
<i>Punta Gorda Harbor, Roatan S</i>	Honduras	Contributing RTX
<i>Tela Harbor</i>	Honduras	Down
<i>Utila Island</i>	Honduras	Down
<i>Cabotaje Harbor, La Ceiba</i>	Honduras	Contributing RTX
<i>Cochino Pequeño</i>	Honduras	Gap
<i>Swan Island</i>	Honduras	Gap
<i>Port Royal</i>	Jamaica	Contributing RTX
<i>Montego Bay</i>	Jamaica	Existing
<i>Port Antonio</i>	Jamaica	Existing
<i>Discovery Bay, Jamaica</i>	Jamaica	Gap
<i>Alligator Pond</i>	Jamaica	Down
<i>Fort de France Harbour</i>	Martinique	Contributing RTX
<i>Le Precheur Harbour</i>	Martinique	Contributing RTX
<i>Le Robert</i>	Martinique	Contributing RTX
<i>Alvarado</i>	Mexico	Contributing RTX
<i>Celestun</i>	Mexico	Contributing RTX
<i>Ciudad del Carmen</i>	Mexico	Contributing RTX
<i>Lerma Campeche</i>	Mexico	Contributing RTX
<i>Frontera</i>	Mexico	Down
<i>Isla Mujeres</i>	Mexico	Contributing RTX
<i>Isla Clarion</i>	Mexico	Down
<i>Progreso</i>	Mexico	Down
<i>Puerto Morelos, Q. R.</i>	Mexico	Contributing RTX
<i>Sanchez Magallanes</i>	Mexico	Contributing RTX
<i>Sisal</i>	Mexico	Down
<i>Tuxpan</i>	Mexico	Contributing RTX
<i>Telchac</i>	Mexico	Down
<i>Veracruz</i>	Mexico	Contributing RTX
<i>Montserrat</i>	Montserrat	Gap
<i>Corn Island</i>	Nicaragua	Down
<i>Blue Fields</i>	Nicaragua	Gap
<i>Puerto Bilwi</i>	Nicaragua	Contributing RTX
<i>Puerto Cabezas</i>	Nicaragua	Gap
<i>Puerto El Bluff</i>	Nicaragua	Contributing RTX
<i>El Porvenir</i>	Panama	Contributing RTX

<i>Bocas del Toro</i>	Panama	Contributing RTX
<i>Galeta Point</i>	Panama	Existing
<i>Limon Bay (replaced Coco Solo)</i>	Panama	Existing
<i>Aguadilla</i>	Puerto Rico	Down
<i>Arecibo</i>	Puerto Rico	Contributing RTX
<i>Culebra Island</i>	Puerto Rico	Contributing RTX
<i>Fajardo</i>	Puerto Rico	Down
<i>Isabel II, Vieques</i>	Puerto Rico	Contributing RTX
<i>La Esperanza, Vieques</i>	Puerto Rico	Contributing RTX
<i>Magueyes Island</i>	Puerto Rico	Contributing RTX
<i>Mayagüez</i>	Puerto Rico	Contributing RTX
<i>Mona Island</i>	Puerto Rico	Contributing RTX
<i>San Juan</i>	Puerto Rico	Contributing RTX
<i>Yabucoa</i>	Puerto Rico	Contributing RTX
<i>Peñuelas</i>	Puerto Rico	Removed
<i>Caja de Muertos</i>	Puerto Rico	Down
<i>Baseterre (Coast Guard Base)</i>	St. Kitts & Nevis	Down
<i>Dennery Harbour</i>	St. Lucia	Planned
<i>Soufriere</i>	St. Lucia	Planned
<i>Vieux Fort Bay</i>	St. Lucia	Planned
<i>Ganter's Bay</i>	St. Lucia	Contributing RTX
<i>Calliaqua (Coast Guard Base)</i>	St. Vincent & the Grenadines	Contributing RTX
<i>Gustavia</i>	St. Barthelemy	Planned
<i>Saint Martin Island</i>	St. Martin	Contributing RTX
<i>Cedros Bay</i>	Trinidad and Tobago	Down
<i>Charlotteville</i>	Trinidad and Tobago	Down
<i>Point Fortin</i>	Trinidad and Tobago	Down
<i>Port Of Spain</i>	Trinidad and Tobago	Down
<i>Scarborough</i>	Trinidad and Tobago	Down
<i>Toco Trinidad</i>	Trinidad and Tobago	Down
<i>Point Galeota</i>	Trinidad and Tobago	Removed
<i>Point a Pierre</i>	Trinidad and Tobago	Planned
<i>Grand Turk</i>	Turks and Caicos	Gap
<i>Charlotte Amalie, St. Thomas</i>	USVI	Contributing RTX
<i>Christiansted Harbor, St. Croix</i>	USVI	Contributing RTX
<i>Lameshur Bay, St. John</i>	USVI	Contributing RTX
<i>Lime Tree Bay, St. Croix</i>	USVI	Contributing RTX
<i>Aves Island</i>	Venezuela	Gap
<i>Punta Arenas, Margarita Island</i>	Venezuela	Gap
<i>La Guaira</i>	Venezuela	Existing