

## Stream flow Bulletin – July 2024

### Introduction

This stream flow bulletin examines the flows within 12 major rivers in Jamaica's 10 Hydrologic Basins. It assesses the rivers responses to rainfall conditions, and the impact of dry and wet seasons on flow dynamics. The Bulletin uses the monthly Rainfall Summary from the Meteorological Services of Jamaica and the Caribbean Climate Outlook Forum (CariCOF) Drought Outlook and the Caribbean Climate Outlook Newsletter for predicted climatic information.

### Climatic Outlook

The Meteorological Service of Jamaica (MSJ) has reported that all 13 parishes recorded rainfall amounts above their respective 30-year means with values ranging from 116% to 673% for July. It further reported that all parishes experienced wetness ranging from near-normal to exceptionally, therefore, there was no report of meteorological drought conditions. The precipitation **forecasts** by the MSJ and CariCOF for August 2024 is for 15-60% - above-normal probabilities. There is also the probability of up to 70% above normal precipitation in some parishes.

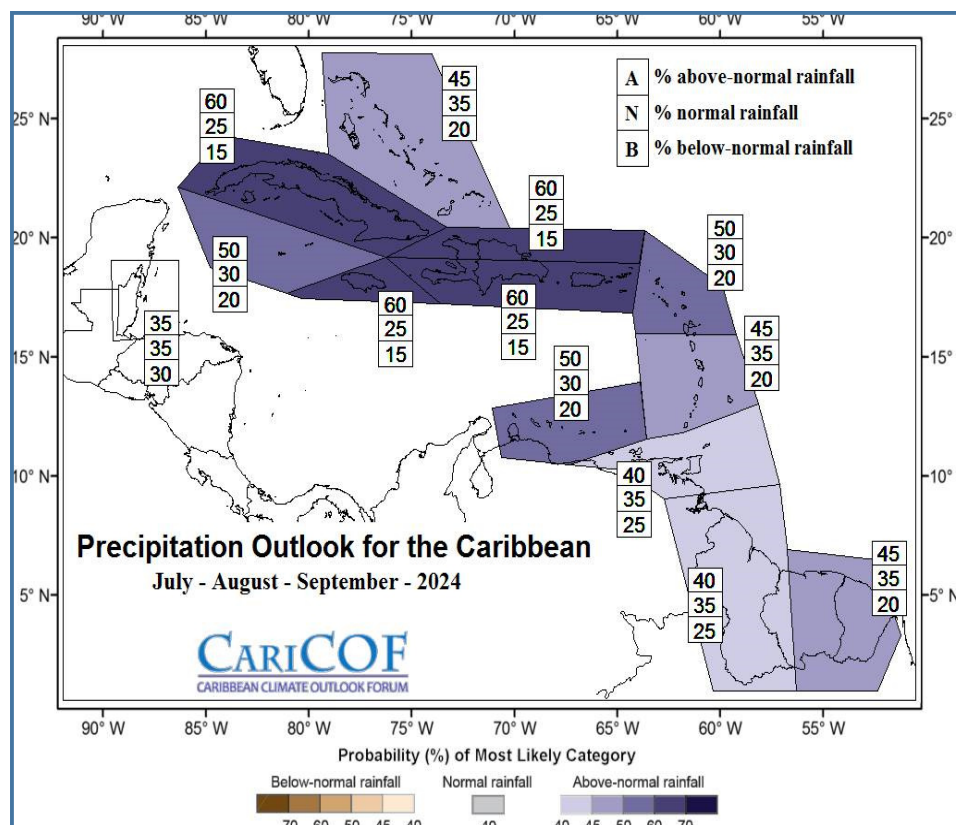
### Precipitation

### Outlook

### July 2024— September 2024

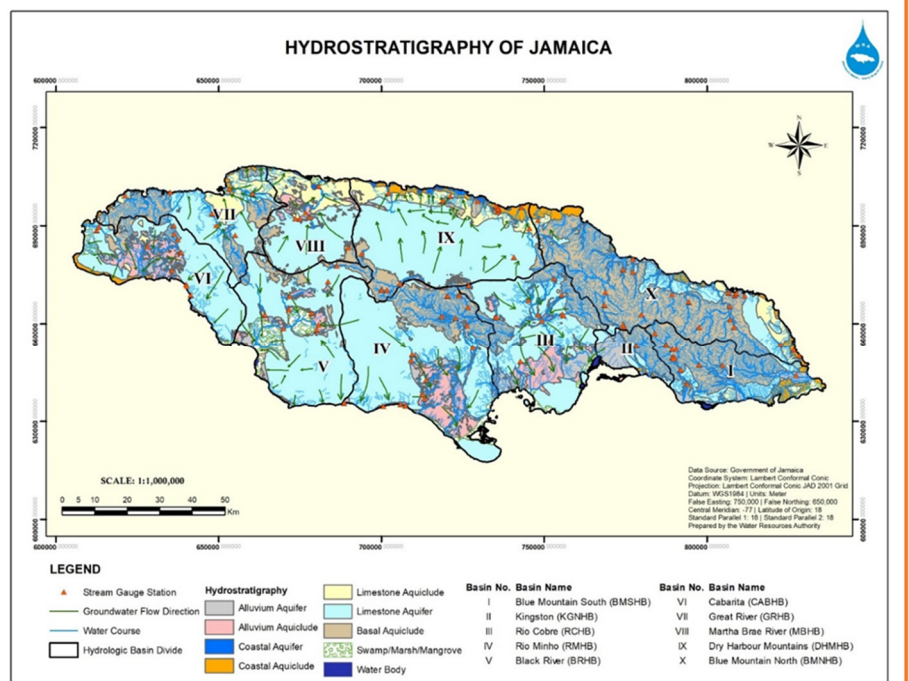
The diagram shows the July 2024 to September 2024 precipitation outlook for the Caribbean. The forecast is for Jamaica to receive below – normal rainfall amounts for the period.

Source: Caribbean Climate Outlook Forum



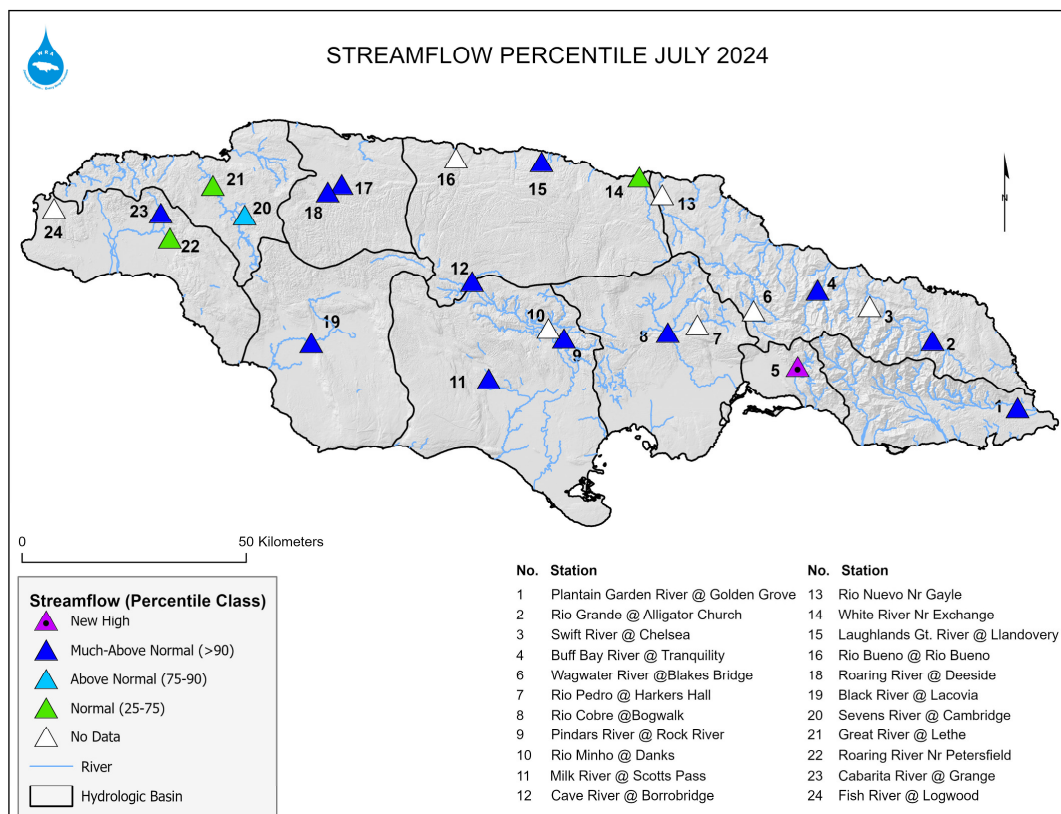
## Jamaica Hydrologic Basins and Hydrostratigraphy

The map shows Jamaica Hydrologic Basins and Hydrogeologic Units (Hydrostratigraphy). Basins X, II, I and the Central Inliers which straddle both Basins IX and IV consist of Volcanoclastic rocks which comprise the Basal Aquicludes, while Basins IX, IV, III, VIII, VII and VI are predominantly limestone aquifers.



