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WRA

WATER RESOURCES AUTHORITY

Jamaica's Water ... Every Drop Precious

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VISION

“To have a world class organization providing efficient and reliable services to stakeholders for facilitating integrated water resources management in Jamaica.”

The background of the page features a water splash effect with various shades of teal, light blue, and purple. The splash is most prominent on the right side and bottom, with some lighter blue and white areas on the left and top.

MISSION

To secure the sustainability
of Jamaica's water resources
and the resilience of the
nation to droughts and floods
through

- ◆ Effective water resources planning;
- ◆ Rational water resources allocation &
 - ◆ Conservation and protection

with the support of a cadre of well
trained, highly motivated,
dedicated staff and empowered
Jamaicans.

CORPORATE DATA



**Water
Resources
Authority**

(An Agency of the Ministry of Economic Growth & Job Creation)



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Water Resources Authority of Jamaica



[Water Resources@WRAgovja](https://twitter.com/WRAgovja)

ABOUT US



The Water Resources Authority (WRA) is an Agency of the Ministry of Economic Growth and Job Creation. It was established by the Water Resources Act, 1995 and is responsible for the regulation, protection, and controlled allocation of Jamaica's water resources. This is achieved through:

- ◆ **Resource Monitoring** - The WRA monitors stream flows, ground water levels, water quality, abstraction and well drilling across the island, and provides data to all stakeholders through its web-enabled database.

- ◆ **Resource Assessment-** Determination of the availability of water resources to reliably meet all demands.

- ◆ **Allocation of Resources (Licensing)** - The WRA secures the sustainability of the water resources through a system of permits and licensing for the drilling of wells and the abstraction and use of surface and groundwater resources.

- ◆ **Water Quality Monitoring-** WRA collaborates with other water sector agencies

in the monitoring and assessment of pollution and identification of threats to the resource.

- ◆ **Support to Development Approval Process**

- The WRA reviews development applications and Environmental Impact Assessments (EIAs) and comments on the risk to water resources from the proposed treatment and disposal of sewage and other wastes, and on possible impacts of flooding by or on the development.

- ◆ **Flood Warning** - The WRA, working with the ODPEM, has established one real time flood warning system in the Rio Cobre Basin and several community flood alert systems across the island in an effort to reduce the threat to lives and property.

- ◆ **Public Education** - Through its Documentation Centre, and website, the WRA provides information to all stakeholders including students, consultants and the general public regarding hydrology, hydrogeology and water resources of the island. The Authority also celebrates special days (World Water Day), and participates in exhibitions to increase public awareness of water issues.



CHAIRMAN'S MESSAGE



DR. PARRIS LYEW-AYEE JR

Chairman

Once again, I am pleased to present this report on behalf of the Board of Directors on the performance of the Water Resources Authority for the fiscal year ending March 2019. The organization has achieved a lot for the period, and has laid the groundwork for much to be achieved in the upcoming years.

The Board focused on administrative development and growth, and the consolidation of gains made from years of investments in equipment and people. This began with the appointment of a new Managing Director, Mr. Peter Clarke, and Deputy Managing Director, Mr. Michael Wilson, with the retirement of Herbert Thomas in January 2019, after 41 years with the WRA, 2 years of which he served as Managing Director. The process of preparation and succession planning for this

took place over several years, with Mr. Clarke serving as DMD under Mr. Thomas for several years. With the ascendancy of Messrs. Clarke and Wilson, as well as the reorganizing of key members of the WRA's management team, a new generation of leadership has emerged at the WRA.

This is timely, as the WRA continues to press ahead with plans for the reclassification and reorganization of the entire organization in order to ensure the proper recruitment and retention of staff, with improved compensation comparable to their sector peers. The WRA completed an external study on this issue, and has submitted its findings to the Ministry of Economic Growth and Job Creation (MEGJC) as well as the Ministry of Finance and the Public Service (MoFPS).

The WRA implemented a water abstraction charge based on the allocated volumes and the intended use, categorized as, domestic, industrial and agricultural. These charges, are intended to incentivize efficient water usage, while also reducing the WRA's dependency on direct Government subventions to fund research and capital projects. I am pleased to report that the WRA recorded over \$50M in revenue from the Volume Based Fees (VBF), over 95% of what was forecast to be earned from this. Further, the imposition of the VBF also saw

several licensees relinquishing their licenses, releasing these volumes back to the general public for possible reallocation, thereby improving legal water availability.

Governance is a critical function of the Board, which met every month for the fiscal period as the Board meetings have never failed to meet a quorum. In addition, the Board conducted a survey of the Board and management performance, in keeping with corporate governance best practices. The questionnaire looked at key areas of Board and management structure, conduct, performance, dissemination of information and meeting effectiveness and reflected 100% satisfaction by all respondents.

In closing, the Board wishes to thank the Management and Staff of the WRA for their hard work and dedication for another year of service to the organization. We would also like to note the important contributions of the previous Managing Director, Herbert Thomas, over the course of most of this review period, and recognize his contributions over the years. The Board looks forward to working with the new management team, and to new and innovative developments ahead.

MANAGING DIRECTOR'S REPORT



PETER CLARKE

Managing Director

As the new Managing Director of the Water Resources Authority (WRA), the opportunity to contribute this message via the Annual Report for the 2018/2019 financial year is of great personal significance. Though I have been at the helm of the organization for only one quarter of the year, I have had the prior privilege of being Deputy Managing Director, under the able guidance of the recently retired Managing Director, Mr. Herbert Thomas. This has prepared me for the many technical challenges that I may face, as well as those presented when managing the financial and human elements of an organization.

As we move forward, it is imperative that the management of the water resources is constantly efficient and effective, or else the sustainability mechanisms put in place by those who have gone before, and which they would have scrupulously championed, could then be seriously jeopardized. There is no doubt that in a fast-paced world with development and production being key factors of economic growth, much demand will be made on our natural resources. It is anticipated that challenges for us water managers will run the gamut, from determining the measured response to economic interests, to recognizing and responding to the vagaries of Mother Nature.

In the past year, activities that have been driven by the overarching mandate of the Authority included: continued collection and computing of Hydromet data which is subsequently available to all stakeholders and interested parties via our Water Resources Management Information System (WRIMS); continued provision of Technical Assistance to our many public and private sector colleagues, partners and clients; continued allocation of water abstraction, where

allowable, that is managed through a licensing regime, bolstered by the first year of the implementation of Water Abstraction Charges; completion of the Rio Cobre Flood Early Warning System that has benefitted from the installation of additional Hydromet equipment, along with installation of photovoltaic emergency back-up for critical computer servers; and continued development of an updated Water Resources Master Plan that commenced under consultancy contracts, and which is to be completed in-house within the 2019/2020 financial year.

Over this past year, the Management and especially the Staff have performed untiringly, despite the financial challenges being faced by many, if not all, as they patiently await the outcome of the much anticipated reclassification / restructuring exercise. As the WRA fastidiously moves forward, let me remind everyone that the allocation, regulation, conservation, protection and management of our water resources is everybody's business, and that every drop of Jamaica's fresh water is precious.

PETER CLARKE

Managing Director



BOARD OF DIRECTORS



DR. PARRIS LYEW-AYEE



STEPHANIE ABRAHAMS



MICHAEL BROWN



GEORGE GRANT



GEORGIA HAMILTON



NOVELETTE HOWELL



ALLISON RANGOLAN



NADEEN SPENCE



PROF. MICHAEL TAYLOR

BOARD'S REPORT



The Board consisting of nine (9) members was appointed by Cabinet Decision of April 12, 2016 on the recommendation of, The Most Honourable Andrew Michael Holness, O.N., M.P., Minister of Economic Growth and Job Creation. Ms Charlene Sinclair resigned in May 2016 and was replaced by Ms. Allison Rangolan on January 2, 2018.

The Board convened on the third (3rd) Monday of each month for the 2018-2019 financial year. Its primary responsibilities were to:

- ◆ Ensure the efficient and effective management of the WRA;
- ◆ Develop adequate information, control, evaluation and reporting systems;
- ◆ Develop specific and measureable objectives and performance targets;
- ◆ Advise the Minister on matters of general policy and
- ◆ Consider applications for licenses to abstract and use water as well as permits to drill wells.

Two (2) committees served for April 1, 2018- March 31, 2019. They were as follows:





FINANCE & AUDIT COMMITTEE:

Dr. Paris Lyew-Ayee Jr
Ms. Cheyenne McClarthy
Mr. Michael Brown
Ms. Allison Rangolan
Ms. Georgia Hamilton (Chairman)
Mr. Herbert Thomas
Mr. George Grant
Ms. Hermine Downer
Ms. Novelette Howell

Ms. Stephanie Abrahams
Mr. Michael Brown
Mr. Herbert Thomas
Mr. Peter Clarke
Mr. Geoffrey Marshall

4. Ms. Hermine Downer, Director of Finance & Accounts

Upon the retirement of Mr. Herbert Thomas, Mr. Peter Clarke was appointed Managing Director.

MANAGEMENT OF THE AUTHORITY

A four (4) person team had responsibility for the management of the Authority. They are;

1. Mr. Herbert Thomas, Managing Director MD
2. Mr. Peter Clarke, Deputy Managing Director DMD
3. Mr. Michael Wilson, Acting Deputy Managing Director***

*** After the elevation of Mr. Peter Clarke to the position of Managing Director,

Mr Michael Wilson acted as Deputy Managing Director from January - March 2019.

TECHNICAL ADVISORY COMMITTEE:

Ms. Allison Rangolan (Chairman)

Dr. Parris Lyew-Ayee
Prof. Michael Taylor
Ms. Nadeen Spence

ATTENDANCE REPORT

DIRECTORS	APRIL 2017- MARCH 2018												TOTAL
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
Dr. Parris Lyew-Ayee	*		*	*	*	*	*	*	*	*	*	*	11
Prof. Michael Taylor	*		*	*	*	*	*	*		*	*		9
Mr. Michael Brown	*	*	*		*	*	*	*	*	*	*	*	11
Ms. Georgia Hamilton	*		*	*	*			*	*	*	*		8
Ms. Nadeen Spence	*	*	*	*		*	*		*	*	*		9
Mr. George Grant	*	*		*	*		*		*	*	*	*	9
Ms. Stephanie Abraham		*	*		*	*	*	*	*	*	*	*	10
Ms. Novelette Howell	*		*	*	*	*	*	*	*	*	*	*	11
Ms. Allison Rangolan	*	*	*	*	*	*	*	*	*	*	*		11



FINANCIAL SUMMARY

INCOME AND EXPENDITURE SUMMARY

	YEARS	
	2018/2019 \$	2017/2018 \$
SUBVENTION	273,166,625.00	197,418,524.00
INCOME	10,087,660.00	17,953,230.00
TOTAL	283,254,285.00	215,371,754.00
EXPENDITURE	208,083,515.00	202,811,072.00
SURPLUS	75,170,770.00	12,560,682.00

The financial year, April 2018 to March 2019, was one in which the Water Resources Authority continued to show improvements in income ending with an operating surplus of \$67.2M compared with \$12.5M in the previous year. The increased surplus arose from the implementation of a Volume Based Fees (VBF) imposed on water abstractors. The VBF of approximately \$46M accounted for sixteen percent (16%) of total operating income. There was however, a four percent (4%) decline in fees for renewal and new license applications. The Authority is encouraged by the response to the Volume Based Fees, having collected seventy six percent (76 %) of the expected target. It is expected that the fees collected under the VBF will significantly allow the WRA to pursue activities to improve the delivery of its mandate.

Despite the increase in operating surplus, Total Comprehensive Income declined by seventy three percent (73%) due to loss on the Defined Benefit Plan moving from a gain of approximately \$111M in the previous year to a loss of (\$J23M) in the current year. The value of the WRA's assets moved from \$J490M in 2018 to \$J545.9M in 2019 reflecting an eleven percent (11%) increase. The WRA continue

to implement measures to contain expenditure to remain within the boundaries of the Approved Estimates of Expenditure, hence there was only a 4% increase in operating expenses.

INTERNATIONAL ACCOUNTING STANDARD (IAS)

The Authority has adopted the amendments to IAS 19, Employees Benefit. The impact

of this amendment is that it requires additional disclosures in the Financial Statements. The disclosure has been recognized in the Statement of Profit or Loss and other comprehensive income and the Balance Sheet.

This standard requires the Authority to undertake an annual Actuarial valuation of the fund and report the surplus or deficit on the Balance Sheet as well as report on the pension costs based on the present assessment of the fund.

The pension cost adjustments are seen in the expense schedule of the financial statements as well as in the Statement of Profit or Loss and Other Comprehensive Income under the heading "Other comprehensive income."

This standard recognizes the fact the Authority operates a Defined Benefit Plan and any future shortfall arising in the plan's ability to meet its obligations will have to be met by the Authority. Therefore, at a glance, one can now see from the financial statements, the future risk to the Authority from the Fund.

This reporting requirement has significantly affected the Authority's numbers.



ALLOCATION OF WATER RESOURCES

There was a 6 percent (6%) increase in the total number of licences to abstract and use water when compared to the 2017/2018 financial year. At the end of the 2018/19 financial year, total licences on record was seven hundred and sixty seven (767) compared to seven hundred and twenty (720) at the end of the 2018/19 financial year. Three hundred and four (304) applications were considered by the Board. Forty eight (48) were new applications, while two hundred and sixteen (216) were renewal of licenses to abstract and use water. Consideration was also given to twenty eight (28) permits for consent to drill wells.

SUMMARY OF APPLICATIONS FOR 2018-2019

TYPES OF APPLICATIONS				
	LICENSES NEW	PERMITS	RENEWALS	TOTAL
Number of applications received	48	28	216	292
Number of completed applications processed within 60 days of receipt	48	28	216	292
Number of Licenses/ Permits granted		28	-	28
Number of applications received in 2017-2018	105	70	70	305
Number of applications refused	-	-	-	-
Number of pending applications	-	-	-	-
Number of applications Drillers Licence	-	-	-	-



APPLICATIONS PROCESSED (APRIL 2018 TO MARCH 2019)

Surface water allocation accounted for 17% or a volume of ~4.6 Mm³/day or ~1.7 Bm³/Yr. The remaining 83% of the licences were from groundwater sources, representing a volume of ~2.1Mm³/day or 763 Mm³/Yr.



Figure 3 Total Volume of Resource Allocated

Further, forty six percent (46%) of the total water allocated was for non-consumptive uses such as: hydropower, recreation and aquaculture. Domestic and agricultural uses accounted for 24% respectively, whilst six percent (6%) was allocated for industrial use in the manufacturing, distilleries and tourism sectors.

Resource Allocation per Sector



TOTAL WATER ALLOCATED (APRIL 2018 - MARCH 2019)

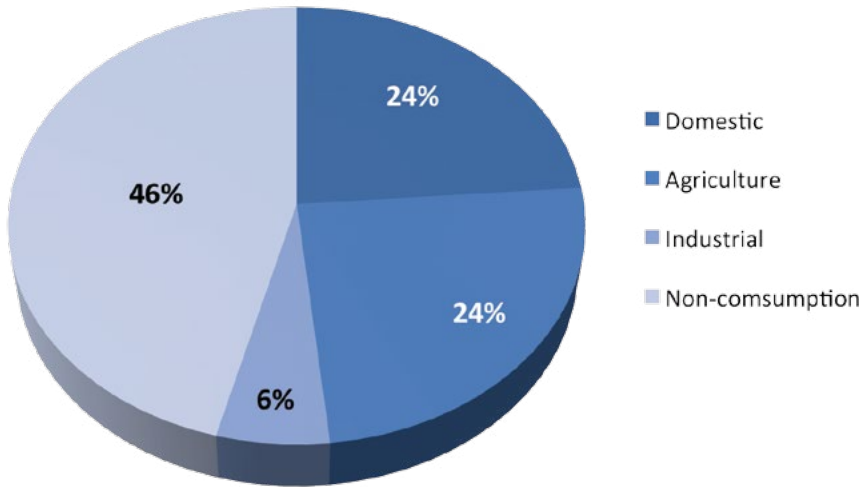


Figure 4: Total

Location of Aquifers and Licensed Sources March 2019

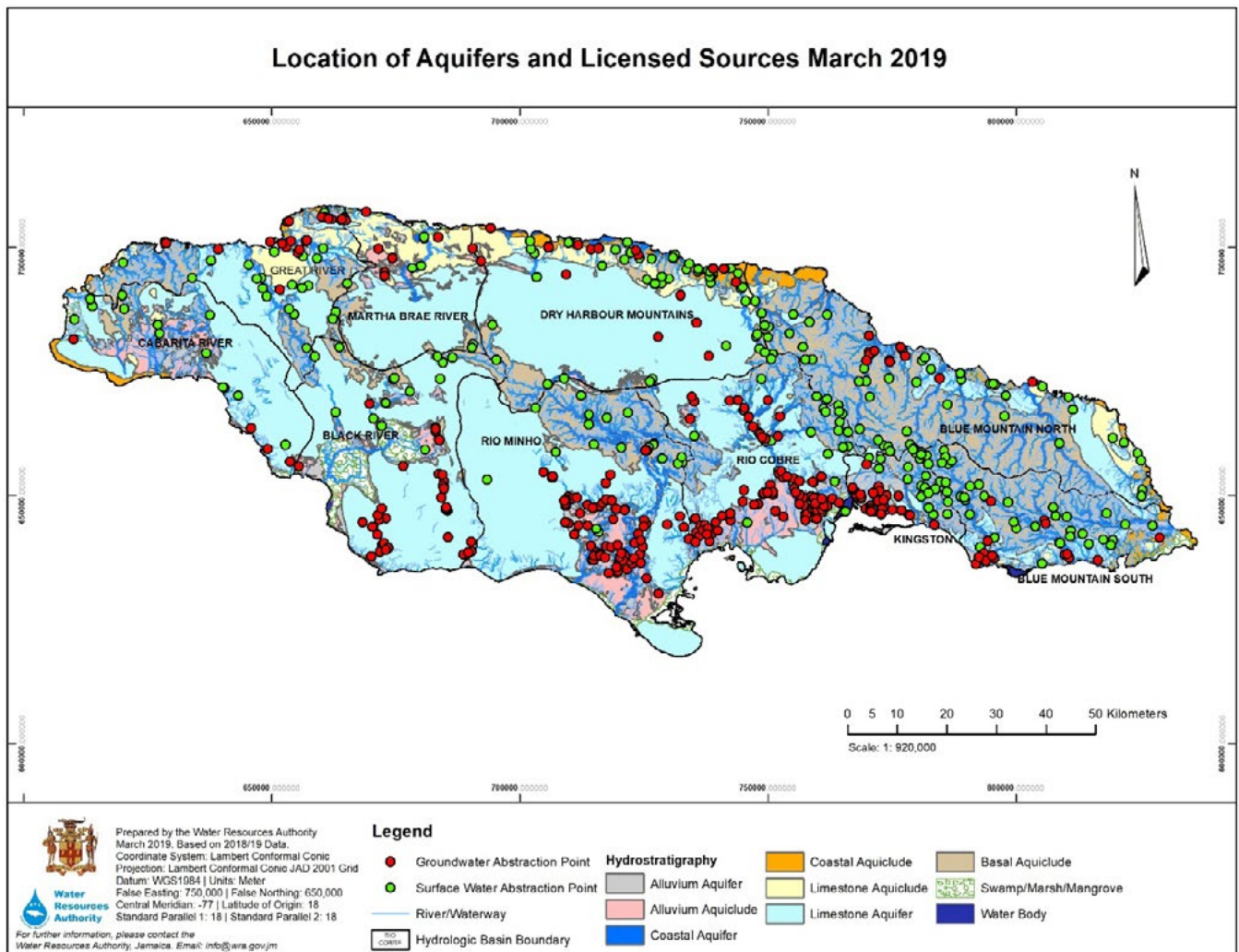


Figure 5: Spatial Distribution of the Licences Sources (source: WRA database)



STATE OF JAMAICA'S WATER RESOURCES

There was a reduction in the volume of water consumed in the 2018- 2019 financial year when compared to the volume consumed in the 2017- 2018 financial year as indicated in figure 6.

