WATER RESOURCES AUTHORITY

ANNUAL REPORT FOR

PERIOD

1ST APRIL 2011 - 31ST MARCH 2012

WATER RESOURCES AUTHORITY
HOPE GARDENS
P.O. BOX 91
KINGSTON 7
JAMAICA
Tel: 927-0077
Fax: 702-3937
977-0179
E-mail: info@wra.gov.jm
Web Site: wra.gov.jm

Our Mission

To ensure sustainability of Jamaica's water resources through

- Continual assessment and proper management…
- The promotion of conservation and protection…
- Optimal development…

…of the resources.

To ensure rational and equitable allocation of the nation's resources, to reduce conflicts among water users.

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MESSAGE FROM THE CHAIRMAN

The Water Resources Authority (WRA) marked a new administration with the change to a new Board of Directors ready to continue working with the management and staff of the organization towards ensuring the proper usage, monitoring and general stewardship of Jamaica's surface and ground water resources. I wish to go on record expressing my thanks to the previous Board for its sterling service and welcome the new Board.

The Honourable Minister in his charge to the new Board emphasized the need to **"create an enabling framework within which all water sector agencies can flourish and support the sustainability of the various water and sewerage providers"**. This could be achieved through continual assessment and proper management of the island's water resources, something that the WRA has consistently provided throughout its existence.

Economic Challenges and realities have not escaped the organization however and we continue to lay vulnerable to pressures from budgetary constraints to attrition of staff in search of greener pastures elsewhere. The latter poses a more longer term challenge to the organization as we lose crucial skills necessary for the efficient operations of the Authority. I however wish to congratulate the staff and management for persevering through these difficult and challenging times and to various staff members for rising to the challenge, taking on new responsibilities without complaint and with fervor of enthusiasm.

On behalf of the Board of the Authority I express our satisfaction with the operation of the WRA and congratulate the management on its continued success in navigating the organization forward.
We look forward to serving with you in the years ahead.

Dr Parris Lyew-Ayee
Chairman

MESSAGE FROM THE MANAGING DIRECTOR

In 2011-2012 the Water Resources Authority continued to provide data, information, technical assistance and water resources assessments to the public and private sectors within and outside the water sector. This became more critical following the serious drought of 2009/2010 where the WRA was continuously bombarded for information and updates on surface water flows and ground water levels to meet water demand. The support to national dvelopment is provided within the liberal interpretation of Section 4(3)(e) of the Water Resources Act 1995 and in keeping with the principle of Integrated Water Resources Management (IWRM). The basis for the provision of information and support to drive national development is the data collected on surface and ground water, water quality, well construction and abstraction of water.

The Authority in June 2011 launched the Water Resources Fact Book which provided easily accessible information in a simple bullet format illustraed by various maps on several aspects of the water resources and water supply across the island. The fact book is a fullfilment of that part of the mandate of the WRA to disseminate water resources data islandwide. The objectives of the Fact Book were to;

- inform the public on the water resources of the island in an attempt to increase awareness and faciliatate Integrated Water Resources Management (IWRM)
- provide factual information to aid students and teachers in completing their SBA and to understand the water resources/supply of Jamaica; and
- to provide water resources nformation to international agencies and audiences.

Congratulations must go to the small group of the WRA staff especially Mrs Natalie Ferguson who worked assiduously to complete the Fact Book while the Chairman pushed for and printed the fact Book .

The WRA continues its effort to raise the awareness of the importance of good management of the island's water resources and uses every medium possible to get its message across. The role of civil society in the effective managemt of water resources cannot be understated and the information produced and disseminated by the Auhtority will raise awareness and improve water resources management.

Let me again congratulate and thank all staff for their untiring effort in getting the message across that without good water resources management we cannot have a sustainable and reliable water supply.

Basil Fernandez
Managing Director

FUNCTION OF THE AUTHORITY

The Water Resources Authority became operational on April 1, 1996 as a result of the promulgation of the Water Resources Act 1995. The Act provides for the management, protection and controlled allocation and use of the water resources of Jamaica.

1. The Authority, under Section 4 of the Act, carries out the following duties:

2. It shall be the duty of the Authority to regulate, allocate, conserve and otherwise manage the water resources of Jamaica.

