



MONTERRAT UTILITITES LIMITED



WATER CONSUMER CONFIDENCE REPORT-2020



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Introduction

This report summarises the public drinking water supplies for Montserrat over the period 2020-2021.

Montserrat is known for its natural spring water that is used widely across the island for a number of different uses ranging from domestic to commercial. Spring water can be defined as water that is a natural outflow of water from an underground supply to the ground surface. In essence it is groundwater, well water or artesian water that comes from an underground aquifer.

Water quality can be impacted by agricultural practices, natural occurrences and pollution due to human interference. It is the mandate of the Montserrat Utilities Ltd. Water and Waste water division to ensure that clean, safe, drinking water is provided to the public 24 hours a day.

Where does my water come from?

There are 6 springs namely Killiecrankie, Hope, Olveston, Quashie, Lawyers, Forgathy springs and one well that currently supply water to the four thousand and ninety-six (4096) connections to the piped water system on island. However, before the water gets to your home it is stored in reservoirs at various points across the island and disinfected with chlorine.

The table below shows a synopsis of the water distribution network highlighting areas which are fed from the various reservoirs. All of Montserrat's reservoirs are interconnected across the island, supplying and distributing water to various districts. As a result, it's critical to note that reservoirs are not confined to serving the areas specified in the table below.





MONTSERRAT RESERVOIRS



Davy Hill Reservoir	Dick Hill Reservoir	Baker Hill Reservoir	Lawyer's Reservoir	Olveston Reservoir	Hope Reservoir
Davy Hill	Blakes	Cudjoe Head	Woodland's	Isles Bay	Salem
Little Bay	St.John's	Brades	Old Towne	Glebe	Hope
Carr's Bay	Look Out	Nixxon's	Olveston	Olveston	Upper and Lower Frith's
	Gerald's	Bank's			Happy Hill
		Manjack			

Figure 1: Table Showing Distribution Summary

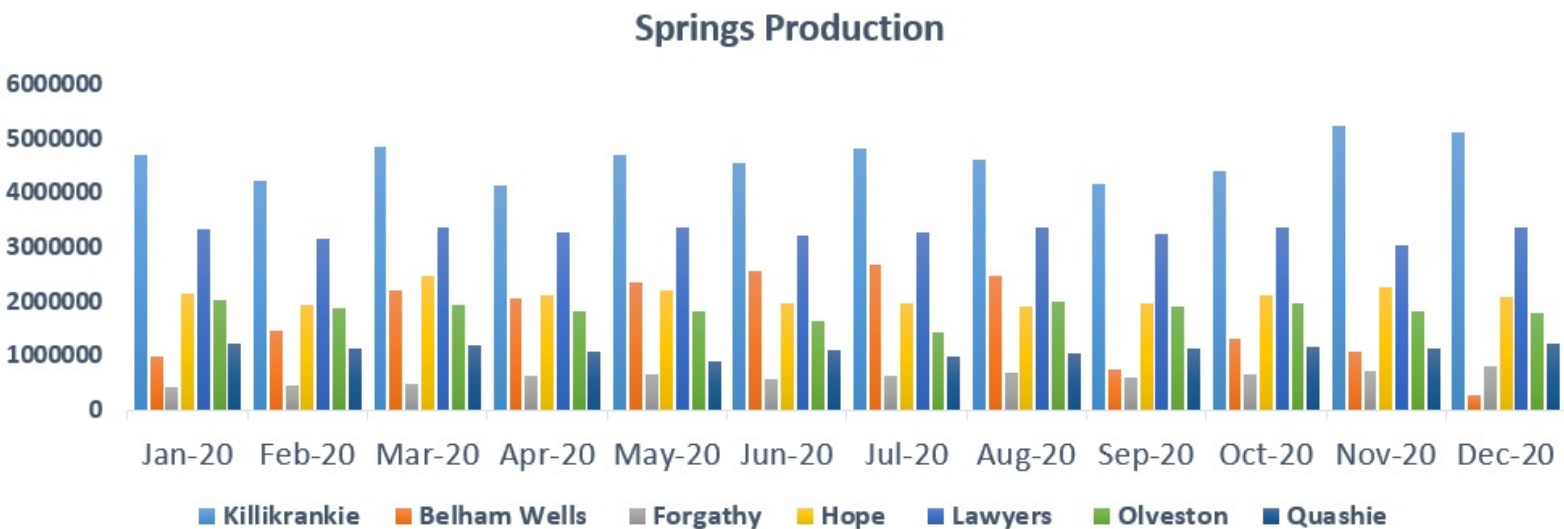


Montserrat now has 11 reservoirs with a combined capacity of 1,665,000 gallons of water. The following image shows the reservoirs, along with their respective total capacity.