## Situation analysis

The hydrological conditions improved in July in all ten Hydrologic Basins as the island rivers and aquifers respond to increase rainfall which has been impacting the island since June and also from hurricane Beryl which contributed significant volumes. Flows averages ranged from normal to much-above normal (25 to above 90 percentile) with the majority being in the upper percentile. The Hope River near Gordon Town recorded the highest flow for July in the history of the station. (Please see the diagram below)



## Further Analysis

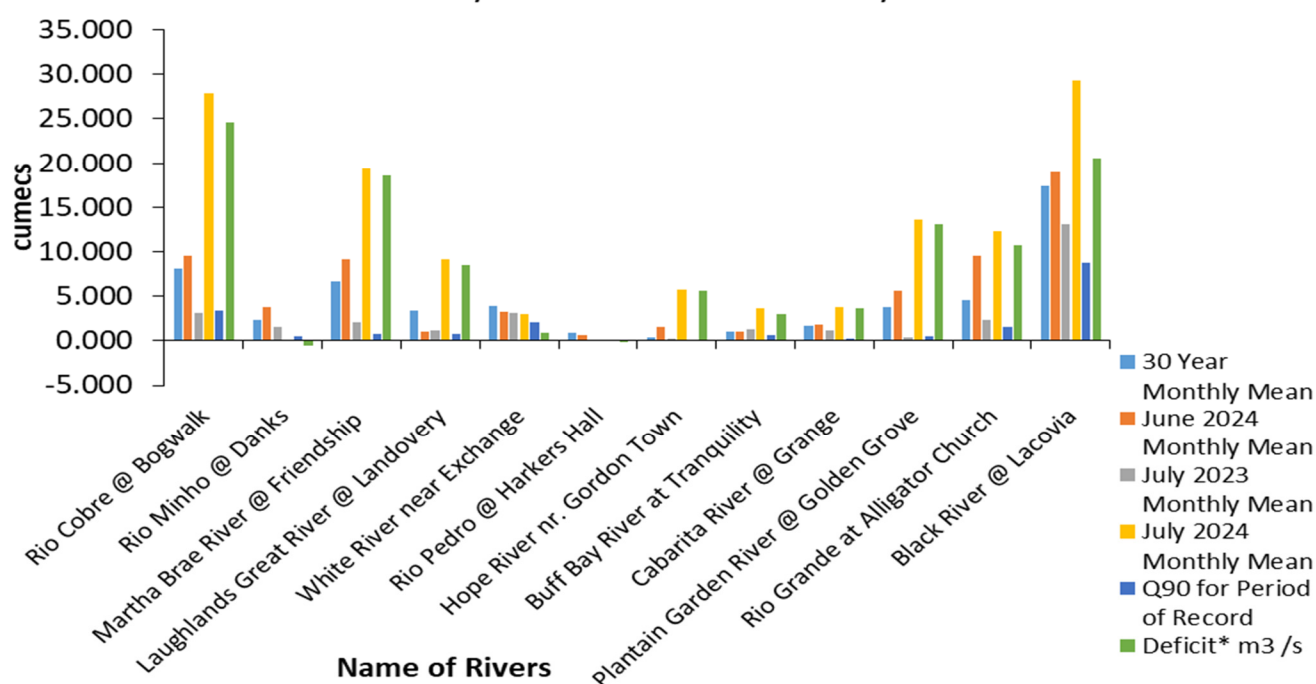
Flow averages recorded for July 2024 were greater in 9 rivers when compared to July 2023, ranging from 224.7% (Black River at Lacovia) to 3692.7% (Plantain Garden River at Golden). The White River near Exchange recorded less flow while there was absent data for the Rio Minho at Danks and the Rio Pedro at Harkers Hall. When compared with June 2024 averages, 9 rivers recorded greater flows in July ranging from 1.936m<sup>3</sup>/s (Cabarita River @ Grange) to 18.45m<sup>3</sup>/s (Rio Cobre at Bog Walk), that is 43,822,970 to 421,111,400 gallons/day, more flow respectively. Nine rivers recorded greater average flows in July ranging from 169.2% (Black River at Lacovia) to 1638% (Hope River near Gordon Town) when compared to the respective 30—year monthly means. There was no record of flow deficit for July as all the rivers recorded higher averages than their respective Q90s ( the rivers with the negative values are as a result of absent data). The table below show flows by volume in cubic metres per second.