TOTAL WATER ALLOCATED VERSUS USAGE FOR THE CALENDAR YEARS 2014 - 2018

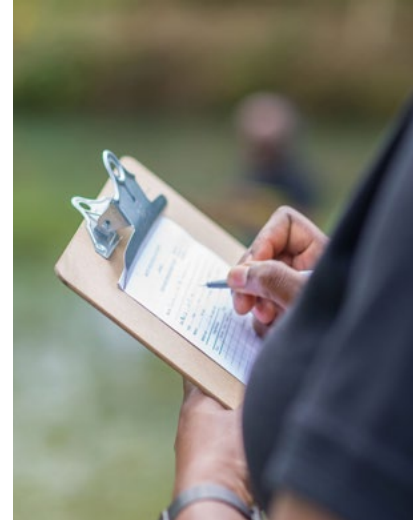
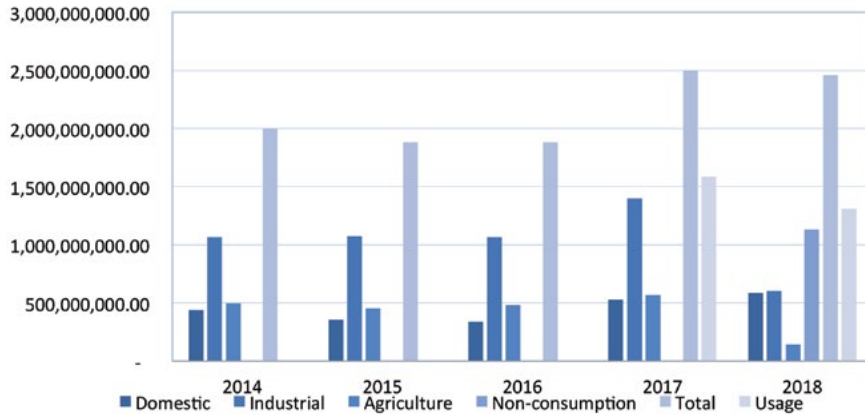


Figure 6: Total Water Allocated versus usage

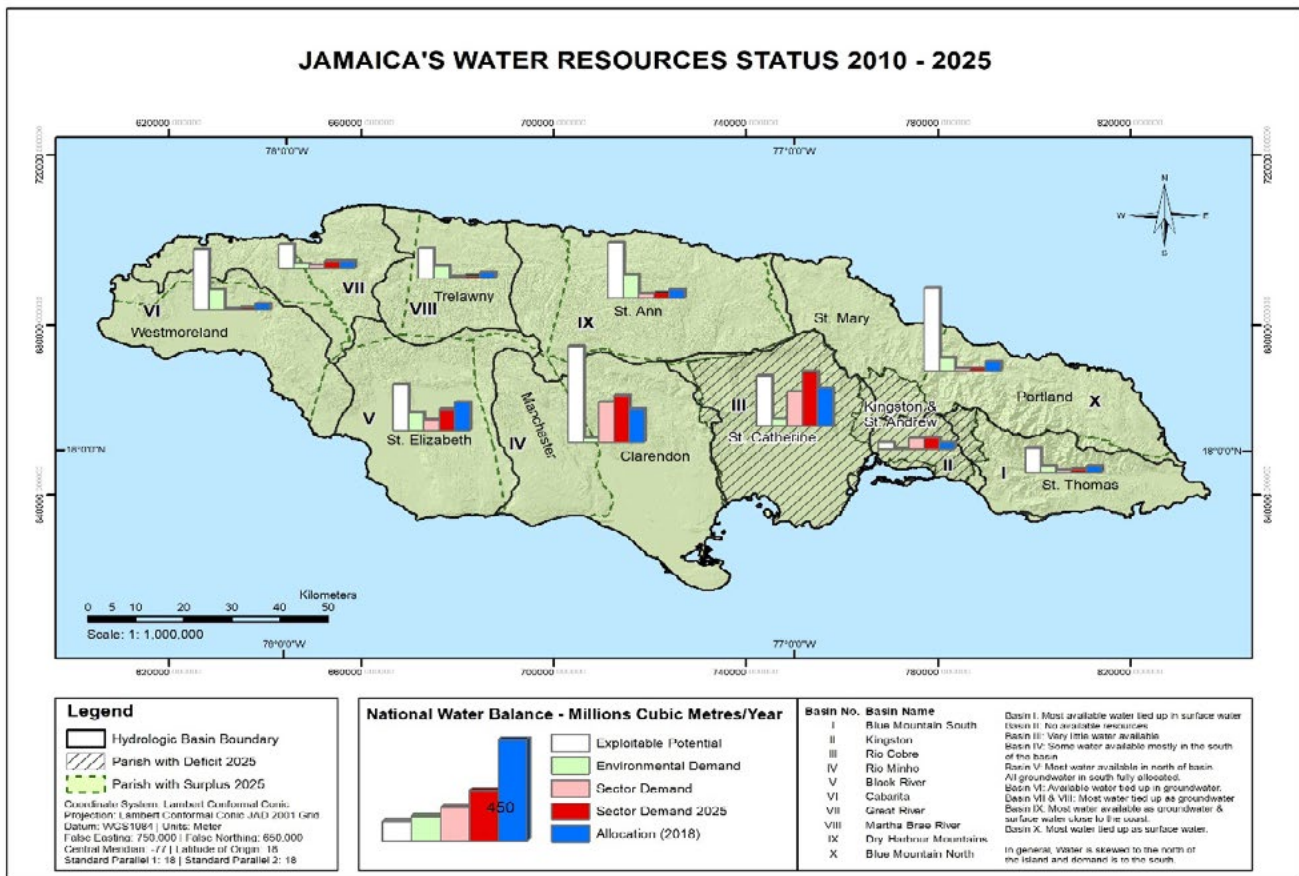


Figure 7: Water Resources and Demand (MCM/y) by Hydrologic Basins (Source: Draft National Water Resources Master Plan 2015)

COMPLIANCE

MONTHLY ABSTRACTION COMPLIANCE APRIL 2018 - MARCH 2019

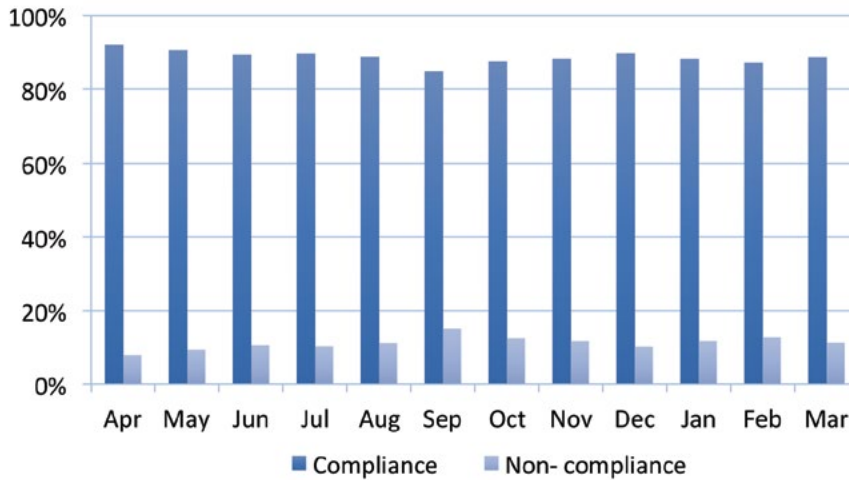


Figure 8: Monthly Abstraction Compliance April 2018 - March 2019

There are seven (7) conditions outlined on each licence however, only two conditions are routinely assessed; the submission of monthly abstraction data and the bi-annual water quality reports. Compliance has remained high with 92% compliance for abstraction returns at the start of 2018 to 89% at the end of the financial year. There was a marked decline in the submission of bi-annual water quality data.

Reminder notices were sent to all abstractors in September, October and November 2018 via emails, telephone calls, and letters to conduct their bi-annual sampling in November 2018. Despite these reminders, several abstractors did not conduct and submit the water quality report as required by the terms and condition of their license. The Authority has submitted enforcement notices to all non-compliant abstractors to indicate breach of licenses. In accordance with the Act and enforcement policy the enforcement notice will be followed by a second enforcement notice then enforcement action resulting in revocation or suspension of licenses.

WATER QUALITY COMPLIANCE STATUS (2017-2018)

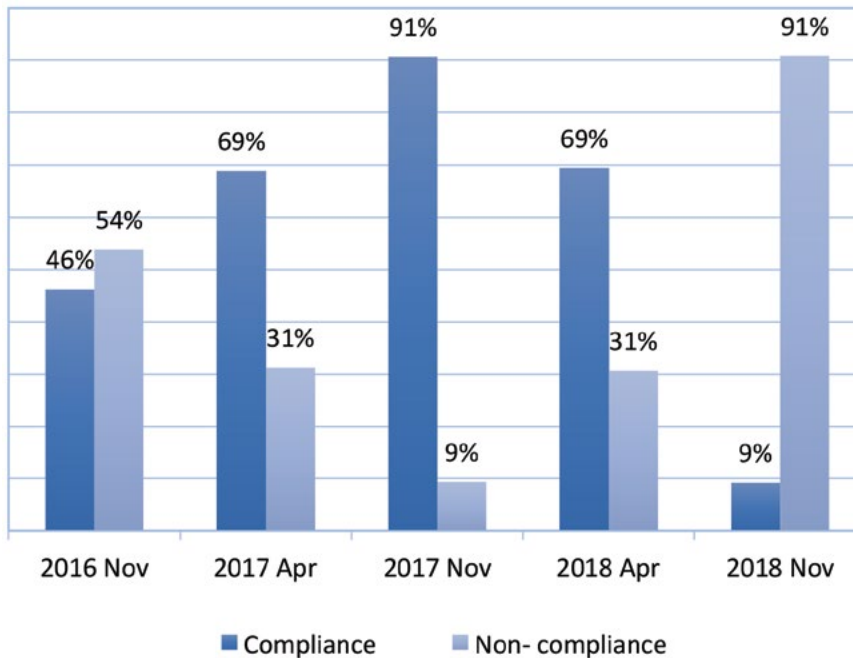


Figure 9: Bi-annual water quality compliance



WATER RESOURCES MONITORING & DATA COLLECTION

There has been significant technological advancements to the hydro-meteorologic network. These advancements have enabled the monitoring of streamflow and potential flooding from 40% of stream gauging stations across the island remotely. The technology uses radar pulse to measure water levels, which are then conveyed via cable to a Stevens eTrackers via a GSM to mobile cellular network to the office of the WRA in real-time.

These sensors/ are not in direct contact with water and hence, have eliminated much of the challenges of the old system such as tape slippage, cable interference, pulley wheel malfunction and clock failure. The switch to Stevens eTrackers has enabled the WRA to;

- Respond quickly to technical and anthropogenic challenges at gauging stations;
- Provide more consistent and accurate which has assisted greatly in improving the frequency and data consistency.

The data collected is then monitored via three (3) forty eight inch monitors in the Data and Resource Monitoring section as indicated below.



Figure 10: 48inch monitors from which stream flows are monitored.

The existing Hydromet Network consists of seventy-nine (79) Stream Gauging Stations (automatic and manual), fifty-six (56) Spot Measurements (ungauged points), thirty-one (31) Intensity Rain Gauges , two (2) Soil Moisture Probes and two hundred and eighty-six (286) Groundwater Monitoring Points, distributed across three (3) Regions as indicated below.

Water Resources Management Regions: Surface Water Monitoring Network

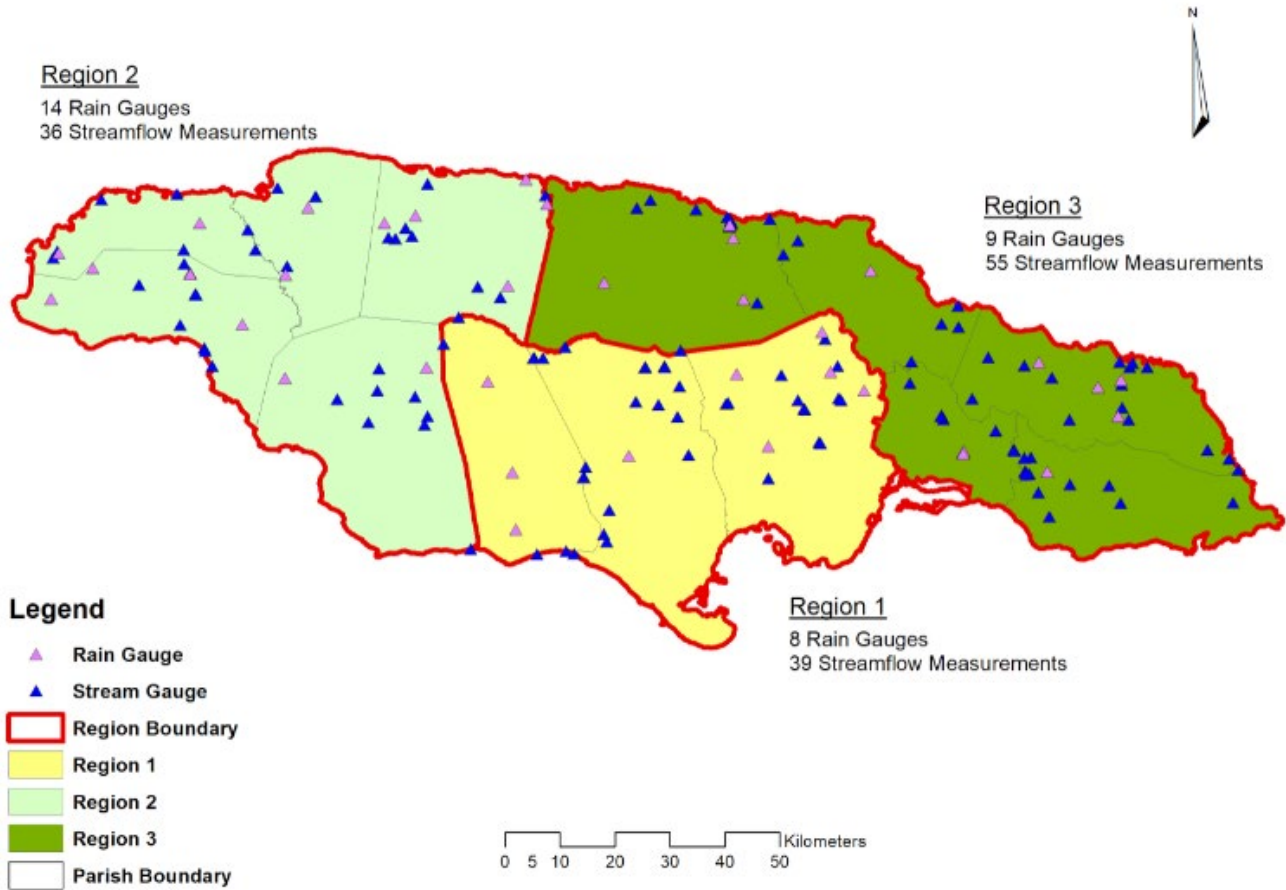


Figure 11: Surface water Monitoring Network

DATA MONITORING NETWORK

MONITORING AREAS	STREAM FLOW GAUGING STATIONS			MONITORING WELLS	ZERO FLOW MEAS.	RAIN GAUGES	FLOOD WARNING SYSTEMS	SOIL MOISTURE PROBES	KARST DEPRESSION MONITORING
	RECORDING	MANUAL	SPOT						
Region 1	8	8	23	143	16	8	6	4	
Region 2	18	13	5	88	26	14	0	5	1
Region 3	17	5	33	56	19	9	0	4	1
TOTAL	43	26	61	287	61	31	6	13	2

Figure 12: Data Monitoring Network

There were challenges that prevented the attainment of 100% for all the targets for surface water measurements. Two stations were vandalized and one Station was rendered inoperable. In a number of instances the streamflow and zero flow measurements were not done due to high flows as a result of rainfall which prevented wading.



Once again, the WRA was able to provide annual streamflow data to members of the public through the WRAMIS. The collection of streamflow data is indicated below;

ACTIVITIES	ANNUAL TARGETS	ACHIEVEMENTS
SURFACE WATER MONITORING		
Computation of 12 Months of Daily Discharge for Gauging Stations	828 (100%)	684 (84%)
Spot-Measurement of Ungauged Stations 61	732 (100%)	677 (92.4%)
Zero Flow Measured at 63 Gauging Stations	189 (100%)	180 (95.2%)
Maintenance of Gauging Stations 40	40 (100%)	39 (98%)

Figure 13: Achievements for Surface water Monitoring

ASSESSING THE IMPACT OF REDUCED RAINFALL IN FIVE HYDROLOGIC BASINS

Based on rainfall data received from thirty-one (31) rainfall intensity gauges strategically placed in Watershed Management Units across the island, there were indications that there has been reduced rainfall which impacted surface water flows. Data collected from five rivers, located in watersheds that have experienced less than normal rainfall and are relied upon for domestic water supply have indicated that the reliable yields (Q90)* exceeded that of the previous periods on record. Comparisons were also made to the reliable yield for 2015, which is on record as the driest year. With the exception of the Rio Minho, the Q90 for all the streams in 2018 exceed those recorded in 2015 as indicated in the table below

RELIABLE YIELDS FOR RIVERS IN 5 HYDROLOGIC BASINS

Hydrologic Basin	River	Period of Record	Reliable Yield (Q90) for period of record (m ³ /s)	Reliable Yield (Q90) for 2015 (m ³ /s)	Reliable Yield (Q90) for 2018 (m ³ /s)	Wettest Months 2018		Driest Months in 2018	
						Mean Runoff (mm)	Mean Flow (m ³ /s)	Mean Runoff (mm)	Mean Flow (m ³ /s)
Kington	Hope River	1955 to 2018	0.172	0.098	0.212	47.30	0.74	16.24	0.26
Rio Cobre	Rio Cobre @ Bog Walk	1986 to 2018	3.40	1.96	4.17	72.04	14.48	25.08	5.04
Rio Minho	Rio Minho @ Danks	1967 to 2018	0.521	0.682	0.538	26.40	2.45	9.68	0.81
Great River	Great River @ Lethe	1955 to 2018	1.761	1.263	2.675	203.71	17.02	42.97	3.72
Martha Brae	Martha Brae @ Friendship	1965 to 2018	0.849	1.419	1.839	993.95	15.32	202.96	3.22

*Reliable yield or Q90 or, 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 low flow or drought.