RESERVOIRS	CAPACITY
Baker Hill	480,000
Davy Hill	20,000
Lower Dick Hill	100,000
Upper Dick Hill	40,000
Friths	60,000
Hope 1	135,000
Hope 2	400,000
Lawyers 2	150,000
Mars Hill	40,000
Olveston	60,000
St. Peters	180,000



Figure 2: Graph Showing Water Production from Springs and Wells



For the months of January through December 2020, the graph above depicts the total gallons of water produced.

The total gallons of water generated for the year was 182,526,270, with the maximum production of 16,483,280 in March and the lowest production of 14,224,930 in February.

The Killiecrankie spring provides the majority of Montserrat's water, while Forgathy Springs provides the smallest quantity.



PRODUCTION & CONSUMPTION

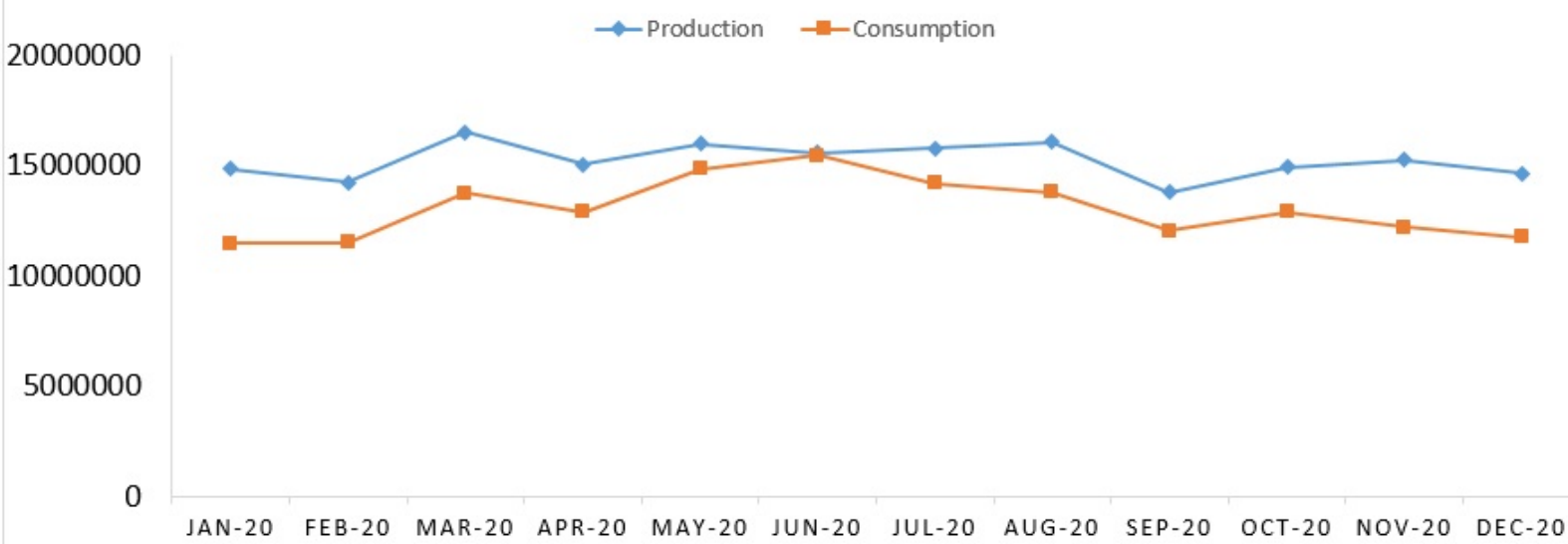


Figure 3: Graph Showing Comparison of Production and Consumption

Figure 3 shows water production by the springs and consumption of treated water by consumers that was recorded by the pump operators. Supply and demand were the closest for the year in June with an excess of 118,960 gallons of water.