**Comparison of monthly mean of July 2024 to the 30 year monthly mean and the Q90**

Name of River	Parish	30 Year Monthly Mean	June 2024 Monthly Mean	July 2023 Monthly Mean	July 2024 Monthly Mean	Q90 for Period of Record	Deficit* m <sup>3</sup> /s
Rio Cobre @ Bogwalk	St. Catherine	8.090	9.49	3.126	27.94	3.371	24.569
Rio Minho @ Danks	Clarendon	2.370	3.73	1.62		0.518	-0.518
Martha Brae River @ Friendship	Trelawny	6.730	9.14	2.037	19.358	0.835	18.523
Laughlands Great River @ Landoverly	St. Ann	3.408	1.018	1.121	9.199	0.732	8.467
White River near Exchange	St. Ann	3.952	3.233	3.139	2.955	2.089	0.866
Rio Pedro @ Harkers Hall	St. Catherine	0.869	0.701	0		0.093	-0.093
Hope River nr. Gordon Town	Kingston	0.350	1.516	0.212	5.733	0.171	5.562
Buff Bay River at Tranquility	Portland	0.987	1.05	1.35	3.694	0.703	2.991
Cabarita River @ Grange	Westmoreland	1.660	1.885	1.119	3.821	0.21	3.611
Plantain Garden River @ Golden Grove	St. Thomas	3.817	5.558	0.368	13.589	0.477	13.112
Rio Grande at Alligator Church	Portland	4.600	9.54	2.341	12.258	1.547	10.711
Black River @ Lacovia	St. Elizabeth	17.349	18.939	13.04	29.304	8.76	20.544

\* Deficits are denoted by a negative value (Deficit = Monthly Mean - Q90)

**Comparison of the July 2024, July 2023, June 2024, the 30-year monthly means and the reliable yields**



Graphical representation of the comparisons shown in the table.



## Discussion

Analysis of the hydrologic data for July 2024 showed increase flow volumes in 75% of rivers which were analysed, when compared with July 2023. Additionally, greater flows were recorded for July 2024 in 75% of the rivers when compared to June 2024, this is an increase of 17% over the period May to June 2024. Regarding the 30—year monthly mean flows, 9 of the 12 rivers recorded greater flow averages than their respective 30—year normal. There were no reports of flow deficit for June 2024.

The flow trends large corresponds with the forecasts from the Caribbean Climate Outlook of higher than usual rainfall conditions across Jamaica for July, 2024.

According to CariCOF Drought Outlook and the Caribbean Climate Outlook, Jamaica may experience normal to higher rainfall probabilities of 15 to 60% for July to September along with above normal temperatures. Based on these forecast, it is expected that rivers in the 10 Hydrologic Basins will continue to experience normal to above-normal flow conditions for July to September, and greater than the respective reliable yields in most, if not, in all instances (especially in rivers that are aquifer fed). It is expected that average flows for August 2024 will be greater than the respective 30—years monthly means in most cases and greater than those of July 2024 averages as Jamaica continue to advance into the hurricane season and with the prediction of usual or higher than normal rainfall.

## Definition of Terms

**Hydrological Drought**—This is a hydrological extreme that manifests in abnormally low stream flows, levels in ponds and lakes, reservoirs and groundwater. Hydrological droughts occurs after many months of meteorological drought, that is, extended period of below normal rainfall.

**Q90**—Q90 or reliable yield, is a statistical low flow index that represents flows that either exceeds or occur 90% of the time. It assists in determining the resource availability during periods of drought.

**Percentile**—A percentile is a value on a scale of 100 that indicates the percent sample distribution (in this case a particular flow) that is equal to or below it. For example, stream flows in this calendar month at the 90<sup>th</sup> percentile are equal to or greater than 90 percent of the stream flows which have been recorded in the calendar month for the extent of the station.

*Percentiles above 90 are considered Much-Above Normal,*

*Percentiles between 75 and 90 are considered Above Normal,*

*Percentiles between 25 and 75 are considered Normal,*

*Percentiles between 10 and 25 are considered Below Normal, and*

*Percentiles below 10 are considered Much-Below Normal.*

**Stream gauging station**— Gauging stations are facilities use to automatically monitor streams, or other water bodies.

**To convert from m<sup>3</sup>/s to gal/day:** -  $\text{m}^3/\text{s} \times 86400 \text{ s/day} \times 264.1721 \text{ gals}$  (where m<sup>3</sup> = cubic meters, s = seconds and gal = U.S. gallons).

Prepared by the

Resource Collection and Data Monitoring Section

Water Resources Authority

P.O. Box 91, Hope Gardens, Kingston 7

Email: [info@wra.gov.jm](mailto:info@wra.gov.jm), Website: [wra.gov.jm](http://wra.gov.jm) Twitter: @wragovja

October 2024