

## Stream flow Bulletin – November 2024

### Introduction

This stream flow bulletin examines the flows of 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

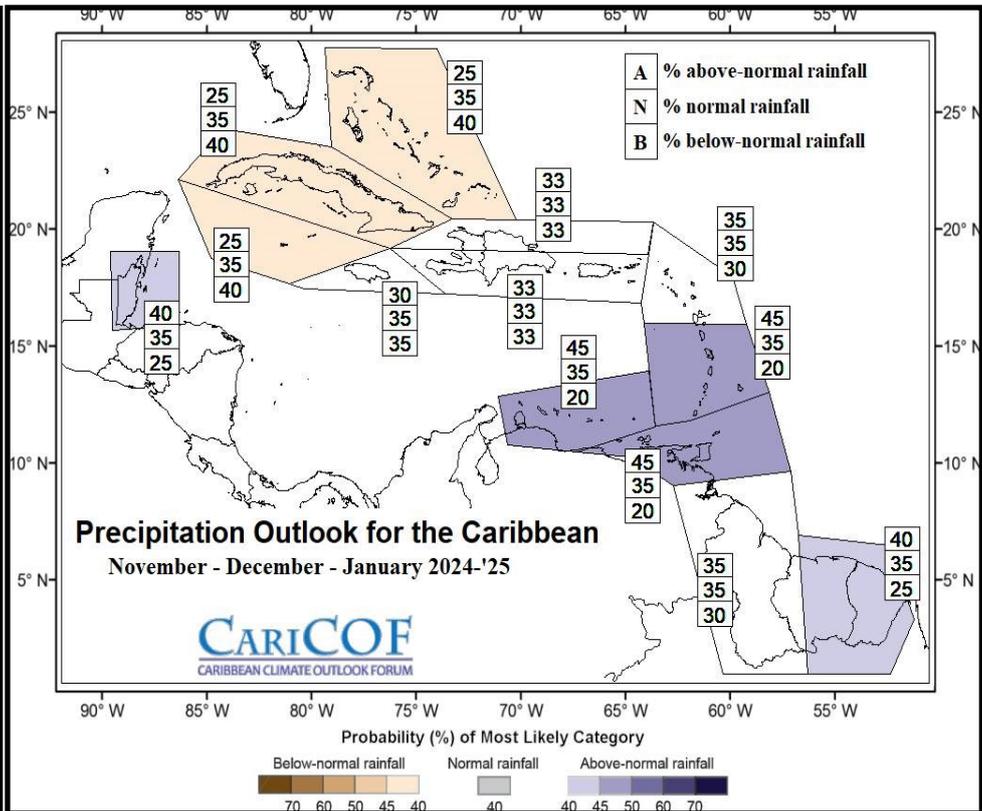
The Meteorological Service of Jamaica (MSJ) has reported that 13 parishes recorded rainfall amounts above their respective 30-year means with values ranging from 136% to 327% for November. It further reported that all parishes experienced wetness ranging from near-normal to extremely wet. There was no report of meteorological drought conditions for any of the parishes. The precipitation forecasts by the MSJ for December 2024 is for 50-70% lower-than-normal probabilities for St. Catherine and Clarendon, sections of KSA, St. Thomas, Portland, St. Elizabeth, Westmoreland, and Hanover. There is also the probability of 40-60% above normal precipitation for Trelawny and St. Ann.