This might seem like a lot but in actuality 435,000 gallons of water is used on island per day. Based on rainfall data collected for the year, the dry period for that year was April to June since only 6.55 inches of rain was recorded. It can therefore be inferred that more water was demanded by consumers particularly for irrigation purposes during this period.



Is my water safe?

To determine the level of water quality being provided and to ensure that adverse health effects are avoided, physio-chemical parameters namely pH, temperature, turbidity, conductivity and salinity are monitored routinely at the spring source before the water is treated and at the reservoir site after the water is treated with chlorine disinfectant. These tests are conducted on-site using hand held meters which provide instant results.

A test for conductivity will reveal the amount of organic or inorganic ions that may be present in the water naturally or through pollution based on the ability of the water to conduct electricity.

Turbidity assesses the level of suspended matter such as clay, silt, finely divided organic and inorganic matter, soluble coloured inorganic compounds, plankton and other micro-organisms.

pH and temperature work hand in hand as they can affect the efficacy of the chlorine treatment.

The World Health Organisation and Caribbean Public Health Agency has determined quantitative limits which determine what a 'good quality' of water is.





CARPHA's recommended limits for drinking water are:

PARAMETER	LIMIT
E.coli	<1 CFU/ 100mL
pH	6.5-9 units
Turbidity	<1 NTU
Residual Chlorine	0.2-1 mg/L

Analysis for the raw water coming from the springs and the wells typically record the results shown in the table below when sampled. Note that the World Health Organisation's guideline recommends that raw water should have less than 25 counts of fecal coliform to be considered fit for drinking water purposes.

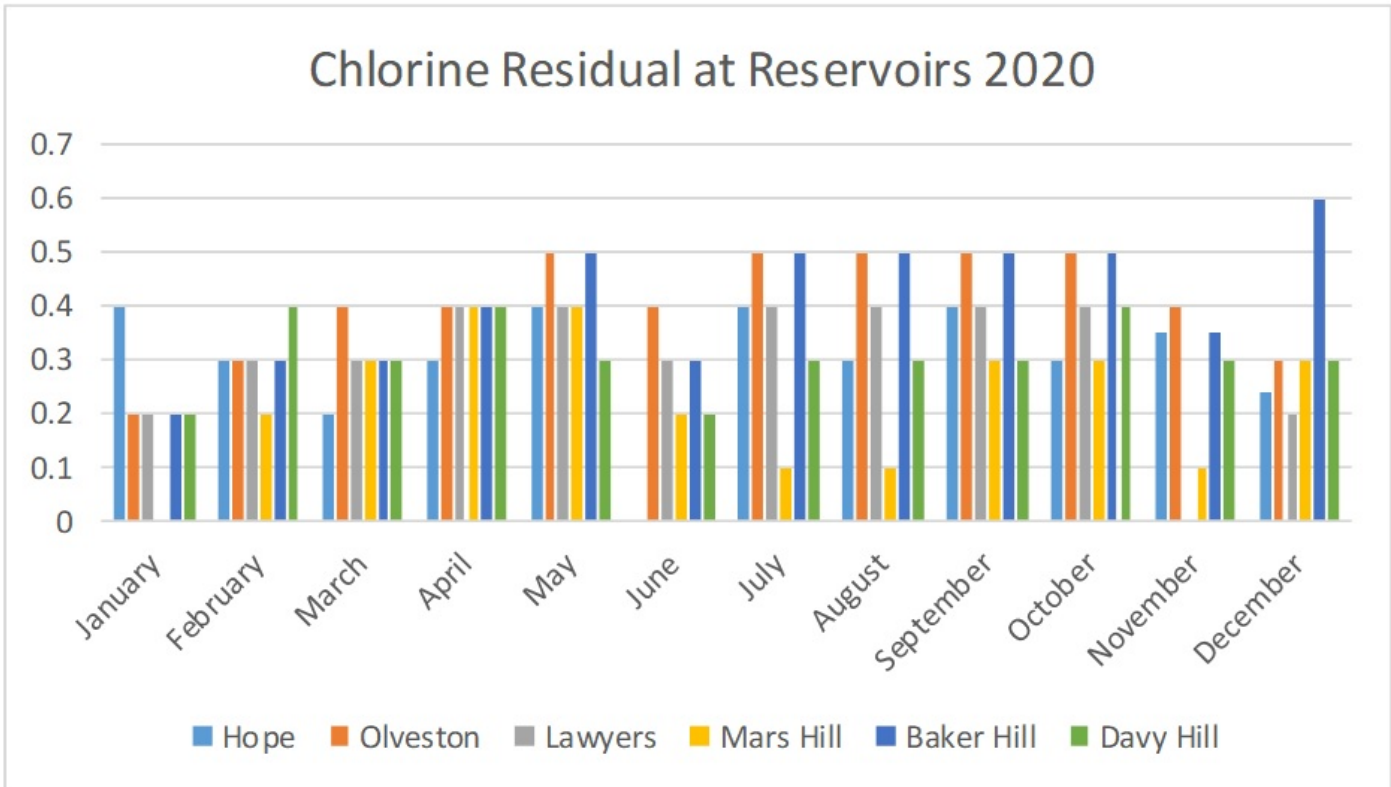
PHYSIO - CHEMICAL PARAMETERS	KILLIECRANKIE SPRING	HOPE SPRING	OVESTON SPRING	QUASHIE SPRING	LAWYERS SPRING	FORGATHY SPRING	BELHAM WELL #2
Ph	7.71	7.61	7.21	7.21	7.17	6.85	7.65
Temperature Degrees Celsius °C	26.3	24.2	24	23.7	24.5	24.2	29.8
Turbidity, Nephelometric Turbidity Units (NTU)	0.25	0.03	0.66	0.22	0.35	1.11	0.13
Conductivity	335.5	292.2	286.1	266.9	267.7	339.6	767
Specific Conductivity	327.2	297.3	291.8	276	272.4	345.9	696
Salinity, parts per million (ppm)	0.2	0.1	0.1	0.1	0.1	0.2	0.3
Micro-Biological							
Fecal Coliform (FC)	None Detected	None Detected	1	None Detected	4	6	None Detected