3. Subject to the provisions of this Act, the Authority may, for the purposes of performing any of its functions under this Act, do anything and enter into any transaction which, in the opinion of the Authority, is necessary to ensure the proper performance of its functions.

    a. In particular, and without prejudice to the generality for the provisions of subsections (1) and (2), the Authority may –

    b. Obtain, compile, store and disseminate data concerning the water resources of Jamaica;

    c. Exercise planning functions as provided in this Act in relation to the Master Plan and Water Quality Control Plans;

    d. Allocate water resources in conformity with the provisions of this Act;

    e. Control the quality of water resources in accordance with the provisions of this Act;

    f. Provide to any department or agency of Government, at its request, technical assistance in respect of any projects, programmes or activities which relate to the development, conservation and use of water resources;

Perform such other functions relating to the management, conservation and use of water resources as may be assigned to it by or under this Act or any other enactment.

THE BOARD

The Executive

The Board of the Authority, by Cabinet Decision No. 38/10 dated 19 October 2010, was re-appointed with effect from 19 October 2010 for a period of three (3) years terminating on 18 October 2013. There was no change to the membership of the Board.
The members of the Board as at 31 December 2011 were:

Dr. Parris Lyew-Ayee Jr.	Chairman
Mr. Basil Fernandez OD, JP	Secretary/Managing Director
Mr. Alexander Williams	Member
Dr. Geoffrey Williams	Member
Dr. Willard Pinnock	Member
Miss Camiek Blair	Member
Mrs. Cheyenne McClarthy	Member
Miss Sandra Buchanan	Member

Mrs. Charmaine James continued as the Recording Secretary, and Mrs. Natalie Ferguson, Hydrogeologist and Head of the Permits and Licences Unit, continued as the Technical Advisor.

The Board met once per month on the second Thursday at 2pm.

During the 2011-2012 Financial Year up to the period ending 28 February 2012 there were eleven (11) meetings of the Board as the Board met every month and no recess was taken. The full Board of eight (8) members was present for three (3) meetings; for five (5) meetings the attendance was seven (7) members; for two (2) meetings the attendance was six (6) members and for one (1) meeting five (5) members.

Committees of the Board

The two committees of the Board established in April 2008 continued to meet every other month at 1pm before the Board meeting at 2pm. The committees are;

1. The Finance and Audit Committee
2. Technical Advisory Committee.

Finance Committee

There was no change in the membership of the Finance Committee.
The following were the membership of the Finance Committee as at 28 February 2012:

Finance Committee

Mr. Alexander Williams Chairman
Dr Parris Lyew-Ayee Jr
Mrs. Cheyenne McClarthy
Miss Sandra Buchanan
Dr. Geoffrey Williams
Mr. Basil Fernandez (MD-WRA)
Miss Hermine Downer (Director Finance and Accounts-WRA)

The Finance Committee met five (5) times for the year (up to 31 December 2011) with an attendance of six (6) persons at two (2) of the meetings; five (5) persons at two (2) of the meetings and four (4) persons at one (1) of the meetings.

Technical Advisory Committee

There was one change to the Technical Advisory Committee. Ms Angella Graham was appointed to replace Mr. Andreas Haiduk who had resigned from the Authority and she attended her first meeting in March 2011.

The following were the membership of the committee as at 31 December 2011.

Dr. Willard Pinnock Chairman
Dr Parris Lyew-Ayee Jr
Miss Camiek Blair
Mr. Basil Fernandez (MD-WRA)
Mr. Herbert Thomas (DMD-WRA)
Ms. Angella Graham (Senior Hydrogeologist-WRA)
Mr. Rafi Ahmad (UWI-Geography/Geology Department)
Dr Arpita Mandal (UWI-Geography/Geology Department)

The committee met every other month at 1pm just before the Board meeting.

For the 2011/2012 financial year up to 31 December 2011 there were four (4) meetings of the Technical Advisory Committee. Attendance varied from four (4) persons in July and November 2011 and three (3) persons in May and September 2011.

Change of Administration

The General Elections of 29 December 2011 saw a change in the political administration and the Board in keeping with the accepted practice tendered their resignation by letter dated 09 January 2012 to the newly appointed Minister of Water, Land, Environment and Climate Change, Hon Robert Pickersgill. The Board was asked to continue until a new Board was appointed. However the Board was not to make any decision that would have policy and financial implications.

Appointment of New Board

Cabinet Decision, dated February 20, 2012, appointed a new Board of the Water Resources Authority effective 20 February 2012 for a period of three (3) years. The new Board members were informed of their appointment by letter dated 28 February 2012 and signed by the Minister.

The new Board membership of seven (7) was:
Dr. Parris Lyew-Ayee Jr. ---------- Chairman
Dr. Conrad Douglas
Mr. Winston Boothe
Mr. Basil Fernandez
Mr. Scean Barnswell
Rev. Franklyn Jackson
Mrs. Rose Bennett-Cooper

The new Board had not yet met by the end of the 2011/2012 financial year as the Minister wanted to be at the first meeting to give the Board his charge.