### Precipitation Outlook

#### November—December 2024

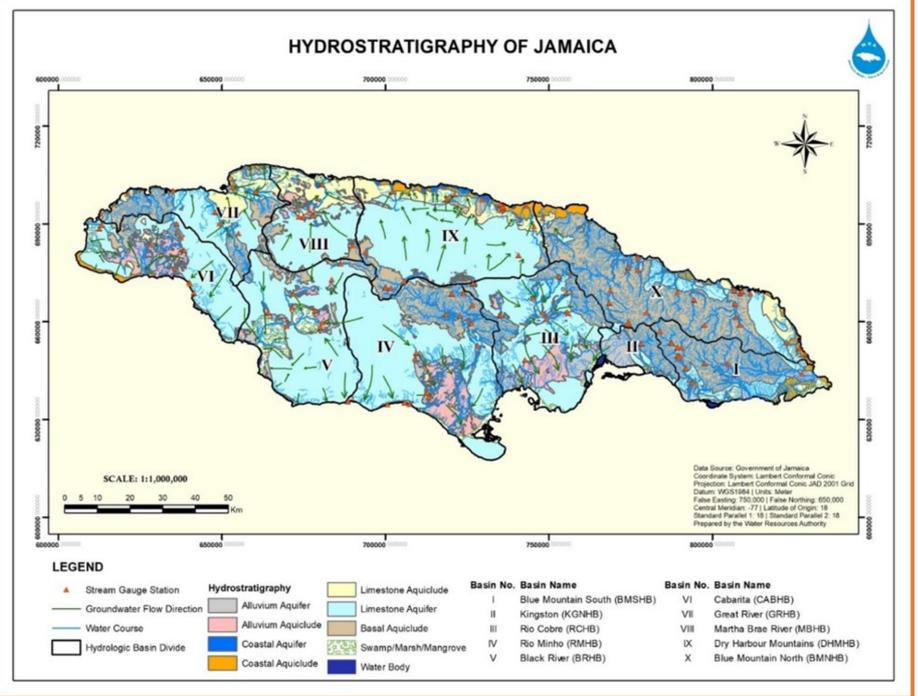
The diagram shows the November to December 2024 precipitation outlook for the Caribbean. The forecast is for Jamaica to receive below – normal rainfall amounts for the period.

*Source: Caribbean Climate Outlook Forum*



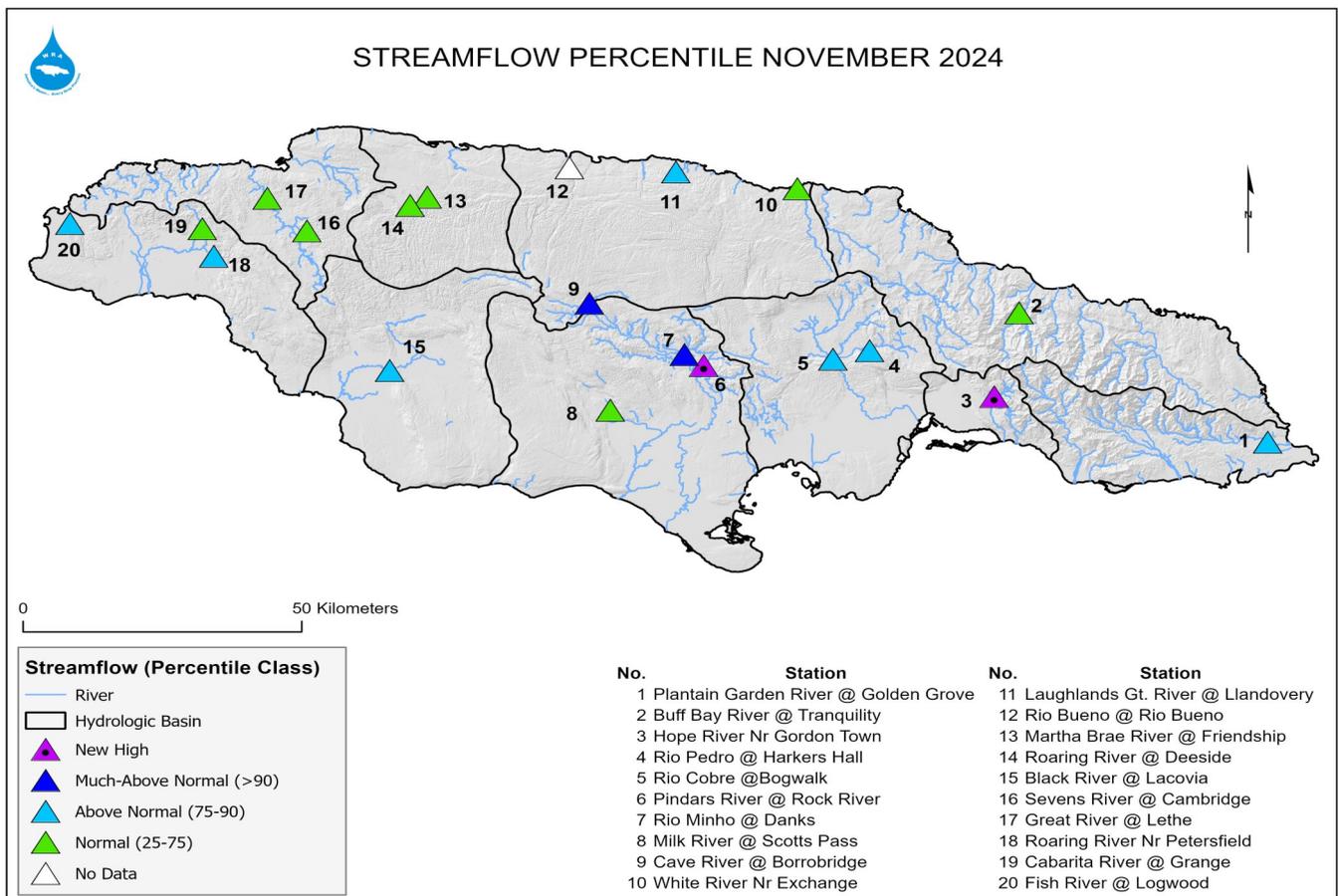
## Jamaica Hydrologic Basins and Hydrostratigraphy