Figure 14: Comparing the Yield for 2015 and 2018



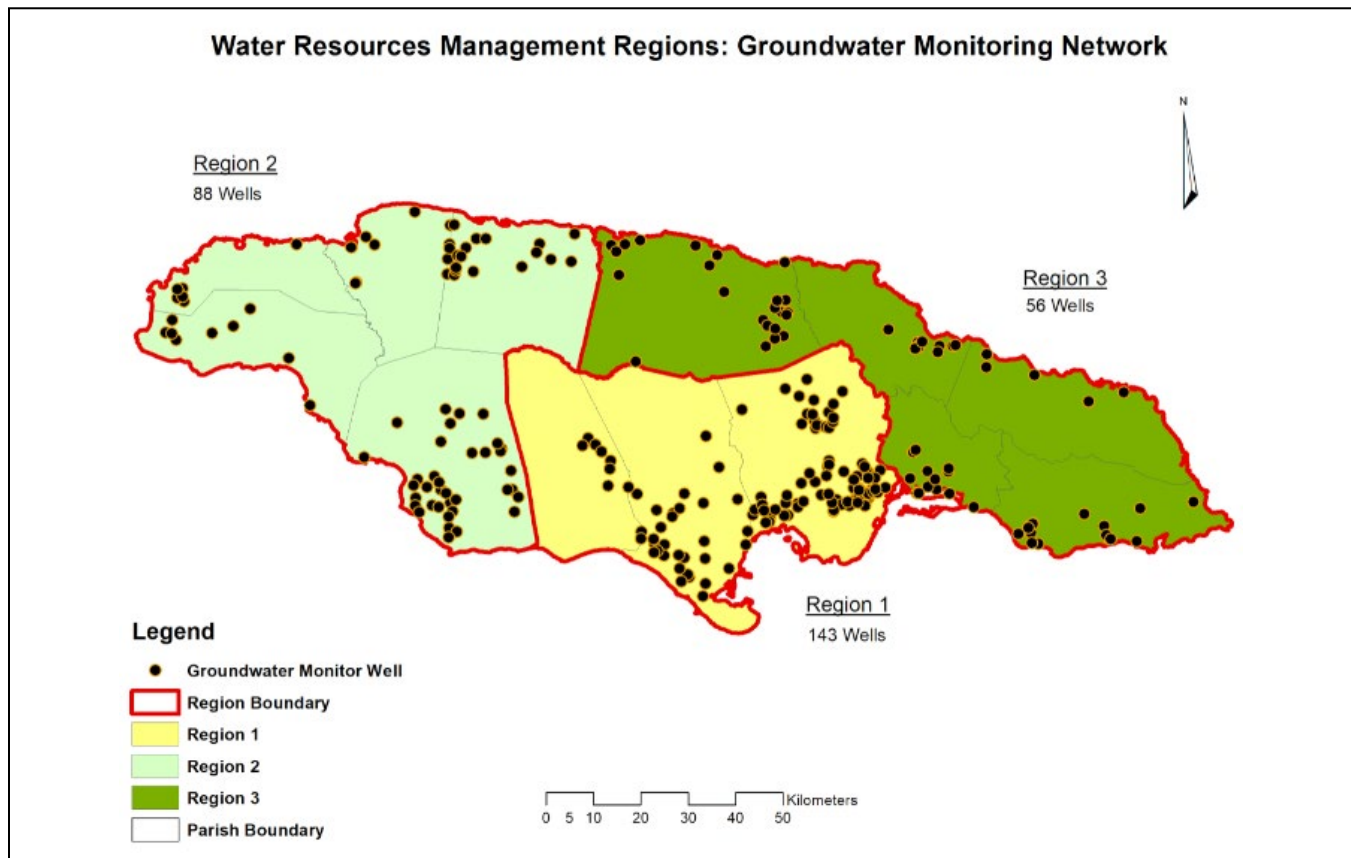
GROUNDWATER MONITORING

Monitoring of ground water levels was done via a network of two hundred and eighty-seven (287) index wells. The total number of water level measurements targeted was 3444; of this amount 3388 were conducted for the 2018-2019 period which represented 98.7% of target. In some instances, the targets were not met as some of the wells were inaccessible, while others had no measuring points.

Please see table below;

ACTIVITIES	ANNUAL TARGETS	ACHIEVEMENTS
Groundwater Measurements (287)	3444 (100%)	3388 (98.7%)
Maintenance of monitoring well (24)	24 (100%)	57(238%)

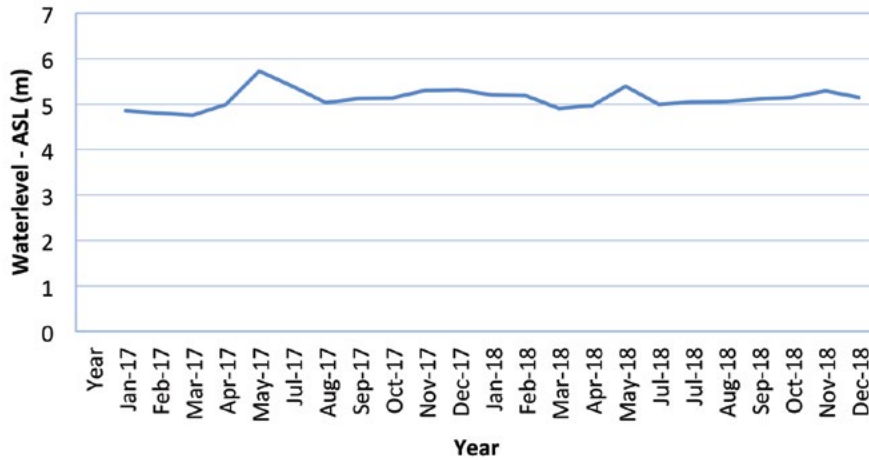
Figure 15: Groundwater Monitoring Targets and Achievements



Based on analysis of water levels throughout the 2018/2019 financial year, Jamaica’s groundwater resources continue to be viable although impacted by seasonal variability in precipitation as indicated on page 22:

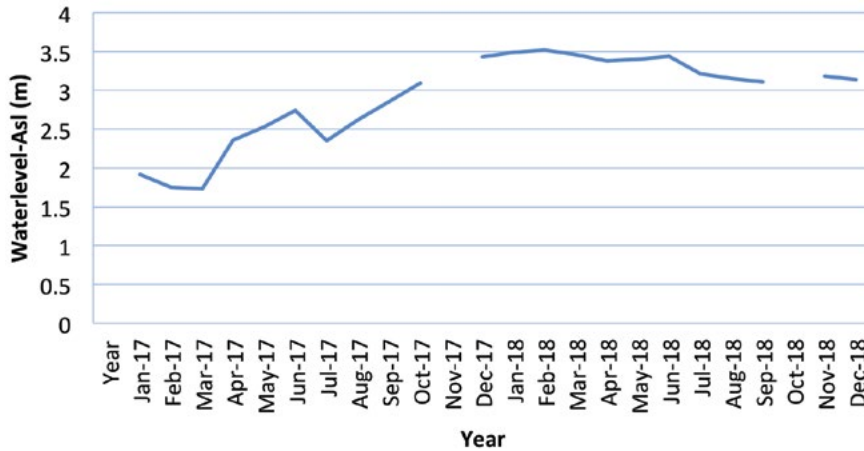


BARTON ISLAND MONITORING WELL



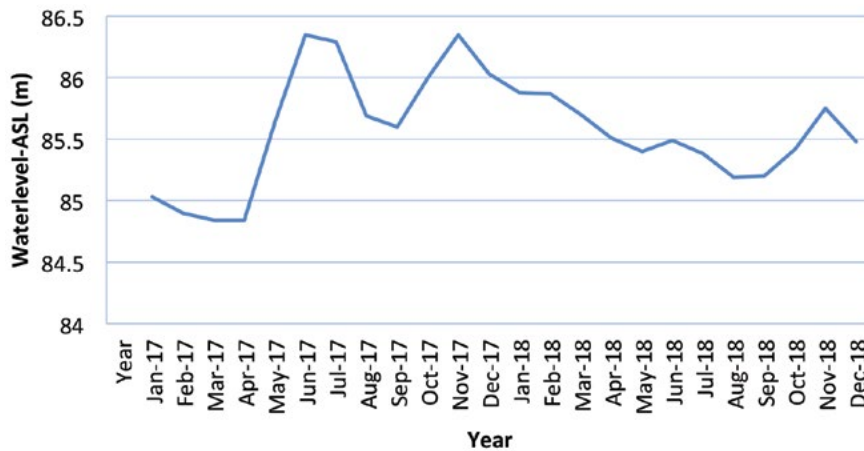
The water level in the Barton Island well in St. Elizabeth, has indicated consistent storage levels 5m above mean sea level.

REST COREHOLE-SOUTHERN CLARENDON



There was a noticeable decline in the Rest Corehole in Southern Clarendon when compared to 2018.

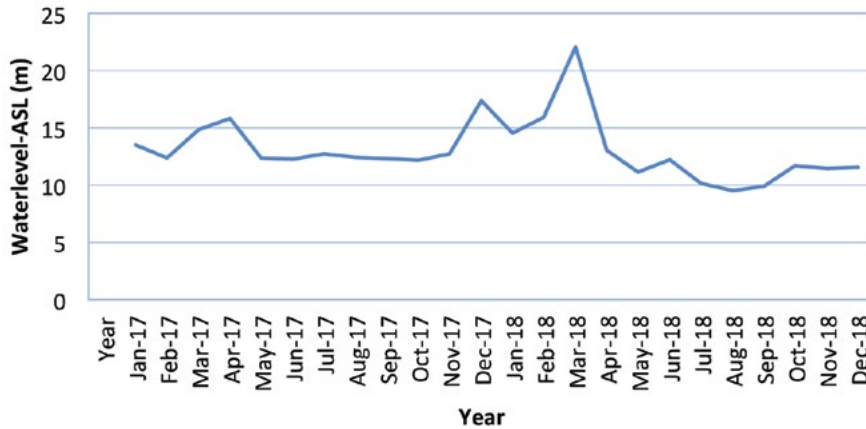
VENECIA COREHOLE-NORTH ST. CATHERINE



The Venecia Corehole in North St. Catherine, showed a steady decline in groundwater levels that began in November 2017 and continued through 2018.



CHARLES TOWN - BUFF BAY # 1



Charles Town # 1 in Portland, responded to the cyclic rainfall pattern similar to the other wells. Storage in all the aquifers were however at safe levels.

RIO COBRE FLOOD EARLY WARNING SYSTEM



Figure 16: Staff Monitoring Flows in the Rio Cobre Watershed from the WRA's 'Situation Room'

The Rio Cobre Flood Early Warning System (RCFEWS) was upgraded through a grant from the Caribbean Development Bank. This enabled the WRA to upgrade four (4) existing rainfall intensity gauges at Guys Hill, Riversdale, Ewarton, Glengoffe, and the installation of two (2) new stations at Macknie and Coolshade in the Rio Cobre Watershed. These intensity gauges will provide comprehensive coverage of the Rio Cobre watershed. Additionally, all existing streamflow stations located at Indian River, Rio Doro, Rio Pedro and Rio Cobre near Linstead in St Catherine were upgraded. The rainfall intensity gauges were retrofitted with modern tipping buckets and eTrackers while the stream gauge stations were retrofitted with Radar Water Level Sensors in addition to eTrackers. The upgraded stations will facilitate real-time data transmission and monitoring.



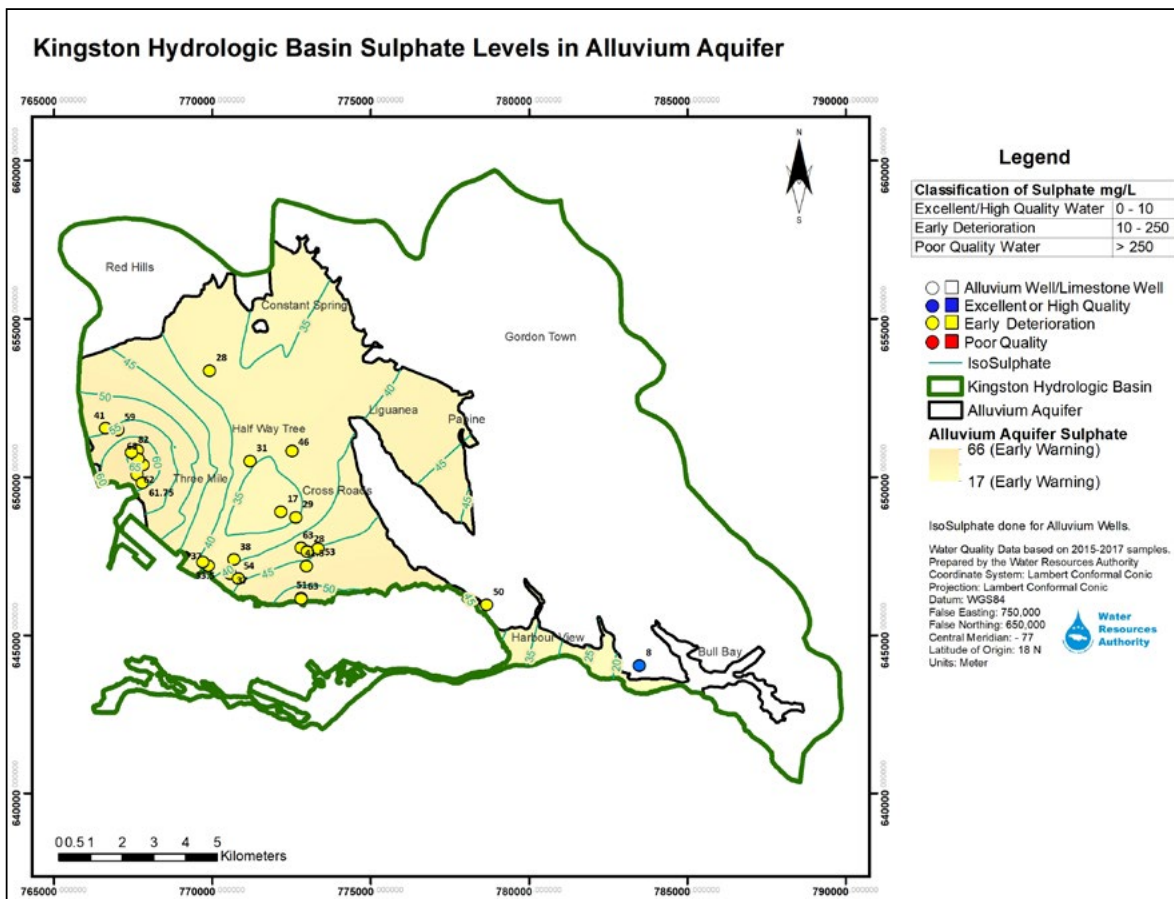
River gauging station on the Rio Doro at Williamsfield, St. Catherine upgraded with radar sensor and eTracker



WATER RESOURCES PLANNING

ASSESSING WATER QUALITY IN THE KINGSTON HYDROLOGIC BASIN

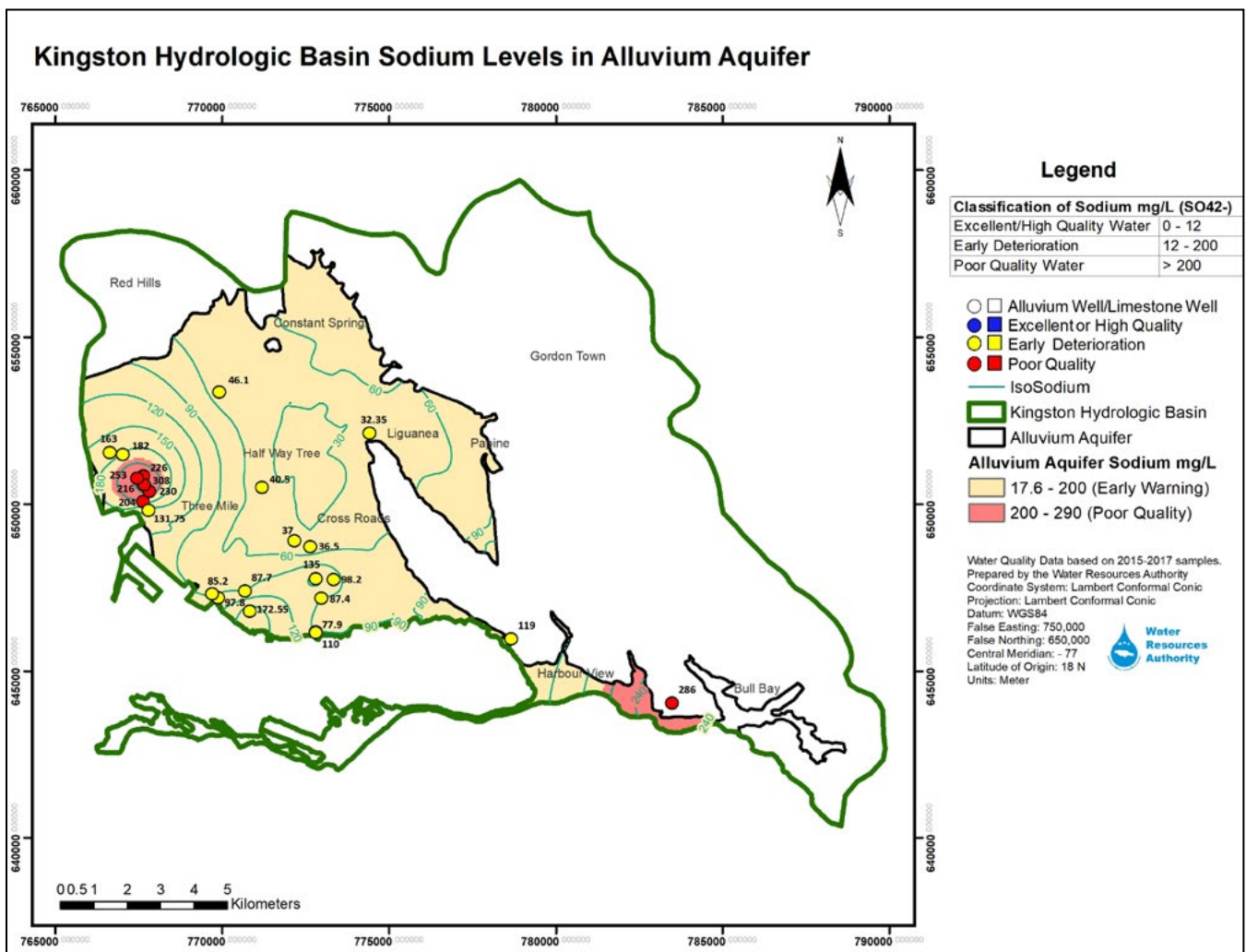
The groundwater resources within the Kingston Hydrologic Basin is comprised of groundwater from the limestone and alluvium aquifers. Analysis of the water quality data within the Basin has indicated that there is groundwater contamination¹ and pollution² in some sections of the Kingston Basin. The iso-chemical maps below indicate the water quality for levels of chloride, nitrate sodium and total dissolved solids. The attached key indicates the areas of highest concentration for each parameter. For chloride, water quality in excess of 250mg/L; for total dissolved solids, levels in excess of 300; for sodium, levels in excess of 200 and for nitrates levels in excess of 40mg/L are classified as poor water quality. The assessments also indicated influence from saline/ brackish water and elevated levels of nitrate from inadequately treated sewage.