Table1: Typical Results Recorded for Raw Water



Additionally, samples are collected and transported to the laboratory for microbial testing. The coliform group of bacteria is the principal indicator of the suitability of water for domestic, industrial and other uses. The density of coliform presence is a criteria of the degree of pollution and thus of sanitary quality. It also indicates the efficacy of the treatment process. Fecal enterococci are also indicators of fecal pollution. However, the presence of any coliform bacteria renders the water satisfactory and unsafe. Therefore, isolation of certain pathogenic bacteria and protozoa are not recommended for routine use.

Tests for nutrients, trace metals and more specific waterborne disease causing organisms namely P.aeruginosa, E.coli and Enterococci are analysed externally by the Caribbean Public Health Agency in St. Lucia. Recently, DR Diagnostic Services tested the water at the spring sources for E.coli, Enterococci, and P.aeruginosa, and the results all came back with zero counts detected.





Chlorine is a useful disinfectant for storage tanks and pipes as well as for controlling taste and odour resulting from organic matter, algae and slime. The World Health Organisation recommends a residual concentration of free chlorine 0.2 to 0.5mg/l after at least 30 minutes contact time at a pH less than 8.0 or above 7.5. The Montserrat Utilities limited maintains chlorine residuals throughout the entire distribution at 0.1-0.3mg/l.

The presence of free chlorine residual in drinking water indicates that:

- 1) A sufficient amount of chlorine was added to the water to inactivate most of the bacteria and viruses that can cause diarrheal disease
- 2) The water is protected from recontamination during transport to the home and during storage of water in the household for a period up to 24hours.

Note that the chlorine demand, i.e. the amount of chlorine needed to effectively disinfect water typically varies based on the characteristics of the water. Chlorine residual is checked at least twice weekly.

How can I get involved?

Climate change will have a significant impact on water sources all over the world. Longer-term droughts and salt water intrusion are two of the negative consequences that will occur due to climate change. Although Montserrat is fortunate since we do not rely on surface water, our water supply can still be impacted. The effects may not be felt immediately, but the water supply is likely to be affected the following year.

We are therefore urging you to not take our water for granted and conserve water where possible. Remember conserving water means conserving life!

Report leaks by calling **1-664-491-2527**