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 for November indicated stream flow averages for the 10 Hydrologic Basins ranged from normal percentiles to new highs (the highest flow averages recorded for November). The Hope River near Gordon Town and the Pindars River at Rock River recorded new highs, while the Rio Minho at Danks and the Cave River at Borobridge recorded flows greater than the 90 percentile or much-above normal. These high flows were as a result of increased runoff and baseflow associated with tropical storm Rafael. ( Please see the diagram below)



### Further Analysis

Flow averages recorded for November 2024 were greater in all 12 rivers when compared with November 2023 ranging from 105% (Hope River nr Gordon Town) to 481% (Rio Minho at Danks). When compared with October 2024 averages, eleven rivers recorded greater flows in November ranging from 0.311m<sup>3</sup>/s or 7,098,409 gal/dy (White River near Exchange) to 18.67m<sup>3</sup>/s or 4.261328 x 10<sup>8</sup> gal/dy (Rio Grande at Alligator Church). Ten rivers recorded greater average flows in November ranging from 113% (Cabarita River at Grange) to 297% (Rio Minho at Danks) when compared to the respective 30—year monthly means. There was no record of flow deficit in November.

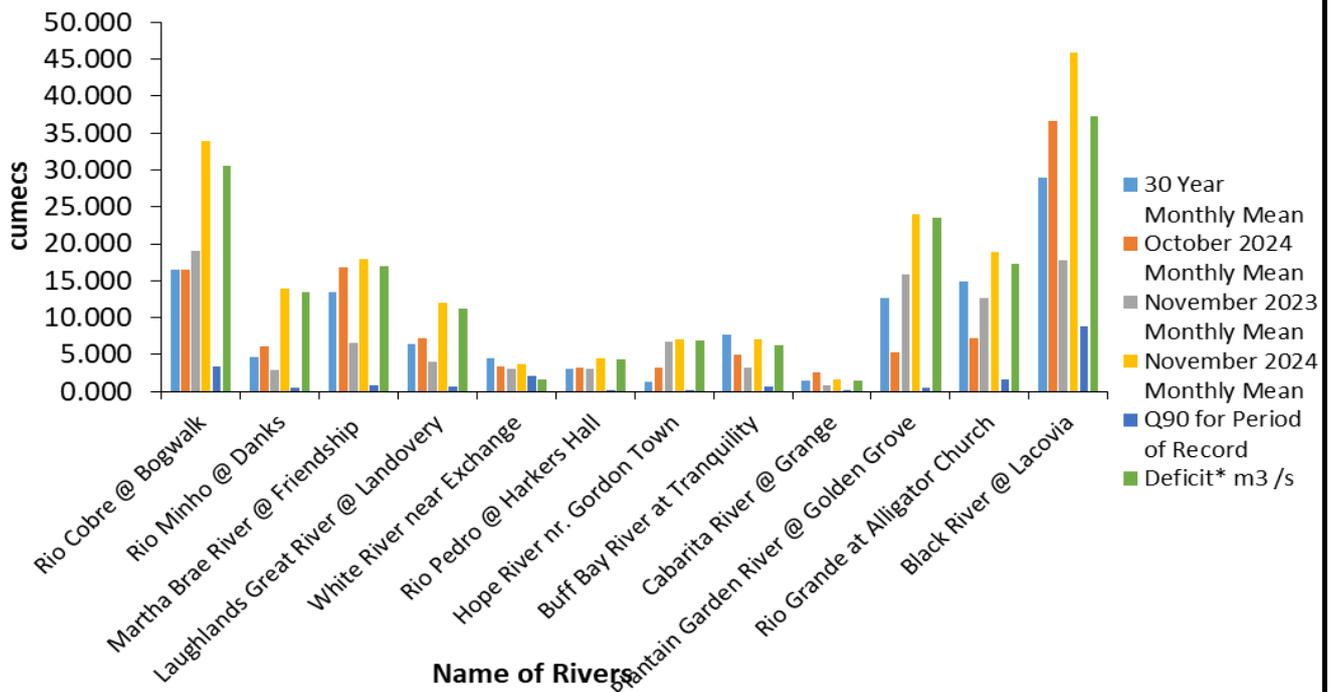
The table below show flows by volume in cubic metres per second.