Isochemical map indicating levels of sulphate in the Kingston Hydrologic Basin

- 1 Contamination refers to measurable deterioration in the quality of water without clear evidence of negative impacts or threats to beneficial uses
- 2 Pollution refers to deterioration in the quality of water to the point where negative impacts are evident or may become evident if the water is utilized for any beneficial use

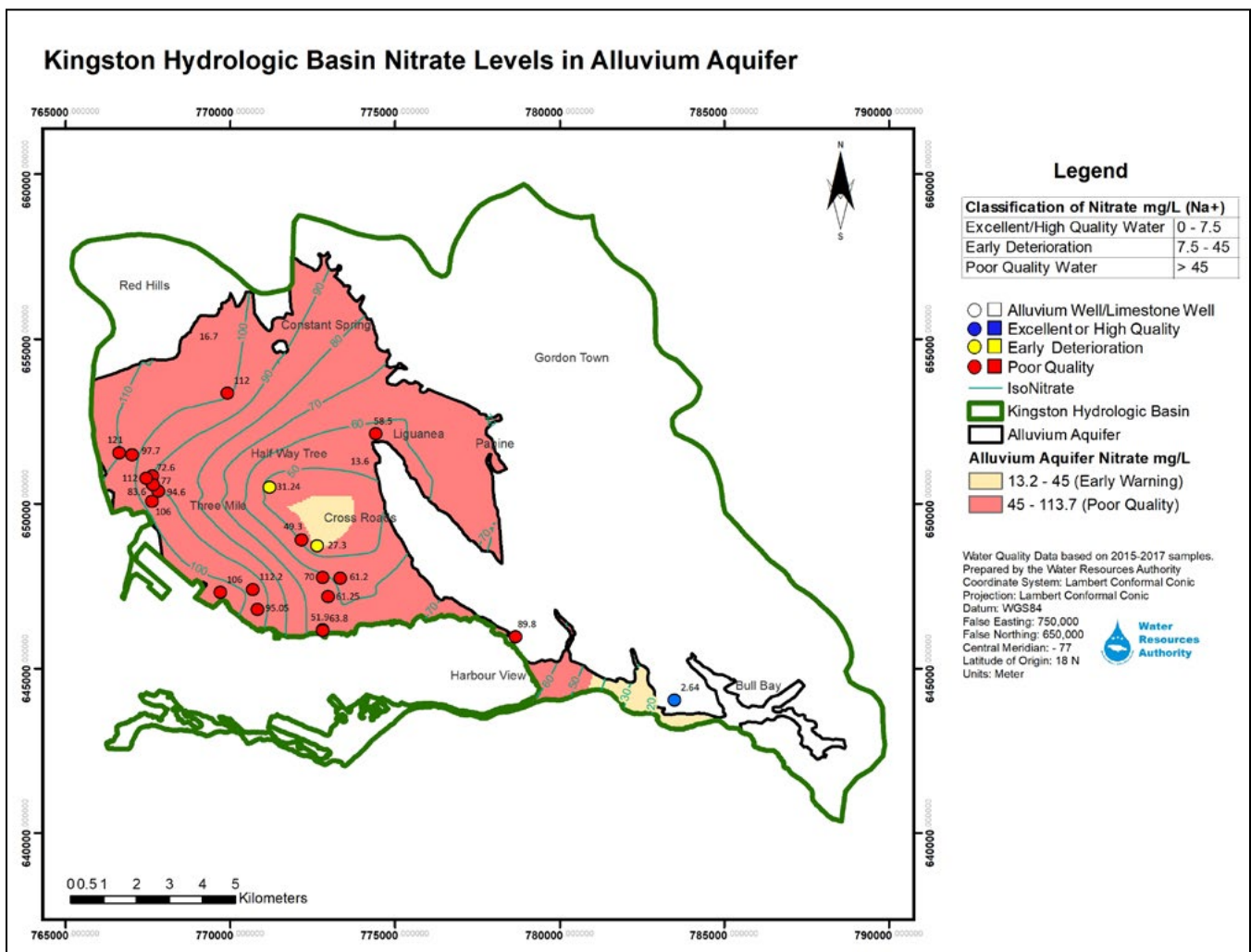
Kingston Hydrologic Basin Sodium Levels in Alluvium Aquifers



Isochemical map indicating levels of sodium in the Alluvium Aquifers in Kingston Hydrologic Basin.



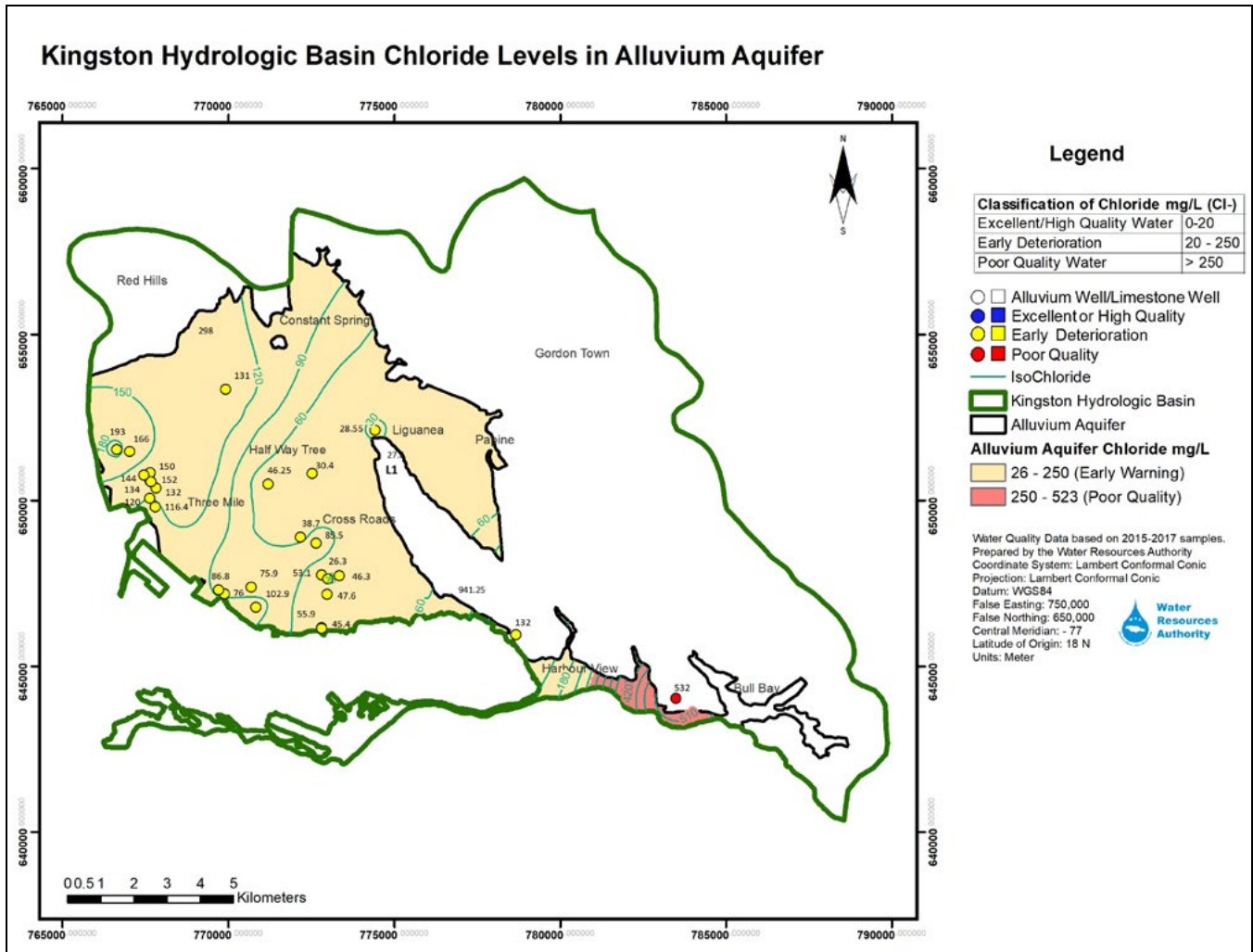
Kingston Hydrologic Basin Nitrate Levels in the Alluvium Aquifer



Isochemical map indicating levels of Nitrate in the Alluvium Aquifers in Kingston Hydrologic Basin

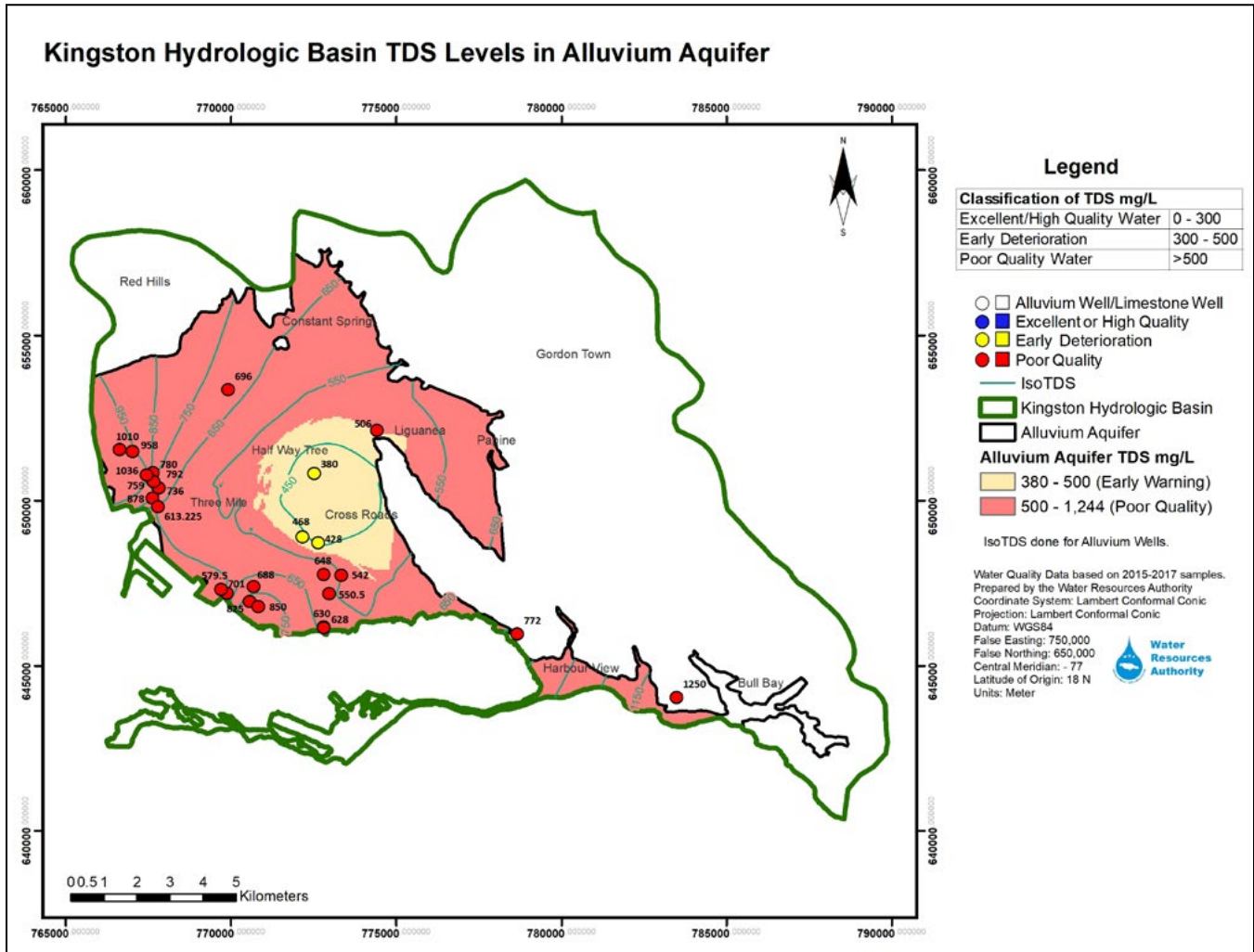


Kingston Hydrologic Basin Chloride Levels in the Alluvium Aquifer



Isochemical map indicating levels of chloride in the Alluvium Aquifers in Kingston Hydrologic Basin

Kingston Hydrologic Basin TDS Levels in Alluvium Aquifer



Isochemical map indicating levels of Total Dissolved Solids in the Alluvium Aquifers in Kingston Hydrologic Basin.

ISOTOPE HYDROLOGY PROJECTS IN PARTNERSHIP WITH THE NATIONAL WATER COMMISSION (NWC) AND THE INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA).

The WRA provided assistance to the National Water Commission IAEA-supported JAM7003. This began in 2016 and focused on the use of isotope techniques to characterize the provenance of groundwater resources in the Kingston Hydrologic Basin's limestone and alluvium aquifers. This assistance included:

- Loan of four (4) rainwater collectors.

- Provision of groundwater level data, advice on groundwater sample sites, and feedback on water quality and isotope results.
- Participation in capacity-building workshops.
- Providing reviews of the project's completion report.

FINDINGS

- The recharge of the Kingston Alluvium Aquifer is most likely from the Limestone Aquifers at Red Hills and Long Mountain, with little or no input from direct precipitation. The groundwater ages ranged from approximately twenty-seven (27) years by Forest Hills (Red Hills) limestone well to over fifty (50) years by Hunts Bay, closer to the coastline.
- The nitrates that have accumulated over time in the Kingston Alluvium Aquifer due to the prevalence of soak away pits are not undergoing denitrification, and may be present in the aquifer for a very long time.

INVESTIGATION OF UNDERGROUND RIVER FLOW DYNAMICS VIA DYE TRACING IN THE RIO BUENO SUB-WATERSHED MANAGEMENT UNIT

Dye Tracing Investigations were conducted of Karstic Limestone Areas of Jamaica, with a focus on the Rio Bueno sub-WMU of the Dry Harbour Mountain Basin.

This project focused on monitoring and determining the interaction between ground and surface waters in Karstic Limestone areas using dye tracing and isotope hydrology methods to gain more knowledge to better enable the WRA to manage and allocate water in the Rio Bueno Basin.

In May 2017, the Planning & Investigations Unit performed an initial field reconnaissance in the Rio Bueno sub-WMU of select dye injection sites (Quashie River and Lowe River) and installed background charcoal receptors at the chosen receptor sites of Dornoch Head (Headwaters of the Rio Bueno), Laughlands Great River, and Pear Tree Bottom River. Dyes were injected at Quashie River and Lowe River in June 2017, and the receptor switching process continued monthly until March 2018. The first analysis of the dye receptors was done in the 2nd quarter of the year, and the final results and final report was completed within the 2018-2019 year.

FINDINGS

The Quashie and Lowe Rivers contribute flow to the Rio Bueno, but do not contribute any flow towards the Pear Tree Bottom or Laughland Great Rivers.

ASSESSING WATER QUALITY IN SOUTH ST CATHERINE AQUIFER PROTECTION ZONE

The water quality monitoring programme for the South St. Catherine Aquifer Protection Zone concluded in March 2019.

The sampling regime saw sixteen (16) monthly sampling exercises conducted over twenty (20) months. A total of thirteen (13) wells were selected for sampling, but constraints including power outages, breaches in distribution network and vandalism resulted in only ten (10) of these being consistently sampled. The parameters used to characterize water quality of the alluvium aquifer are as follows:

PARAMETERS	UNIT	STANDARDS (AMBIENT)
pH	pH units	7.0-8.4
Temperature; T	degrees C/ °C [Celsius]	
Electrical Conductivity; EC	µS/cm at stated temperature	150-600
Chloride; Cl	mg/L	5-20
Sodium; Na	mg/L	4.5-12
Total Hardness CaCO ₃	mg/L	127-381
Orthophosphate; P	mg/L	
Nitrate; N	mg/L	0.1-7.5
Sulphate; SO ₂ -4	mg/L	3-10
Faecal coliform	number/100 ml Coliforms, Total	
Total Dissolved Solids (TDS)	mg/L	120-300
Pesticides	mg/L specific compound (s)	



The results will form a baseline characterization of the alluvium aquifer water quality, to build upon for subsequent studies in the lower Rio Cobre sub-basin and the larger Hydrologic Basin. Analysis of the results indicated the following:

- All the wells sampled over the period showed water quality exceeding the National Ambient Water Quality Standard (freshwater), 2009.
- The parameters that showed the greatest exceedance were sulphate, sodium, chloride, total dissolved solids (TDS) and electrical conductivity, while those showing the least frequency of exceedance include faecal coliform and nitrates. Phosphate, pH and total hardness recorded levels well within the Standard. This indicates a problem of high concentration of salts.

- Residue of the pesticide Terbutan was detected in one well's sample, on a single occasion; there was no subsequent find over the sampling period for the well, which suggests an isolated incident. No residual pesticide was detected for any other well over the monitoring period.

There was no defined pattern with the elevated levels of the parameters of exceedance. Sodium and chloride levels in particular did not meet the Standard on any sample occasion for any well sampled. Interestingly, chloride and sodium values demonstrated no correlation and elevated levels do not appear to be seasonal. Therefore, the quality of the water seemed to be a factor of human influence (pumping practices, and landuse).

FINDINGS

There was no marked distinction between the domestic and irrigation water supply wells. Both categories produced water quality results showing some wells slightly exceeding the standard and most exceeding it. Therefore, where water production costs, or converting irrigation wells to domestic supply ones is concerned, the issue of salt content and nutrient (nitrates) will have to be considered. Notwithstanding this, groundwater is expected to be of the best quality and considering this is what the KMA and sections of St. Catherine relies on for safe and clean drinking water, Water Resources Authority must act to safeguard against the future deterioration of the water quality in the alluvium aquifer.

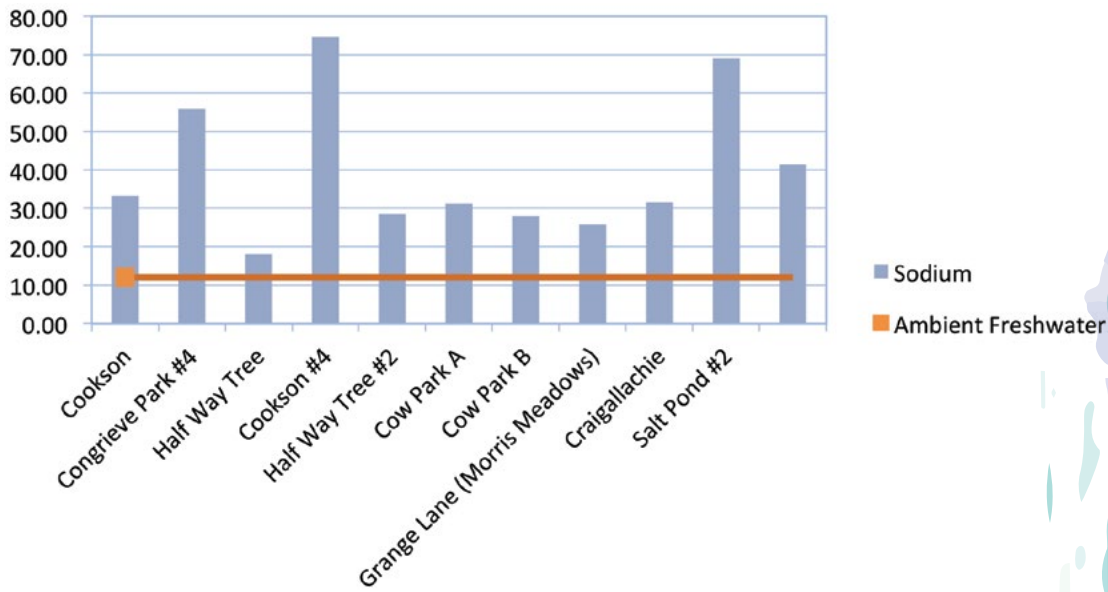
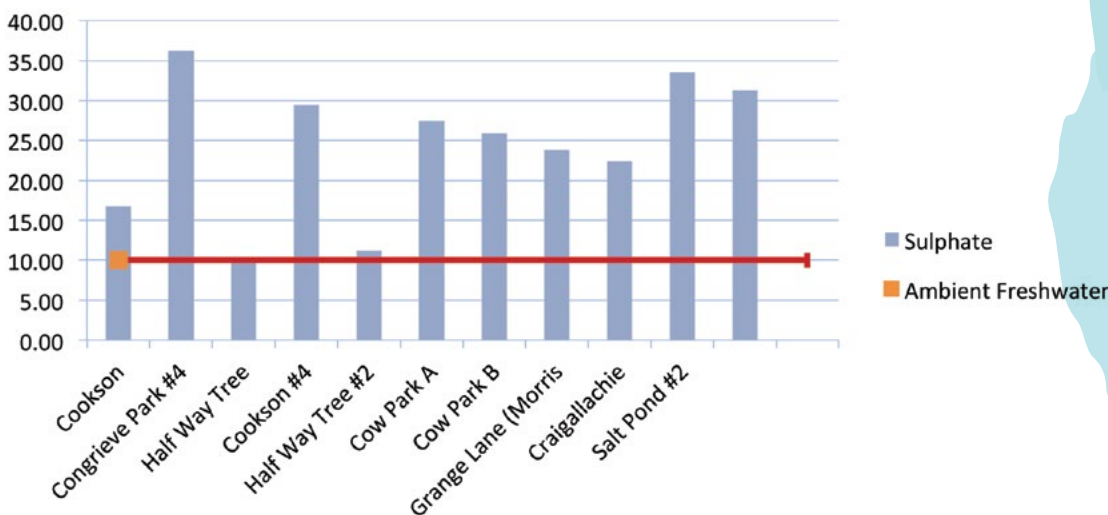
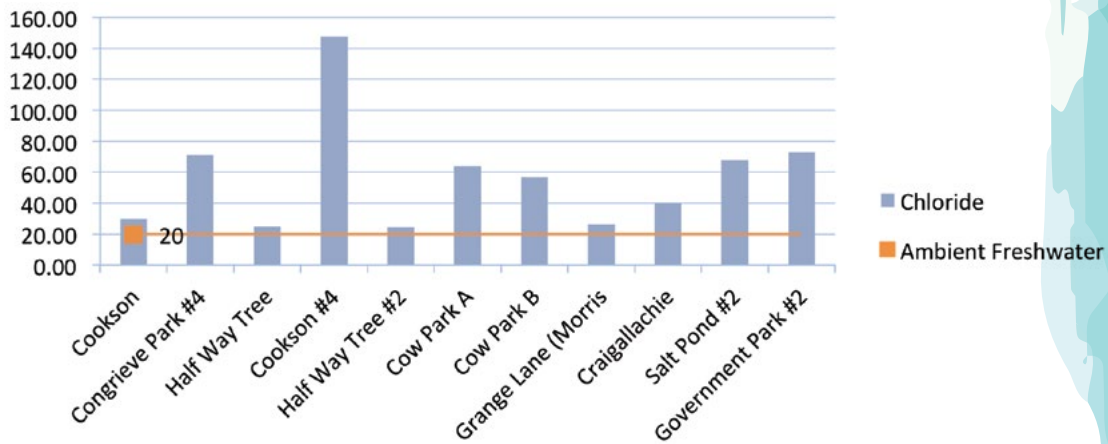


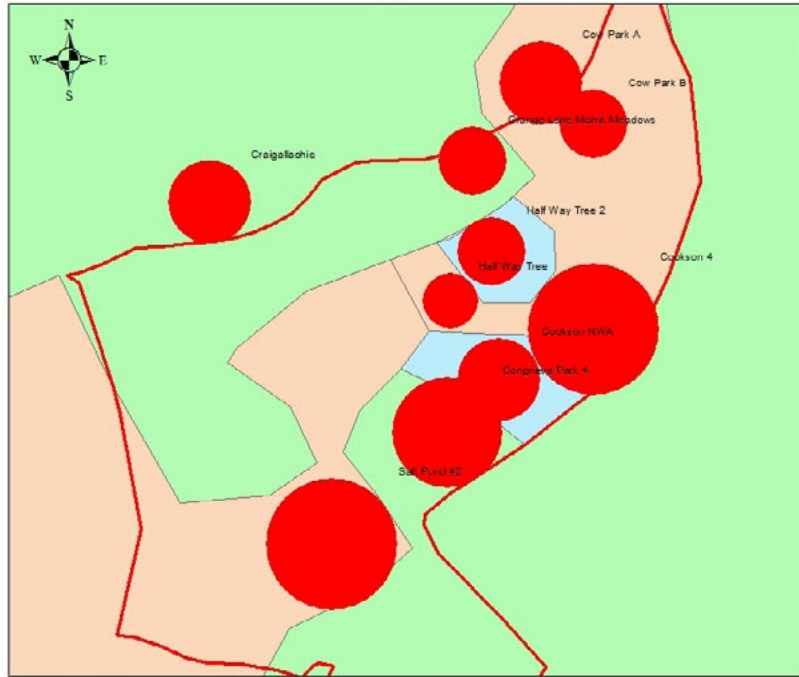
Figure 17: Average parameter values for the wells over the sixteen (16) months sample period.



Spatial distribution of selected parameter concentration



Targeted Wells; Aquifer Protection Zone



Legend

Average Sodium

	20 mg/L		41 - 50 mg/L
	21 - 30 mg/L		51 + mg/L
	31 - 40 mg/L		

Aquifer Protection Zone

LANDUSE

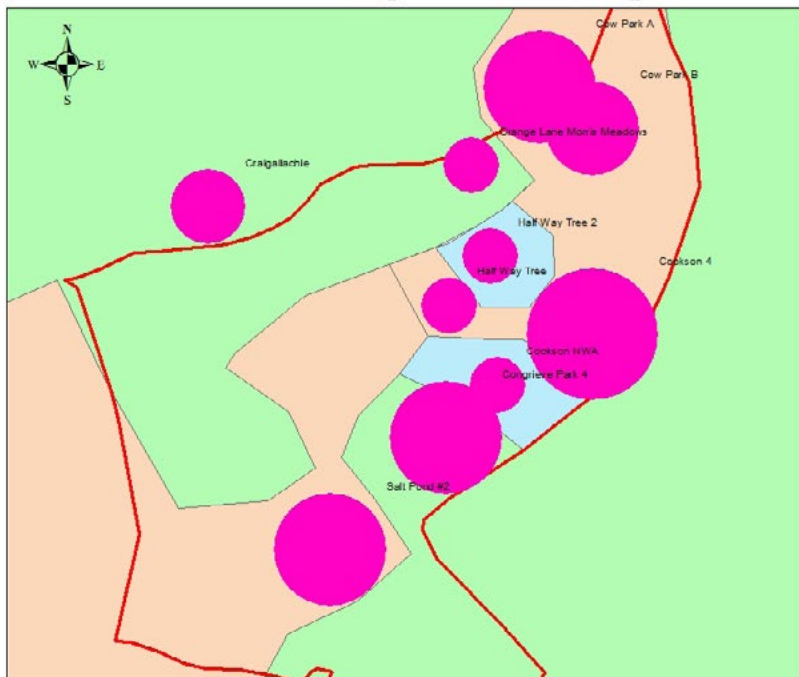
- Built Up Area
- Cash Crop Agriculture
- Cash Crop Animal Husbandry

Prepared by the
Water Resources Authority

WGS_1984_Lambert_Conformal_Conic
Authority: Custom

Projection: Lambert_Conformal_Conic

Targeted Wells; Aquifer Protection Zone



Legend

Average Chloride

	25 - 30 mg/L		51 - 60 mg/L
	31 - 40 mg/L		61 + mg/L
	41 - 50 mg/L		

Aquifer Protection Zone

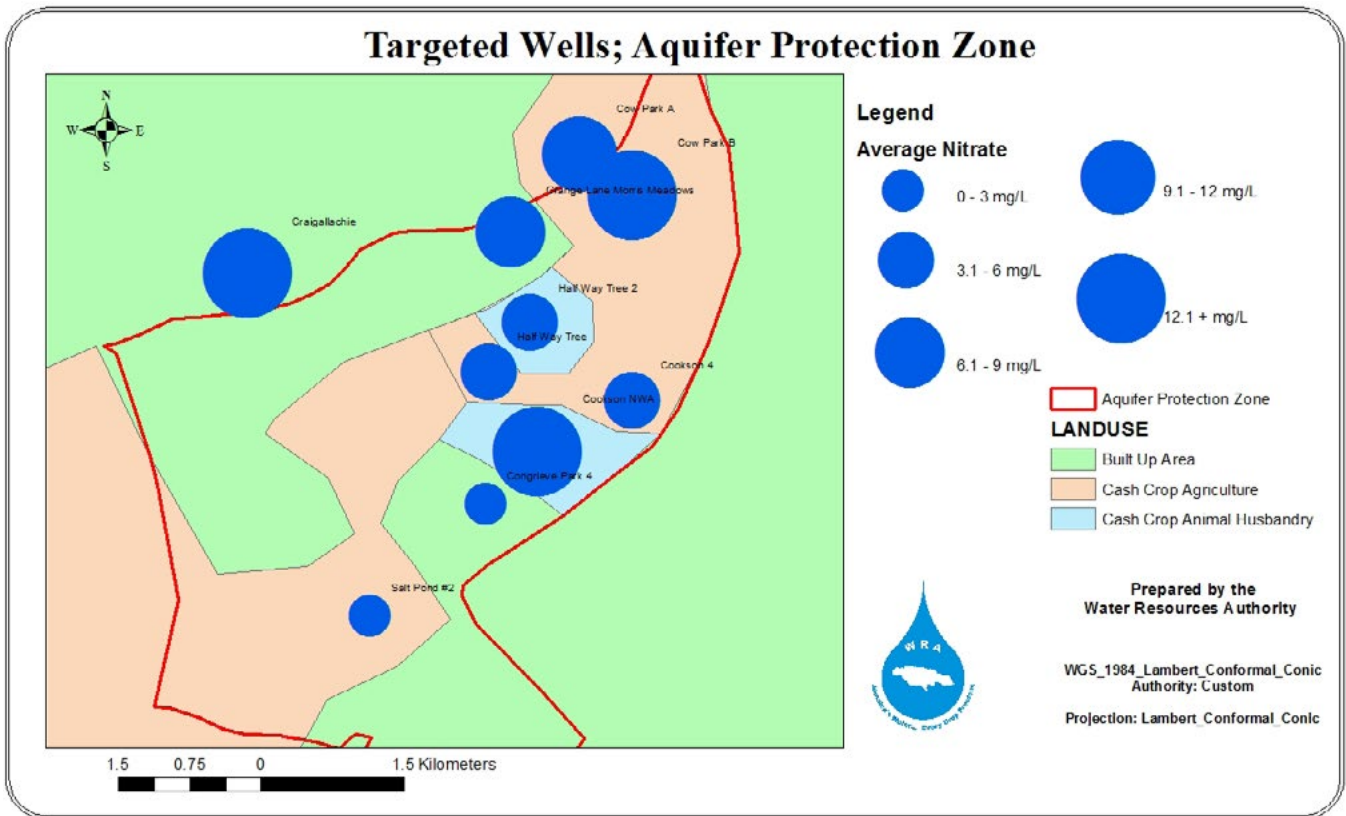
LANDUSE

- Built Up Area
- Cash Crop Agriculture
- Cash Crop Animal Husbandry

Prepared by the
Water Resources Authority

WGS_1984_Lambert_Conformal_Conic
Authority: Custom

Projection: Lambert_Conformal_Conic



FEASIBILITY STUDY OF INTER-BASIN TRANSFER OF WATER FROM DRY HARBOUR MOUNTAINS BASIN TO RIO COBRE AND KINGSTON BASINS.

A desk study was done to ascertain the feasibility of identifying and transferring surplus water from the Dry Harbour Mountains Basin to Rio Cobre and Kingston Hydrologic Basins. The two main goals of this study were to:

- Identify potential sources of water in Dry Harbour Basin for abstraction and transfer.
- Suggest modalities of transfer and storage/usage of water in target basin.

FINDINGS

The Rio Bueno, Laughlands Great River and White River were identified as potential sources of water for interbasin transfer, based on the calculated surplus yields available from those sources. For the Rio Bueno, calculated surplus water available was 165,732.5m³/day (60 Mm³/year), Laughlands Great River was 18,748.8m³/day (6 Mm³/year) and White River was 140,551.1m³/day (51 Mm³/year).

RESOURCE ASSESSMENTS & FIELD INVESTIGATIONS

The WRA completed investigations into John Daggy Spring (Trelawny) and Essex Hall River (St. Andrew), and submitted reports regarding water availability for same to the Rural Water Supply Limited (RWSL) and the National Water Commission (NWC) respectively. The WRA is currently conducting two investigations to determine water availability as indicated below.



Stream Flow Measurement at Essex Hall, St. Andrew.



ACTIVE INVESTIGATIONS	LOCATION	REQUESTED BY	COMPLETION DATE
Pearl/Tiki-Tiki Spring	Northern Manchester	Rural Water Supply Limited	2019-2020
Noisy Water Spring	Cave Valley, St Ann	National Water Commission	2019-2020

The WRA also carried out thirty six (36) field investigations based on requests from public and private enterprises. These field investigations included (but were not limited to) site visits to bauxite companies and cemetery site investigations.



PROVISION OF TECHNICAL SUPPORT TO THE GOJ

The WRA provided technical support to the GOJ via participation in the Development Approval Process and at meetings and workshops as requested. During the 2018-2019 financial year, one hundred and twenty-three (123) of one hundred and fifty-five (155) or 73% of technical responses were prepared and dispatched to the National Environment Planning Agency (NEPA) and various Municipal Corporations within the requested 30 day period. This compares to the 89% (185/209) for the 2017/18 financial year.

While there was a slight decline in the number of responses for the Development Approval Process there was an increase in the number meetings / committees that the WRA was called upon to attend.

For 2018-2019 the WRA was represented at seventy eight (78) meetings. This represents a slight decline when compared to the 84 meetings for the corresponding period for 2017-2018. Some of these meetings include the following (not an exhaustive list):

- NEPA - Subdivision Committee
- NEPA - Technical Review Committee
- Cockpit Country Boundaries Meeting with MSTEM
- NEPA- Development Assistance Centre (DAC) Meeting.
- ODPEM - Climate Change Adaptation TWG Meeting
- Ministry of Tourism - Advisory Committee Meeting
- RAMSAR Committee Meeting
- DAC Meeting Stakeholders Meeting Towards the Preparation of the Cemetery Research Planning Paper
- River Rafting Authority Meeting

- Environmental Monitoring meeting - Ewarton Works
- New permit categories and amended regulations of NEPA Meeting.
- Hope/Yallahs PSC Meeting Hope/Yallahs Special Project Meeting.
- Essex Valley Agricultural Development Project
- Agro Parks PSC Meeting
- GOJ bauxite/alumina Monitoring Meeting with JBI, NEPA, MGD..
- JAMPRO Meeting.
- NAMA Meeting for Water Sector
- Vision 2030 Planning Workshop

THE WATER RESOURCES MASTER PLAN

The Resource Consultant submitted revised boundaries for certain sub-Watershed Management Units as well as a revision of the island's hydrostratigraphic classifications. After review by the WRA, there was a disagreement between the WRA and the Resource Consultant regarding the spatial unit of assessment for water resources. This disagreement led to the mutual dissolution of the contract between the Resource Consultant and the WRA in August 2018.