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

| Name of River                        | Parish        | 30 Year Monthly Mean | October 2024 Monthly Mean | November 2023 Monthly Mean | November 2024 Monthly Mean | Q90 for Period of Record | Deficit* m <sup>3</sup> /s |
|--------------------------------------|---------------|----------------------|---------------------------|----------------------------|----------------------------|--------------------------|----------------------------|
| Rio Cobre @ Bogwalk                  | St. Catherine | 16.480               | 16.477                    | 19.08                      | 33.907                     | 3.371                    | 30.536                     |
| Rio Minho @ Danks                    | Clarendon     | 4.690                | 6.09                      | 2.90                       | 13.96                      | 0.518                    | 13.437                     |
| Martha Brae River @ Friendship       | Trelawny      | 13.470               | 16.783                    | 6.627                      | 17.852                     | 0.835                    | 17.017                     |
| Laughlands Great River @ Landoverly  | St. Ann       | 6.441                | 7.147                     | 4.03                       | 11.985                     | 0.732                    | 11.253                     |
| White River near Exchange            | St. Ann       | 4.490                | 3.357                     | 3.084                      | 3.668                      | 2.089                    | 1.579                      |
| Rio Pedro @ Harkers Hall             | St. Catherine | 3.015                | 3.219                     | 3.11                       | 4.489                      | 0.093                    | 4.396                      |
| Hope River nr. Gordon Town           | Kingston      | 1.360                | 3.245                     | 6.806                      | 7.115                      | 0.171                    | 6.944                      |
| Buff Bay River at Tranquility        | Portland      | 7.623                | 5.025                     | 3.18                       | 7                          | 0.703                    | 6.297                      |
| Cabarita River @ Grange              | Westmoreland  | 1.450                | 2.561                     | 0.782                      | 1.65                       | 0.21                     | 1.44                       |
| Plantain Garden River @ Golden Grove | St. Thomas    | 12.713               | 5.321                     | 15.868                     | 23.991                     | 0.477                    | 23.514                     |
| Rio Grande at Alligator Church       | Portland      | 14.940               | 7.181                     | 12.69                      | 18.83                      | 1.547                    | 17.283                     |
| Black River @ Lacovia                | St. Elizabeth | 28.894               | 36.687                    | 17.775                     | 45.958                     | 8.76                     | 37.198                     |

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

**Comparison of the November 2024, November 2023, October September 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 November 2024 showed greater flow volumes in 100% of rivers which were analysed, when compared with the same period of 2023. Additionally, eleven rivers recorded greater flows than the October 2024 averages. Regarding the 30—year monthly mean flows, 10 of the 12 rivers recorded less flow averages than their respective 30—year normal. The figure on page 2 shows that 8 rivers recorded flows between 75 to 90 percentiles (above and much-above average) while 2 rivers recorded the highest average for the November. There was no record of flow deficit in November 2024.

The flow trends did not correspond with the forecasts of lower than usual rainfall conditions for some sections of Jamaica for November 2024, due to the impact from rainfall as a result of tropical storm Rafael.

According to CariCOF Drought Outlook and the Caribbean Climate Outlook, Jamaica may experience higher than usual rainfall probabilities of 40 to 70% for December along with above normal temperatures. Based on these forecasts, it is expected that rivers in the 10 Hydrologic Basins will continue to experience normal to above-normal flow conditions in December, and greater than the respective reliable yields in most, if not, in all instances (especially in rivers that are aquifer fed as aquifers are recharge by the November rains). It is expected that average flows for December 2024 will be greater than the respective 30—years monthly means in approximately to 60% of the rivers and comparable to those of November 2024 averages.

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

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