HUMAN RESOURCES

STAFFING

The Human Resources Unit collaborated with other operational Units to assess the needs of the organisation in order to ensure the right knowledge, competency and talents are recruited to complement the committed cadre of employees on whose talents and initiatives the WRA depends. As a result, the organisation was able to fill vacancies in keeping with the Ministry of Finance and Planning Post Operations Committee's Guidelines. Nine (9) persons were recruited. Additionally, six (6) employees were promoted. Ten (10) persons were separated-five (5) resignation (all migrated); three (3) contract of employment ended and two (2) retired.

NUMBER OF PERSONS EMPLOYED	
POSITIONS	NUMBER OF EMPLOYEES
Assistant Environmental Officer	1
Technical Assistant	1
Drivers	3
Artisan	1
Temporary Administrative Assistant	1
Temporary Office Attendant	1
Apprentice	1

PERSONS PROMOTED	
POSITIONS FILLED VIA PROMOTION	NUMBER OF EMPLOYEES
Managing Director	1
Deputy Managing Director	1
Senior Hydrologist	1
Hydrogeologist	1

PERSONS PROMOTED	
POSITIONS FILLED VIA PROMOTION	NUMBER OF EMPLOYEES
Senior Assistant Hydrogeologist	1
Senior Technical Assistant	1

SEPARATIONS	
POSITIONS	NUMBER OF EMPLOYEES
Managing Director	1
Water Resources Engineer	1
Environmental Officer	1
Assistant Environmental Officer	1
Senior Technical Assistant	1
Driver	2
Artisan	1
Temporary Administrative Assistant	1
Apprentice	1

The WRA's Human Resources Unit ensured an effective communication medium to keep staff informed, maintain a strong and engaging relationship in an environment that is conducive to stable industrial relations, promotes healthy lifestyle and safety of its employees. It ensured good governance and mutual respect in sustaining employees' productivity, rewards, and recognitions. The Unit also ensured that all retirees were fully compensated through its pension fund and continue to receive health insurance in support their health.





HUMAN RESOURCE CAPACITY PLAN

The organisation was able to carry out its full operations with the cadre of staff as indicated in the Human Resource Capacity Plan as follows:

UNITS/DIVISIONS OR PROJ-ECTS	STAFF COMPLE-MENT	PLANNED 2017/2018	PLANNED 2018/2019	PLANNED 2019/2020
Executive	2	2	2	2
Admin/HRD	17	19	19	23
Finance and Accounts	4	4	4	5
Management Info. System	3	4	4	3
Technical Services	2	2	2	2
Permits and Planning	7	7	7	7
Planning and Investigation	8	8	8	9
Resource Management	22	22	22	14

TRAINING & DEVELOPMENT

In order to enhance the knowledge and talents of its employees in building the capacity of the organization and for their self-development and succession planning, the organization invested in training, learning and development programmes both locally and overseas which resulted in Seventy-three employees’ participation in at least one of these programmes. The WRA also collaborated with the programme for Housing, Opportunity, Production and Employment (HOPE), University of Technology, and the Collage of Agriculture Science & Education (CASE) to facilitate two apprentices and seven interns for on the job learning.

CONFERENCE/COURSE/SEMINAR/WORKSHOP	NUMBER OF PARTICIPANTS
Supervisor Management Course (Jamaica)	2
Government Accounting Level 1: Module 1 (Jamaica)	2
Technical Writing Training (Jamaica)	18
Aquarius Hydrometric Workflow Training Course (Jamaica)	12
Water Quality Monitoring Training (Jamaica)	18
Global Conference on Prosperity Through Hydrological Services (Jamaica)	1
Procurement Laws and Regulation (Jamaica)	4
Environmental Impact Related to Hydrological System (Jamaica)	9
Wellness Symposium (Jamaica)	2
General Management Course (Jamaica)	1
Managing Artificial Recharge Workshop (Isotopes) (Jamaica)	4



LOOKING AHEAD

The following will be the focus for the 2019/2020 financial year:

IMPROVEMENTS IN DATA COLLECTION

The WRA will continue to partner with the Pilot Programme for Climate Resilience (PPCR) to upgrade Jamaica's hydro-meteorological network. Under this leg of the project, critical surface water stations will be retrofitted with Radar Level Sensors and ETrackers. These upgrades will allow for greater reliability in the event of a natural disaster such as flooding or hurricane.

FOCUS ON HUMAN RESOURCES

A Performance Management and Appraisal System will be implemented. The WRA also intends to complete and submit to the Ministry of Finance and the Public Service (MOFPS) a proposal for restructuring of the WRA and the reclassification of posts on the establishment.

COLLECTION OF FEES

A programme will be put in place to ensure the timely collection of approximately forty-five million (\$45,000,000.00) dollars in Water Abstraction Charges (Volume Based Fees).

FORGING PARTNERSHIPS

The WRA will seek to collaborate with other government agencies and institutions with responsibility for environmental sustainability for data sharing and analysis.





Water Resources Authority

(An Agency of the Ministry of Economic Growth & Job Creation)

FINANCIAL STATEMENTS

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Year Ended 31 • March • 2019  
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Independent Auditor's Report
To the Members of
Water Resources Authority

Opinion

We have audited the financial statements of Water Resources Authority (the Authority) which comprise the statement of financial position as at March 31, 2019, Statement of Profit or Loss and other comprehensive income, changes in equity and cash flows for the year then ended, and notes, comprising significant accounting policies and other explanatory information.

In our opinion, the accompanying financial statements give a true and fair view of the financial position of the Authority as at March 31, 2019, and of its financial performance and cash flows for the year then ended in accordance with International Financial Reporting Standards (IFRS) and the Public Body Management and Accountability Act.

Basis for Opinion

We conducted our audit in accordance with International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of the Company in accordance with the International Ethics Standards Board for Accountants Code of Ethics for Professional Accountants (IESBA Code) and we have fulfilled our other ethical responsibilities in accordance with the IESBA Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and the Board of Directors for the Financial Statements

Management is responsible for the preparation of financial statements that give a true and fair view in accordance with IFRS and the Public Body Management and Accountability Act., and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Authority's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Authority or to cease operations, or has no realistic alternative but to do so.

The Board of Directors is responsible for overseeing the Authority's financial reporting process.

Independent Auditor's Report (Continued)

To the Members of

Water Resources Authority

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with ISAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Authority's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Authority's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Authority to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that presents a true and fair view.

We communicate with the Board of Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.



Chartered Accountants
Kingston, Jamaica
06 November 2019

**STATEMENT OF FINANCIAL POSITION**

AS AT 31 MARCH 2019

(EXPRESSED IN JAMAICAN DOLLARS)

	Note	2019 \$	Restated (Page 5) 2018 \$
ASSETS			
NON-CURRENT ASSETS			
Retirement benefit asset	3	239,744,000	246,038,000
Property, plant and equipment	4	178,977,782	187,284,801
Intangible assets	5	13,099,033	16,267,147
		<u>431,820,815</u>	<u>449,589,948</u>
CURRENT ASSET			
Receivables and prepayments	6	28,350,863	10,293,107
Investment	7	4,839,537	4,637,286
Cash and cash equivalents	8	78,838,218	31,000,744
		<u>112,028,618</u>	<u>45,931,137</u>
TOTAL ASSETS		<u><u>543,849,433</u></u>	<u><u>495,521,085</u></u>
RESERVES AND LIABILITIES			
Reserves and Accumulated Funds			
Capital reserve	9	74,068,693	74,068,693
Revaluation reserve	10	140,945,766	140,945,766
Accumulated surplus		314,162,814	262,159,044
		<u>529,177,283</u>	<u>477,173,503</u>
NON-CURRENT LIABILITIES			
Deferred income – Capital projects subvention	11	-	1,044,720
Deferred income – Capital project grant	12	6,701,344	7,060,257
Deferred income – Other project funds	13	700,931	4,553,279
		<u>7,402,275</u>	<u>12,658,256</u>
CURRENT LIABILITIES			
Payables and accruals	14	7,269,875	5,689,326
		<u>7,269,875</u>	<u>5,689,326</u>
TOTAL RESERVES AND LIABILITIES		<u><u>543,849,433</u></u>	<u><u>495,521,085</u></u>

Approved for issue on behalf of the Board of Directors on 06 November 2019 and signed on its behalf by:

Chairman

Managing Director

**STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME**

YEAR ENDED 31 MARCH 2019

	Note	2019 \$	Restated (Page 5) 2018 \$
Income			
Subventions		273,166,625	197,418,524
Other operating income	15	<u>10,087,660</u>	<u>17,953,230</u>
		283,254,285	215,371,754
Expenditure			
Expenses	16	<u>(208,083,515)</u>	<u>(202,811,072)</u>
Surplus for the year		75,170,770	12,560,682
OTHER COMPREHENSIVE INCOME:			
Other comprehensive income(loss) not to be classified to income in subsequent period:			
Recognition of capital asset at valuation		-	12,850,000
Revaluation gain on property		-	37,732,679
Measurement (loss)/gain on defined benefit plan	6.2	<u>(23,167,000)</u>	<u>111,023,000</u>
		<u>(23,167,000)</u>	<u>161,605,679</u>
Total comprehensive income for the year		<u><u>52,003,770</u></u>	<u><u>174,166,361</u></u>



STATEMENT OF CASH FLOWS

YEAR ENDED 31 MARCH 2019

	Note	2019 \$	2018 \$
Cash Flows from Operating Activities			
Surplus for the year		75,170,770	12,560,682
Adjustments			
Depreciation and amortisation		15,398,364	18,323,420
Gain on disposal of property, plant and equipment		-	(299,666)
Amortisation of deferred grant		(358,913)	(358,914)
Net change in retirement benefits		(16,514,077)	(7,459,000)
Adjusted surplus for the year		<u>73,696,144</u>	<u>22,766,522</u>
Decrease/(Increase) in current assets			
Change in receivables and prepayments		(18,057,756)	1,709,260
Change in investment securities		(202,251)	(214,335)
(Decrease)/Increase in current liabilities			
Change in payables and accruals		<u>1,580,549</u>	<u>(3,417,123)</u>
Net cash flow from operation		57,016,686	20,844,324
Cash Flow from Investing Activities			
Proceed disposal of property plant and equipment		-	331,960
Additions to property, plant and equipment		(3,370,481)	(12,757,444)
Additions to intangible assets		(552,750)	(590,423)
Net cash flow from investing activities		<u>(3,923,231)</u>	<u>(13,015,907)</u>
CASH FLOW FROM FINANCING ACTIVITIES			
Change in capital projects subventions		(5,255,981)	4,448,926
Net cash inflow from financing activities		<u>(5,255,981)</u>	<u>4,448,926</u>
Increase in cash resources		47,837,474	12,277,343
Cash and Cash Equivalent at Beginning of Year		<u>31,000,744</u>	<u>18,723,401</u>
Cash and Cash Equivalent at End of Year	8	<u><u>78,838,218</u></u>	<u><u>31,000,744</u></u>



STATEMENT OF CHANGES IN RESERVES
YEAR ENDED 31 MARCH 2019

	Accumulated Surplus	Capital Reserve	Revaluation Reserve	Pension Revaluation Reserve	Total
	\$	\$	\$	\$	\$
Balances at 1 April 2017	72,081,076	61,218,693	103,213,087	66,494,286	303,007,142
Surplus for the year, restated	12,560,682	-	-	-	12,560,682
Other comprehensive income, restated	-	12,850,000	37,732,679	111,023,000	161,605,679
Total comprehensive income	<u>12,560,682</u>	<u>12,850,000</u>	<u>37,732,679</u>	<u>111,023,000</u>	<u>174,166,361</u>
Balances at 31 March 2018, as previously stated	84,641,758	74,068,693	140,945,766	177,517,286	477,173,503
Revaluation reserve reclassified	177,517,286	-	-	(177,517,286)	-
Balances at 31 March 2018, as restated	262,159,044	74,068,693	140,945,766	-	477,173,503
Surplus for the year	75,170,770	-	-	-	75,170,770
Other comprehensive income	(23,167,000)	-	-	-	(23,167,000)
Total comprehensive income	<u>52,003,770</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>52,003,770</u>
Balances at 31 March 2019	<u>314,162,814</u>	<u>74,068,693</u>	<u>140,945,766</u>	<u>-</u>	<u>529,177,273</u>

Restatements:

Restatements to the financial statements were made in the previous financial year to allow consistent application of financial reporting standards in relation to the current financial year. The retirement benefit reserve was derecognized and subsumed into accumulated surplus. Increase in the capital reserve as a result of valuing assets of the Authority is recognised as part of other comprehensive income. Capital project subventions and grants as well as any advances for projects for which funds were not yet utilised at the end of the reporting period are treated as deferred income until expended in subsequent accounting periods. Finally, the value of gifted or donated property, plant and equipment received from projects are recognised in deferred income and the annual amortization is credited to income rather than reserves.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

1. The Authority

The Water Resources Authority was established under the Water Resources Act of 1995. The Act became effective as of April 7, 1996.

Its main objective is to ensure the sustainability of the water resources of Jamaica and the resilience of the nation to floods and drought. The main activities for achieving these are water resources monitoring, planning, allocation, regulation and the promotion of water conservation.

In July 1985 the functions and duties of the Authority were transferred from the Ministry of Public Utilities and Transport to the Ministry of Agriculture. However, in 1989, the Ministry of Public Utilities and Transport again assumed responsibility of the Authority. The Water Resources Authority is currently being funded by subventions from the Ministry of Economic Growth and Job Creation.

The registered office of the Authority is situated at Hope Gardens, Kingston 7, Jamaica.

2. Significant Accounting Policies:

The principal accounting policies applied to the preparation of these financial statements are set out below. These policies have been applied to all the years presented, unless otherwise stated.

2.1 Compliance and basis of preparation

These financial statements have been prepared in accordance with and comply with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB). The financial statements have been prepared under the historical cost convention.

The preparation of financial statements in conformity with IFRS requires the use of certain critical accounting estimates. It also requires management to exercise its judgment in the process of applying the Authority's accounting policies. Although these estimates are based on management's best knowledge of current events and actions, actual results could differ from those estimates

Interpretations and amendments to published standards effective in the current year and are relevant to the authority

2.2 New and revised standards effective for the current year

In the current year the Authority has applied for the first time IFRS 9 and IFRS 15 issued by the International Accounting Standards Board (IASB), effective for annual periods beginning on or after January 1, 2018. The application of these new standards have not significantly affected amounts reported nor disclosures in the current and prior period, except where indicated.

IFRS 9 Financial Instruments

IFRS 9 'Financial Instruments' replaces IAS 39 'Financial Instruments: Recognition and Measurement' and includes revised guidance on the classification and measurement of financial assets and liabilities, including a new expected credit loss model for calculating impairment of financial assets and the new general hedge accounting requirements. It also carries forward the guidance on recognition and derecognition of financial instruments from IAS 39.

The Authority has applied the transitional provisions of IFRS 9 and has elected not to restate comparatives thereby utilising the modified retrospective approach as of April 1, 2018 for all ongoing customer contracts. As a result, the comparative information is disclosed in accordance with the Authority's previous accounting policy under IAS 39 and is not fully comparable with the presentation for the current financial year. No restatements have been recognised arising from the adoption of IFRS 9. The changes in the Authority's accounting policies for financial instruments are disclosed in Note 3.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies:

Interpretations and amendments to published standards effective in the current year and are relevant to the authority (continued)

2.2 New and revised standards effective for the current year (continued)

IFRS 9 Financial Instruments (continued)

Details of the new requirements and the impact on the financial statements are as follows:

(a) *Classification and measurement of financial assets and financial liabilities*

IFRS 9 contains three principal classification categories for financial assets: measured at amortised cost, fair value through other comprehensive income (FVOCI) and fair value through profit or loss (FVTPL). The classification of financial assets under IFRS 9 is generally based on the business model in which a financial asset is managed and its contractual cash flow characteristics. IFRS 9 eliminates the previous IAS 39 categories of held-to-maturity (HTM), loans and receivables and available for sale (AFS).

IFRS 9 largely retains the existing requirements in IAS 39 for the classification and measurement of financial liabilities.

The adoption of IFRS 9 has not had a significant effect on the Authority's accounting policies related to financial liabilities. There are two categories for the classification of financial liabilities: (i) Amortised cost and (ii) Fair value through Profit or Loss (FVTPL).

The following table disclose the original measurement categories under IAS 39 and the new measurement categories under IFRS 9 for each class of the Authority's financial assets as at April 1, 2018.

	<i>Original classification under IAS 39</i>	<i>New classification under IFRS 9</i>
Financial Assets		
Cash and cash equivalents	Loans and receivables	Amortised cost
Investment	Held to maturity	Amortised cost
Receivables	Loans and receivables	Amortised cost
Financial Liabilities		
Payables	Other liabilities	Other liabilities



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies:

Interpretations and amendments to published standards effective in the current year and are relevant to the authority (continued)

2.2 New and revised standards effective for the current year (continued)

IFRS 9 Financial Instruments (continued)

(b) Impairment of financial assets

In relation to the impairment of financial assets, IFRS 9 requires an ‘expected credit loss’ (ECL) model as opposed to an “incurred loss model under IAS 39. The expected credit loss model requires that expected credit losses and changes in those expected credit losses to reflect changes in credit risks since the initial recognition of the financial asset, at the end of each reporting period. It is no longer necessary for a credit event to have occurred before credit losses are recognised. The new impairment model applies to financial assets measured at amortised cost, contract assets and debt investments at FVOCI, but not to investments in equity instruments. Impairment losses for assets in the scope of the IFRS 9 impairment model are generally expected to increase and become more volatile also greater judgement is required due to the need to factor in forward looking information when estimating the appropriate amount of provisions.

IFRS 9 requires measurement of the loss allowance for a financial instrument at an amount equal to the lifetime expected credit losses (ECL) if the credit risk on that financial instrument has increased significantly since initial recognition. However, if the credit risk on an instrument has not increased significantly since initial recognition, the loss allowance is measured for that financial instrument at an amount equal to 12-months ECL. IFRS also requires a simplified approach for measuring the loss allowance at an amount equal to lifetime ECL for trade receivables, contract assets and lease receivables in certain circumstances. The Authority had none of these assets at the current or previous reporting date and therefore does not apply the simplified approach.

The Authority applies the IFRS 9 12-months ECL to initially assess expected credit losses for its receivables. In applying ECL the Authority estimates the lifetime cash shortfalls that will result if a default occurs in the 12 months after the reporting date (or a shorter period if the expected life of the instrument is less than 12 months), weighted by the probability of that default occurring. The probability weighted outcome takes into consideration reasonable and supportable information about past events, current conditions, forecast of future economic conditions and the time value of money as applicable.

The Authority has identified the following financial assets as subject to the expected credit loss model.

<i>Items existing at April 1, 2018 that are subject to the impairment provisions of IFRS 9</i>	<i>Credit risk attributes at 1 April 2018</i>	<i>Increased Impairment allowance recognised on April 1, 2018</i>
		\$
Cash and cash equivalents	Assessed at low credit risk	None
Investment	Assessed at low credit risk	None
Other investment	Assessed at low credit risk	None
Receivables	12-months ECL	None



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies:

Interpretations and amendments to published standards effective in the current year and are relevant to the authority (continued)

2.2 New and revised standards effective for the current year (continued)

IFRS 9 Financial Instruments (continued)

(c) General Hedge accounting

These requirements of IFRS 9 do not apply on initial application as the Authority does not apply hedge accounting.

IFRS 15 Revenue from Contracts with Customers

IFRS 15 establishes a comprehensive framework for determining whether, how much and when revenue is recognised. It replaced IAS 18 *Revenue*, IAS 11 *Construction Contracts* and related interpretations. Under IFRS 15, revenue is recognised when a customer obtains control of the goods or services. It is recognised at an amount that reflects the consideration to which an entity expects to be entitled in exchange for transferring goods or services to the customer. Judgment is required in determining the timing of the transfer of control whether at a point in time or over time. The principles in IFRS 15 provide a more structured approach to measuring and recognising revenue. It also includes disclosure requirements to provide comprehensive information about the amount, timing and uncertainty of revenue and cash flows arising from the entity's contracts with customers.

Apart from providing additional disclosures for the Authority's revenue transactions, the application of IFRS 15 has not had any significant impact on the financial position and/or financial performance of the Authority on transition to IFRS 15 on April 1, 2018.

The following additional new and revised Standards and Interpretations have been adopted in these financial statements. Their adoption has not had any impact on the amounts reported in these financial statements but may impact the accounting for future transactions or arrangements.

<u>Amendments to Standards</u>		<u>Effective for annual Periods beginning on or after</u>
IFRS 2	Share-based Payment: - Amendments to clarify the classification and measurement of share-based payment transactions	1 January 2018
IFRS 4	- Applying IFRS 9 Financial Instruments with IFRS 4 Insurance Contracts – Amendments to IFRS 4	1 January 2018
IFRS 1 and IAS 28	Amendments arising from 2014 – 2016 Annual Improvements to IFRS - Removing short-term exemptions; Clarifying certain fair value measurements	1 January 2018
IAS 40	Investment Property - Amendments to clarify transfers of property to, or from, investment property	1 January 2018
IFRIC 22	Foreign Currency Transactions and Advance Consideration	1 January 2018



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies:

Standards and amendments to published standard that are not yet effective and have not been early adopted by the authority

At the date of authorisation of these financial statements, the following Standards and Interpretations were in issue but not effective or early adopted for the financial period being reported on:

		<u>Effective for annual periods beginning on or after</u>
<u>New Standards</u>		
IFRS 16	Leases	January 1, 2019
IFRS 17	Insurance Contracts	January 1, 2021
<u>Revised Standards</u>		
IFRS 9	Financial Instruments	
	- Amendments regarding prepayment features with negative compensation and modifications of financial liabilities	1 January 2019
IFRS 3, 11, IAS 12, 23,	Amendments arising from 2015 – 2017 Annual Improvements to IFRS	
	- Measurement of previously held interest in a joint operation (IFRS 3&11); Income tax consequences of payments on financial instruments classified as equity (IAS 12); Borrowing costs eligible for capitalisation (IAS 23)	1 January 2019
IFRS 10, IAS 28	Consolidated Financial Statements; Investment in Associates and Joint Ventures	
	- Sale or Contribution of Assets between an Investor and its Associate or Joint Venture	Postponed indefinitely by IASB pending research project on equity method of accounting
IAS 19	Employee Benefits	
	-Plan Amendment, Curtailment or Settlement	1 January 2019
IAS 28	Investments in Associates and Joint Ventures	
	- Amendments regarding long –term interest in associates and joint ventures	1 January 2019
IFRS 3	Business Combinations	
	- Definition of a business	1 January 2020
IAS1, IAS 8	Presentation of Financial statements; Accounting Policies, Changes in Accounting Estimates and Errors	
	- Definition of material	1 January 2020
<u>New Interpretations</u>		
IFRIC 23	Uncertainty over Income Tax Treatments	1 January 2019
<u>Conceptual Framework of Financial Reporting</u>		1 January 2020

Of the above, the following are considered relevant to the operations of the Authority and are likely to impact amounts reported in the Authority's financial statements:



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies:

Standards and amendments to published standard that are not yet effective and have not been early adopted by the Authority (cont'd)

- **IFRS 16 Leases, (effective for annual periods beginning on or after 1 January 2019).** This new standard requires lessees to account for all leases under a single on-balance sheet model, subject to certain exemptions in a similar way to finance leases under IAS 17. Lessees recognize a liability to pay rentals with a corresponding asset and recognize interest expense and depreciation separately. The standard provides guidance on the two recognition exemptions for leases – leases of “low value” assets and short-term leases with a term of 12 months or less. Lessor accounting is substantially the same as IAS 17. Early adoption is permitted but not before the Company applies IFRS 15. The directors and management have not yet assessed the impact of the application of this standard on the Authority’s financial statements.

2.4 Summary of accounting policies

The principal accounting policies applied in the presentation of these financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated.

(a) Foreign currency translation

(i) Functional and presentational currency

Items included in the financial statements are measured using the currency of the primary economic environment in which the entity operates (the functional currency) the financial statements are presented in the Jamaican dollars, which is the functional and presentation currency.

(ii) Transaction and balances

Foreign currency transactions are translated into the functional currency using the exchange rates prevailing at the dates of transactions. Foreign exchange gains and losses resulting from the settlement of such transaction and from the translation at the year-end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognised in the statement of changes in net assets available for benefits. At the year-end date, monetary assets and liabilities denominated in foreign currency are translated using the closing mid-point rate of exchange. Unrealised foreign exchange differences on unsettled foreign currency monetary assets and liabilities are recognized in the statement of changes in net assets available for benefits.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies (Cont'd):

2.4 Summary of accounting policies (Cont'd)

(b) Investment securities

Investment securities are measured at fair value by reference to quoted market prices when available. If quoted market prices are not available, then fair values are estimated on the basis of pricing models or other recognised valuation techniques.

(c) Receivables

Receivables are carried at cost which approximates the fair value of those assets.

(d) Revenue recognition

(Policy prior to April 1, 2018)

Revenue is recognised to the extent that it is probable that the economic benefits will flow to the Authority and the revenue can be reliably measured. The following specific recognition criteria must also be met before revenue is recognised.

Subventions

Subventions are recognised when control of the asset has been attained and recorded in the year to which they relate.

Interest income

Interest income is recognised on a time proportion basis using the effective interest method and includes interest income from debt securities.

(Policy as of April 1, 2018)

Revenue from contracts with customers is recognised when control of the goods or services are transferred to the customer at an amount that reflects the consideration to which the Authority expects to be entitled in exchange for those goods or services.

Deferred Revenues

Deferred revenues is recognised when cash payments are received or due in advance of performance obligations in relation to goods or services transferred to customers and is classified as current where there are no significant financing components. Revenues expected to be earned over more than twelve months are classified in non-current liabilities. Deferred revenue is amortised to income over the period to which the contract relates.

Interest income

Interest income is accrued on a time basis, by reference to the principal outstanding and at the effective interest rate applicable, which is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset to that asset's net carrying amount on initial recognition.

Other revenue from sources other than customer contracts and interest primarily relates to miscellaneous receipts. Revenue from these sources are not considered material.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies (Cont'd):

2.4 Summary of accounting policies (Cont'd)

(d) Revenue recognition (Cont'd)

Subventions and Grants

Government of Jamaica Subventions:

Recurring grants or subvention received from the Government of Jamaica are recognised as they are received.

Grants and contributions received specifically earmarked to purchase, construct or otherwise acquire non-current assets are recognised as deferred revenue in the statement of financial position and transferred to income on a systematic and rational basis over the useful lives of the related assets.

(e) Expenses

All expenses are recognised in the statement of changes in net assets available for benefits on the accrual basis. Accrued expenses are recognised initially at fair value and subsequently stated at amortised cost using the effective interest method.

(f) Financial instruments (Policy prior to April 1, 2018)

(i) Classification

The Authority classifies its investment in debt and equity securities. These financial assets are classified as available-for-sale investment securities. The Authority's policy is for the managers to evaluate the information about these financial assets on a fair value basis together with other related information.

(ii) Recognition/derecognition

Purchases and sales of investments are recognised on the trade date, the date on which the Authority commits to purchase or sell the investment. Investments are derecognised when the rights to receive cash flows from the investments have expired and the Authority has transferred substantially all risks and rewards of ownership.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies (Cont'd):

2.4 Summary of accounting policies (Cont'd)

(f) Financial investments (Policy prior to April 1, 2018) Cont'd

(iii) Measurement

Financial investments are initially recognised at fair value. Transaction costs are expensed in the statement of changes in net assets available for benefits. Subsequent to initial recognition, all financial investments are measured at fair value based on quoted bid prices or amounts derived from cash flow invested. Unrealised gains and losses are recognised in the statement of changes in net assets available for benefits.

(iv) Fair value estimation

The fair value of the financial instruments traded in active markets (such as equity securities) is based on quoted market prices at the year-end date. The quoted market prices used for financial assets held by the Authority is current bid price.

(Policy as of April 1, 2018)

Financial Assets

The Authority classifies its financial assets at amortised cost as these assets are held only within a business model the objective of which is to collect the contractual cash flows and the contractual terms give rise to cash flows that are solely payments of principal and interest. Financial assets at amortised cost include cash and bank balances, investment and receivables.

A loss allowance for expected credit losses on receivables and other financial assets that are measured at amortised cost is assessed applying the expected credit loss model (ECL). The amount of expected credit losses is updated at each reporting date to reflect changes in credit risk since initial recognition of the respective financial instrument.

Lifetime ECL is recognised when there has been a significant increase in credit risk since initial recognition. However, if the credit risk on the financial instrument has not increased significantly since initial recognition, the Authority measures the loss allowance for that financial instrument at an amount equal to 12-month ECL.

For financial assets, the expected credit loss is estimated as the difference between all contractual cash flows that are due to the Authority in accordance with the contract and all the cash flows that the Authority expects to receive, discounted at the original effective interest rate.

Financial assets are written off when there is information indicating that the debtor is in severe financial difficulty and there is no realistic prospect of recovery. Subsequent recoveries of amounts previously written off are recognised in surplus or deficit.

Financial liabilities

These are classified as "other financial liabilities".

Financial liabilities are initially measured at fair value, net of transaction costs (where applicable). They are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective yield basis except for short-term liabilities when the recognition of interest would be immaterial.

The Authority's financial liabilities comprise accounts payable and other payables



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies (Cont'd):

2.4 Summary of accounting policies (Cont'd)

(g) Cash and cash equivalents

Cash and cash equivalents include cash in hand, demand deposits, other short-term highly liquid investments with original maturities of three months or less.

(h) Use of estimates and judgments

The preparation of financial statements in accordance with International Financial Reporting Standards requires the Board of Directors to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. These estimates are based on historical experience and the Board of Directors' best knowledge of current events and actions and are reviewed on an ongoing basis. Actual results could differ from those estimates.

(i) Pension Scheme costs

The Authority participates in a defined benefit contribution pension scheme, the assets of which are held separately from those of the Authority, however, the net value of the fund and the actuarially determined employer contribution costs are reflected in the books of the Authority.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

2. Significant Accounting Policies (Continued)

Summary of accounting policies (Continued)

(j) Property, plant and equipment:

- (i) Items of property, plant and equipment, excepting building are stated at cost, less accumulated depreciation and impairment losses. The directors however, revalued the building during the current year and indicated that the current book value represents the replacement value.
- (ii) Depreciation is calculated on the straight-line basis at annual rates to write down the assets to their estimated residual values over their expected useful lives. The depreciation rates are as follows:

Computer hardware	25%
Computer software	25%
Technical and scientific equipment	20%
Buildings	2.50%
Furniture and fixtures	10%
Motor vehicles	20%
Capital projects	2.50%

Land is not depreciated and is stated at cost. Depreciation rates estimated residual values and expected useful lives are re-assessed at each financial year end.

3.1 Retirement Benefits Pension Scheme

The Authority participates in a defined benefit pension plan which is open to all permanent employees and administered by Sagicor Life Jamaica Limited.

	2019 \$' 000	2018 \$' 000
Assets recognized in the Statement of financial position -		
Retirement Benefit Asset- Pension plan	239,744	246,038
Income recognized in the profit or loss	(8,484)	(509)
Expense/(income) recognized in other comprehensive income	<u>23,167</u>	<u>(111,023)</u>

Actuarial assumptions

The key financial assumptions used in valuing the retirement benefit obligations at the reporting date are as follows:

	2018 %	2018 %
Discount rate	7.0	7.5
Salary increase rate	5.0	5.0
Post retirement increases in pension	1.5	1.125
Interest on refunds	<u>7.0</u>	<u>6.0</u>

Demographic assumptions include assumed retirement age of 60 for members (normal retirement age). Assumptions regarding future mortality are based on 1994 Group Annuitant Mortality rates projected to the measurement date using the Society of Actuaries' Scale AA



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

3.1 Retirement Benefits Pension Scheme (Cont'd)

Pension Plan Benefits

The pension plan is legally separate from the Authority and is administered by Sagicor Life Jamaica Limited.

The valuation of the plan's assets and the present value of the defined benefit obligation at March 31, 2019 was carried out by Eckler Jamaica Limited, the Principal of which is a Fellow of the Society of Actuaries. The present value of the defined benefit obligation and the related asset service cost were measured using the projected unit credit method.

The plan is funded by the employees' contributions at 5% of salary with the option to contribute an additional 5% and employer contribution as recommended by the independent actuaries. Pension at normal retirement age is based on 2% of final 3 year average salary per year of pensionable service, plus any declared bonus pensions. The defined benefit asset recognized in the Balance Sheet was determined as follows:

	2019	2018
	\$' 000	\$' 000
Fair value of plan assets	426,810	384,017
Present value of funded obligations	<u>(187,066)</u>	<u>(137,979)</u>
	239,744	246,038
Effect of asset ceiling	<u>-</u>	<u>-</u>
	<u><u>239,744</u></u>	<u><u>246,038</u></u>

The movement in the net retirement benefit asset in the year is as follows:

	2019	2018
	\$'000	\$'000
Net defined benefit asset at beginning of the year	246,038	127,556
Amounts credited to income	8,484	509
(Expense)/income recognised in other comprehensive income	(23,167)	111,023
Employer contributions	<u>8,389</u>	<u>6,950</u>
Net defined benefit asset at end of year	<u><u>239,744</u></u>	<u><u>246,038</u></u>

The Movement in the fair value of plan assets during the year is as follows:

	2019	2018
	\$' 000	\$' 000
At beginning of year	384,017	325,193
Employer's contributions	8,389	6,950
Members' contributions	5,016	4,120
Interest on plan assets	28,917	31,079
Benefits paid	(2,855)	(4,592)
Settlement	-	(4,496)
Administration fees	(1,600)	(1,321)
Re-measurement of the plan assets	<u>4,926</u>	<u>27,084</u>
At end of year	<u><u>426,810</u></u>	<u><u>384,017</u></u>



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

3.1 Retirement Benefits Pension Scheme (Cont'd)

Pension Plan Benefits (Cont'd)

The movement in the present value of the defined benefit obligation during the year is as follows:

	2019	2018
	\$' 000	\$' 000
At beginning of year	(137,979)	(85,631)
Current service cost	(8,618)	(4,381)
Interest cost	(10,213)	(8,046)
Member's contributions	(5,016)	(4,120)
Actuarial gains on obligations:		
Due to experience	(3,908)	(1,435)
Due to financial assumptions	(24,187)	(37,273)
Benefits paid	2,855	4,592
Past service cost	-	(6,181)
Settlement	-	4,496
At end of year	<u>(187,066)</u>	<u>(137,979)</u>

The amounts recognized in profit or loss is as follows:

	2019	2018
	\$' 000	\$' 000
Current service cost	8,618	4,381
Interest cost on present value obligations	10,213	8,046
Interest/(income) on plan assets	(28,915)	(31,079)
Interest on effect of asset ceiling	-	10,641
Past service cost	-	6,181
Administration fees	1,600	1,321
Total included in staff costs (Note 17)	<u>(8,484)</u>	<u>(509)</u>

The credit of \$8,484,000 (2018: \$509,000) was included in administrative expense in the profit or loss in the statement of comprehensive income.

The amounts recognized as other comprehensive income are as follows:

	2019	2018
	\$' 000	\$' 000
Re-measurement of the defined benefit liability	28,093	38,708
Change in effect on ceiling assets	-	(122,646)
Re-measurement of the plan assets	(4,926)	(27,085)
Total charge/ (credit) included in other comprehensive income	<u>23,167</u>	<u>(111,023)</u>



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

3.1 Retirement Benefits Pension Scheme (Cont'd)

Pension plan benefits (Cont'd)

The assets of the fund were invested in Sagicor Pooled Investments Funds as follows:

	Fair value of asset 2019 \$M	% of Total 2019 %	Fair value of asset 2018 \$M	% age of Total 2018 %
CPI	27.20	6.37	25.19	6.56
Global market Fund	15.39	3.60	13.42	3.49
Quoted equities	158.97	37.24	120.07	31.27
Mortgage and real estate	100.07	23.45	106.82	27.82
Fixed income	29.90	7.01	27.28	7.10
Foreign currency	62.86	14.73	59.28	15.44
Money market	32.43	7.60	31.96	8.32
	426.81	100.00	384.02	100.00

The expected return on plan assets was determined by considering the expected returns available on the assets underlying the current investment policy. Expected yields on fixed interest investments are based on gross redemption yields as at the reporting date. Expected returns on equity and property investments reflect long-term real rates of return experienced in the respective markets.

The three year trend for the surplus/(deficit) in the plan, as well as actuarial (gains)/losses is as follows:

	2019 \$'000	2018 \$'000	2017 \$'000
Present value of obligation	(187,066)	(137,979)	(85,631)
Fair value of plan assets	426,810	384,017	325,193
	239,744	246,038	239,562
Experience adjustments -			
Defined benefit obligation -loss	3,907	1,435	414
Fair value of plan assets -gain	4,926	27,085	25,899



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

3.1 Retirement Benefits Pension Scheme (Cont'd)

Pension plan benefits (Cont'd)

Sensitivity analysis at the end of the reporting period for key economic assumptions are as follows:

Effect on the Present Value of Obligations – increase/(decrease)

	2019	2018
	\$' 000	\$' 000
Increase in discount rate - + 1 %	(32,996)	(24,355)
Decrease in discount rate - - 1%	43,777	32,214
Pension increases - + 1%	21,086	15,314
Pension decreases - - 1%	(18,236)	(13,330)
Salary increase rate - + 1 %	22,491	17,414
Salary decrease rate - - 1%	(19,013)	(14,685)
Increase of one year in life expectancy	4,050	2,980

Membership summary

	2019	2018
	\$	\$
Active members	53	53
Pensioners	2	1
All participants	<u>55</u>	<u>54</u>

The weighted average duration of the defined benefit obligation as at March 31, 2019 for all members is 21.1 years (2018: 21.3 years).

The estimated pension contribution expected to be paid into the plan by the Authority for the next financial year is \$8.4 million based on the employer's contribution rate of 10% of pensionable salaries..



NOTES TO THE FINANCIAL STATEMENTS
YEAR ENDED 31 MARCH 2019

4. Property, plant and equipment	Building	Furniture & Fixtures	Computer Hardware	Stations	Technical & Scientific Equipment	Motor Vehicles	Total
	\$	\$	\$	\$	\$	\$	\$
At Cost / Revaluation:							
1 April 2017	109,807,637	12,130,559	18,810,550	32,650,690	35,279,405	22,342,026	231,020,867
Additions	-	1,364,258	878,315	141,759	31,000	10,342,112	12,757,444
Disposal	-	-	-	-	(199,582)	(180,258)	(379,840)
Revaluation gain	10,192,363	-	-	-	-	-	10,192,363
31 March 2018	120,000,000	13,494,817	19,688,865	32,792,449	35,110,823	32,503,880	253,590,834
Additions	-	557,719	2,016,620	-	796,142	-	3,370,481
31 March 2019	120,000,000	14,052,536	21,705,485	32,792,449	35,906,965	32,503,880	256,961,315
Accumulated Depreciation:							
1 April 2017	25,287,364	9,039,358	18,752,084	1,440,017	13,543,368	12,194,397	80,256,588
Charge for year	2,252,951	690,439	95,627	819,811	3,291,689	6,786,789	13,937,306
Eliminated on disposal	-	-	-	-	(167,288)	(180,258)	(347,546)
Eliminated on revaluation	(27,540,315)	-	-	-	-	-	(27,540,315)
31 March 2018	-	9,729,797	18,847,711	2,259,828	16,667,769	18,800,928	66,306,033
Charge for the year	3,000,000	746,157	297,289	891,811	3,371,413	3,442,830	11,677,500
31 March 2019	3,000,000	10,475,954	19,145,000	3,079,639	20,039,182	22,243,758	77,983,533
Carrying Amount							
31 March 2019	117,000,000	3,576,528	2,560,485	29,712,810	15,867,783	10,260,122	178,977,782
31 March 2018	120,000,000	3,765,020	841,154	30,532,621	18,443,054	13,702,952	187,284,801

The property was valued by DC Tavares Realty as at March 31, 2018. The valuers arrived at a market value of \$120m and a replacement cost of \$171m. The directors are of the opinion that the market value has not changed since the last valuation.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

5. Intangible Assets

	Computer Software 2019 \$	Computer Software 2018 \$
At Cost:		
April 1	35,051,447	21,611,024
Additions	<u>552,750</u>	<u>13,440,423</u>
March 31	<u>35,604,197</u>	<u>35,051,447</u>
Accumulated Depreciation:		
April 1	18,784,300	14,398,186
Annual Amortisation	<u>3,720,864</u>	<u>4,386,114</u>
March 31	<u>22,505,164</u>	<u>18,784,300</u>
Carrying Amount	<u>13,099,033</u>	<u>16,267,147</u>

6. Receivable and prepayments

	2019 \$	2018 \$
Motor vehicle repair loans	7,505,295	1,992,288
Computer loans	640,170	268,509
Staff loans	78,867	547,150
Withholding tax recoverable	838,046	835,955
Interest receivable	97,680	32,232
Due from BOJ	700,931	4,553,279
Deposit on fixed asset	432,329	805,136
Other receivables	<u>16,392,563</u>	<u>286,385</u>
	26,685,881	9,320,934
Prepayments	<u>1,664,982</u>	<u>972,173</u>
	<u>28,350,863</u>	<u>10,293,107</u>



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

7. Investment

Investment comprises the following:

	2019 \$	2018 \$
Managed funds	<u>4,839,537</u>	<u>4,637,286</u>
	<u>4,839,537</u>	<u>4,637,286</u>

8. Cash and Cash Equivalents

	2019 \$	2018 \$
Bank of Nova Scotia - current account	62,518,107	22,976,722
Motor vehicle repair loan account	14,624,830	6,604,625
Capital projects account	1,683,756	1,407,872
Petty cash	<u>11,525</u>	<u>11,525</u>
	<u>78,838,218</u>	<u>31,000,744</u>

9. Capital Reserve

This represents a valuation of stations built by the Authority previously excluded from the accounts. Values were determined by qualified internal valuers.

10. Revaluation Reserve

The revaluation reserve was a result of revaluing the office buildings. The movement on the reserve was as follows:

	2019 \$	2018 \$
Opening balance	140,945,766	103,213,087
Revaluation gain	<u>-</u>	<u>37,732,679</u>
Closing balance	<u>140,945,766</u>	<u>140,945,766</u>



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

11. Deferred income - Capital projects subvention

	2019 \$	2018 \$
Balance of unused subvention at 1 April	1,044,720	1,333,482
Add funds received	-	2,900,000
	<u>1,044,720</u>	<u>4,233,481</u>
Less expenditure on capital projects for year	<u>(1,044,720)</u>	-
Balance of unused subvention 31 March	<u>-</u>	<u>1,044,720</u>

12. Deferred income - Capital project grant

	2019 \$	2018 \$
Balance at beginning of year	7,060,257	2,512,395
Addition	-	4,906,776
Amortisation to income (Note 15)	<u>(358,913)</u>	<u>(358,914)</u>
Balance at end of year	<u>6,701,344</u>	<u>7,060,257</u>

Deferred grant income represents the value of assets transferred to the Authority, which were purchased and used by various projects and also includes capital grant received for the construction of the Hubert Chin Building. This account is being written down by an amount equivalent to the depreciation charged on these assets and is included in other operating income.

13. Deferred income - Other Projects Fund

	2019 \$	2018 \$
WRA/IDB Master Plan project	<u>700,931</u>	<u>4,553,279</u>
	<u>700,931</u>	<u>4,553,279</u>

14. Payables and Accruals

	2019 \$	2018 \$
Accruals	4,777,350	4,390,634
Administrative expenses	<u>2,492,525</u>	<u>1,298,692</u>
	<u>7,269,875</u>	<u>5,689,326</u>

**NOTES TO THE FINANCIAL STATEMENTS**

31 MARCH 2018

15. Other Operating Income

	2019	2018
	\$	\$
Deferred income amortised (Note 12)	358,913	358,914
Well applicant fees	7,403,900	14,136,237
Reimbursements of expenditures	1,977,563	2,917,945
Interest income	269,791	234,498
Gain on disposal of property, plant and equipment	-	299,666
Other Income	<u>77,493</u>	<u>5,970</u>
	<u><u>10,087,660</u></u>	<u><u>17,953,230</u></u>



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

16. Expense by Nature

	2019	2018
	\$	\$
Salaries and related costs (Note 16 (a))	103,002,816	103,482,840
Staff benefits	15,833,735	12,541,669
Income related to post-employment defined benefit plan	(8,484,000)	(509,000)
Other staff related - net	(172,224)	-
Accommodation and machine rental	1,926,333	2,290,390
Telephone	2,324,159	1,084,955
Utility expenses	4,676,355	4,457,967
Motor vehicle expenses	5,111,210	4,811,542
Repairs, materials and related expenses	4,292,404	6,201,542
Cleaning & sanitation	160,500	138,091
Construction materials	-	34,616
Project write off	(1,044,720)	-
Haulage	81,000	85,300
Security	1,782,408	1,713,670
Postage, stationery and printing	4,381,548	3,374,567
GCT expense	6,427,641	2,084,778
Professional fees	10,019,139	1,700,931
Audit fees	1,095,143	930,000
Licenses & taxes	207,023	228,550
Foreign travel	264,726	297,428
Travel and subsistence	32,793,453	32,249,010
Bank charges	347,498	389,799
Meals & entertainment	1,164,608	737,804
Training	2,363,619	-
Miscellaneous purchases	852,347	1,340,838
Depreciation and amortisation	15,398,364	18,323,420
Insurance – property	613,754	2,425,511
Advertising	2,664,424	2,394,854
	<u>208,083,515</u>	<u>202,811,072</u>

(a) Staff welfare

	2019	2018
	\$	\$
Salaries, wages and related expenses	95,488,043	95,797,659
Payroll taxes - employer's portion	<u>7,514,773</u>	<u>7,685,181</u>
	<u>103,002,816</u>	<u>103,482,840</u>



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

17. Related Party Transactions

A related party is one which controls or exercises significant influence over, or is controlled or significantly influenced by, the Authority in making financial or operating decisions or, along with the Authority, is subject to common control or significant influence.

	2019	2018
	\$' 000	\$' 000
(a) Transactions with related parties		
Directors' fees	1,048	907
Directors' emoluments	<u>5,887</u>	<u>10,179</u>
(b) Key management compensation		
	2019	2018
	\$' 000	\$' 000
Short-term employee benefit-		
Management remuneration	15,391	16,998
Other	-	436
	<u>15,391</u>	<u>17,434</u>
Pension	<u>1,280</u>	<u>1,377</u>
	<u>16,671</u>	<u>18,811</u>

18. Fair value estimation

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction. Market price is used to determine fair value where an active market exists as it is the best evidence of the fair value of a financial instrument. A market is regarded as active if quoted prices are readily and regularly available from an exchange, dealer, broker, industry group, pricing service, or regulatory agency, and those prices represent actual and regularly occurring market transactions on an arm's length basis. Where no market price is available, the fair values presented have been estimated using present values or other estimation and valuation techniques based on market conditions existing at balance sheet dates.

The values derived from applying these techniques are significantly affected by the underlying assumptions used concerning both the amounts and timing of future cash flows and the discount rates. The following methods and assumptions have been used:

- (1) Investment securities classified as available-for-sale are measured at fair value by reference to quoted market prices when available.
- (2) The fair value of liquid assets and other assets maturing within three months is assumed to approximate their carrying amount. This assumption is applied to liquid assets and the short-term elements of all other financial assets and financial liabilities.
- (3) The fair value of variable rate financial instruments is assumed to approximate their carrying amounts.
- (4) Equity securities for which fair values cannot be measured reliably are recognized at cost less impairment.

NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

18. Fair value estimation (cont'd)

The estimated fair values of the following financial instruments do not differ from their carrying values.

	2019		2018	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
	\$'000	\$'000	\$'000	\$'000
Investment securities -				
Amortised cost (2018: Held to maturity)	4,840	4,840	4,637	4,637

- Level 1 includes those instruments which are measured based on quoted prices in active markets for identical assets and liabilities. These mainly comprise of equity shares traded on the Jamaica Stock Exchange and are classified as available-for-sale and financial assets at fair value through profit or loss.
- Level 2 includes those instruments which are measured using inputs other than quoted prices that are observable for the instrument, directly or indirectly. The fair value for these instruments is determined by using valuation techniques and maximizes the use of observable market data where it is available and rely as little as possible on entity specific estimates. If all significant inputs required to fair value an instrument are observable, the instrument is included in level 2.
- If one or more of the significant inputs is not based on observable market data, the instrument is included in level 3.

The Authority has no financial instruments that are measured at fair value after initial recognition.

19. Financial risk management

The Authority's activities expose it to a variety of financial risks: market risk (including currency risk, fair value interest rate risk, cash flow interest rate risk and price risk), credit risk and liquidity risk. The Authority's overall risk management programme focuses on the unpredictability of financial markets and seeks to minimise potential adverse effects on the Authority's financial performance.

The Ministry of Finance are ultimately responsible for the establishment and oversight of the Authority's risk management framework. The Managers provide guidelines for overall risk management and areas, such as foreign exchange risk, interest rate risk and credit risk, and investment of excess liquidity. The Managers manage and monitoring risks, as follows:



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

19. Financial risk management (cont'd)

(a) Market risk

The Authority does not take exposure to market risk.

(i) Currency risk

Currency risk is the risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

The Authority is exposed to currency risk due to fluctuation in the exchange rates on balances that are denominated in currencies other than the Jamaican Dollar.

Management ensures that the net exposure is kept to an acceptable level by monitoring all currency positions and ensuring adherence to predetermined limits.

There were no foreign currency related liabilities at the reporting date

(ii) Interest rate risk

Interest rate risk is the risk that the future cash flows of a financial instrument will fluctuate because of changes in market interest rates.

Floating rate instruments exposes the Authority to cash flow interest risk whereas fixed interest rate instruments expose the Authority to fair value interest risk.

The Authority's exposure to interest rate risk is affected by its holding in cash and bank deposits. In respect of liabilities, the Authority does not enter into transactions involving interest costs and is therefore not affected by interest rate risk on liabilities.

The following table indicates the level of interest rate exposure of the Authority:

	2019 \$	2018 \$
Managed funds	4,839,537	4,637,286
Bank Saving Accounts	<u>16,308,586</u>	<u>8,012,497</u>
Total	<u><u>21,148,123</u></u>	<u><u>12,379,783</u></u>



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

19. Financial risk management (cont'd)

(a) Market risk (cont'd)

(ii) Interest rate risk

Interest rate sensitivity analysis

The sensitivity analysis below has been determined based on the exposure to variable interest rate financial instruments at the end of the reporting period. The exposure is substantially on holdings of US dollar fixed deposits. The analysis is prepared assuming the amount outstanding at the end of the reporting period was outstanding for the whole year. 100 basis point increases or 100 basis point decreases (2018: 100 basis points increase or 100 points decrease) is used when reporting interest rate risk internally and represents management's assessment of the reasonably possible change in interest rates.

The following table indicates sensitivity to a reasonable possible change in interest rate with all other variables held constant. The analysis is prepared assuming the amount of assets outstanding at the end of the reporting period was outstanding for the whole year.

	2019 \$	2018 \$
Effect on profit or loss – increase/(decrease) in net surplus		
- increase 100 (2018: 100) basis points	<u>211,481</u>	<u>115,975</u>
- decrease 100 (2018: 100) basis points	<u>211,481</u>	<u>123,798</u>

(iii) Price risk

Price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market price, other than those arising from currency or interest rate risk, whether those changes are caused by factors specific to the instrument or affecting all similar instruments in the market.

The Authority is not exposed to price risk.

(b) Credit Risk

Credit risk is the risk that a party to a financial instrument will fail to discharge an obligation and cause the other party to incur a financial loss.

Investments are allowed principally in secure liquid instruments and with counterparties that the Managers believe do not offer any significant credit risk. Based on their assessment, the Managers do not expect any counterparties to fail to meet their obligations. The managers manage credit risk by having an investment policy which includes written authority levels and prior approval by the Ministry of Finance of any investment transaction.

At the date of the statement of financial position, there were significant concentrations of credit risk in one financial institution. There are no off-balance-sheet investments and, therefore, the maximum exposure to credit risk is represented by the total carrying amount of financial assets.



NOTES TO THE FINANCIAL STATEMENTS

31 MARCH 2018

19. Financial risk management (cont'd)

(c) Liquidity Risk

Liquidity risk, also referred to as funding risk, is the risk that the authority will encounter difficulty in raising funds to meet commitments associated with financial instruments. Liquidity risk may result from an inability to sell a financial asset quickly at, or close to, its fair value. Prudent liquidity risk management implies maintaining sufficient cash and marketable securities, and the availability of funding through an adequate amount of committed facilities. Due to the nature of the authority, which accumulates and invests funds to pay liabilities which crystallise principally in the short term and in a measured predictable manner, the Managers believe liquidity risk for the Authority is negligible.

DIRECTORS' COMPENSATION

POSITION OF DIRECTOR BOARD MEMBERS	FEES (\$)	MOTOR VEHICLE UP-KEEP/TRAVELLING OR VALUE OF ASSIGNMENT OF MOTOR VEHICLE (\$)	HONORARIA (\$)	ALL OTHER COMPEN- SATION INCLUDING NON-CASH BENEFITS AS APPLICABLE (\$)	TOTAL (\$)
Dr. Parris Lyew-Ayee (Chairman)	188,400.00				188,400.00
Dr. Michael Taylor	81,000.00				81,000.00
Mr. Michael Brown	77,400.00	41,116.00			118,516.00
Ms. Nadeen Spence	59,800.00	2,381.40			62,181.00
Ms. Stephanie Abrahams	77,400.00	18,772.00			96,172.00
Mr. George Grant	74,000.00	7,410.00			81,410.00
Ms. Georgia Hamilton	73,000.00	6,618.80			79,618.80
Ms. Novlette Howell	77,400.00	7,574.00			84,974.00
Mrs. Allison Rangolan	186,000	6,206.00			192,206.00

NOTES

- Where a non-cash benefit is received (e.g. government housing), the value of that benefit shall be quantified and stated in the appropriate column above.



SENIOR EXECUTIVES' COMPENSATION

POSITION OF SENIOR EXECUTIVE	SALARY (\$)	GRATUITY OR PERFORMANCE INCENTIVE (\$)	TRAVELLING ALLOWANCE OR VALUE OF ASSIGNMENT OF MOTOR VEHICLE	PENSION OR OTHER RETIREMENT BENEFITS (\$)	OTHER ALLOWANCES (\$)	NON-CASH BENEFITS (\$)	TOTAL (\$)
HERBERT THOMAS MANAGING DIRECTOR	5,645,640.00	3,281,442.00	670,412.00			-	9,597,494.00
PETER CLARKE DEPUTY MANAGING DIRECTOR	4,340,356.00	-	1,542,864.00				5,883,220.00
HERMINE DOWNER DIRECTOR FINANCE & ACCOUNTS	3,543,293.00		1,542,864.00		698,070.00		5,784,227.00
MICHAEL WILSON DEPUTY MANAGING DIRECTOR	597,749.00		294,471.36				\$892,220.00

NOTES

Where contractual obligations and allowances are stated in a foreign currency, the sum in that stated currency must be clearly provided and not the Jamaican equivalent.

1. Other Allowances (including laundry, entertainment, housing, utility, etc.)
2. Where a non-cash benefit is received (e.g. government housing), the value of that benefit shall be quantified and stated in the appropriate column above.
3. Where a non-cash benefit is received (e.g. government housing), the value of that benefit shall be quantified and stated in the appropriate column above.

*** The salary indicated for Mr. Peter Clarke is inclusive of \$191,099 which represents two (2) months salary upon promotion to the position of Managing Director .



Water Resources Authority

(An Agency of the Ministry of Economic Growth & Job Creation)



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