Management of the Authority

A three (3) person team had the responsibility for the management of the Authority. They are listed below:

- Basil Fernandez OD, JP. Managing Director (MD)

- Herbert Thomas, Deputy Managing Director (DMD)

- Miss Hermine Downer, Director, Finance and Accounts (DFA)

Two positions, that of the Director, Planning and Investigation and Director Administration and Human Resource Development remained vacant for the entire year as despite several attempts the WRA was unable to recruit suitable candidates at the salary offered in keeping with the classification of the Ministry of Finance.

Special Events

World Water Day 2012

The **United Nations General Assembly** in *1993* designated *March* 22 of each year as **World Water Day (WWD).** World Water Day is intended to focus attention on the importance of freshwater and advocating for the sustainable management of freshwater resources. Each year WWD highlights a specific aspect of freshwater. For 2012 the theme of WWD was ***Water and Food Security***

The theme provided an opportunity for us to reflect on:

- The diversion of water from food production to meeting the domestic demand of the cities; and
- The conversion of arable and irrigable land from agriculture into housing and the use of water for non-agricultural purposes.

(visitors observing a demonstration of the WRA's rainwater harvesting model at WWD 2012)

The Authority embarked on a public education drive to encourage Jamaicans to continue to take the issues of our water security serious. Particularly in light of the fact that our ability to produce sufficient food has been impacted by the ever expanding and water demanding towns and industry along the south coast of the island where the major agricultural lands are located but where water resources availability is limited.

Among the day's events was an exhibition at the NWC's Mona Reservoir.The WRA promoted rainwater harvesting as a means by which farmers could irrigate crops and reduce their reliance on surface and ground water sources.

Other activities included; Outside broadcast on Radio Jamaica,Suplement in the Jamaica Gleaner,Several television interviews, and 1 hour television feature on the Susan Simes TV show ' Kids say… with students form the Constant Spring Primary and Junior High.

Launch of Jamaica's Water Resources Fact Book

On June 9, 2011 the WRA launched Jamaica's first fact book on water resources.Aptly titled **'Water Resources of Jamaica Fact Book',** the book covers a range of topics including; domestic and Irrigation water supply, occurrence of springs across the island, water quality and contamination, a detailed description and water profile of the country's 10 hydrologic basins as well as flooding. The book was the result a of collaborative effort between the WRA and the Mona Geoinformatics Institute, with the latter undertaking the cost of printing the book.

(Fr. Left, Basil Fernandez, managing director of the WRA, Karen Mc Donald-Gayle,executive director of Environmental Foundation of Jamaica and Parris Lyew Ayee Jr,director of the Mona Geoinfromatics and Chairman of the WRA peruse a copy of the Water Resources of Jamaica Fact Book).

The 67 page book was designed to be a point of reference for members of the public as well as teachers and students preparing for CAPE and CSEC examinations. The Environmental Foundation of Jamaica (EFJ) assisted with the distribution of the book to students at secondary and tertiary institutions across the island.

TECHNICAL REPORTS

PERMIT & LICENCE

Allocation of Ground and Surface Water Resources

In ensuring the equitable allocation of water resources in each hydrological basin as a strategy linked to achieving the Vision 2030, National Outcome 15 "*Urban and rural water and sanitation needs are met using modalities that are safe and sustainable*" the processing of permit, licence and renewal applications within 60 days of receipt was the target.

For the 2011-2012 year, twenty (20) of the forty-seven (47) applications received (or 43%) were processed within 60 days of receipt; the details of which are tabulated below.

APPLICATION SUMMARY 2011-2012

	APPLICATION TYPES			
	Licence	Permit	Renewal	**Total**
Number of applications received	47	8	41	96
Number of application processed within 60 days of receipt	20	8	29	57
Percentage of applications processed within 60 days of receipt	43%	100%	71%	59%
Number of applications granted	22	8	29	59
Number of applications received in previous year (2010-2011) and granted in 2011-2012	20	2	1	23
Total volume Granted (cubic metres per day)	**87,069.33**			
Number of applications refused	0	0	0	0
Number of pending applications	25	0	12	37

Allocation Review

Licences –

Of the forty-two (42) applications granted within the period (22 from the 47 received in 2011-2012 and 20 received in 2010-2011), twenty-nine (29) or 69% represented regularization of existing abstraction while thirteen (13) or 31% represented the allocation of new resources. The total volume allocated for the period was 87,069.33 cubic metres per day (m^3/d) of water.

Of the total volume allocated, 7% (6,064.1m^3/d) represented allocation from rivers and springs while 93% (81,005.2m^3/d) represented groundwater abstraction from wells.

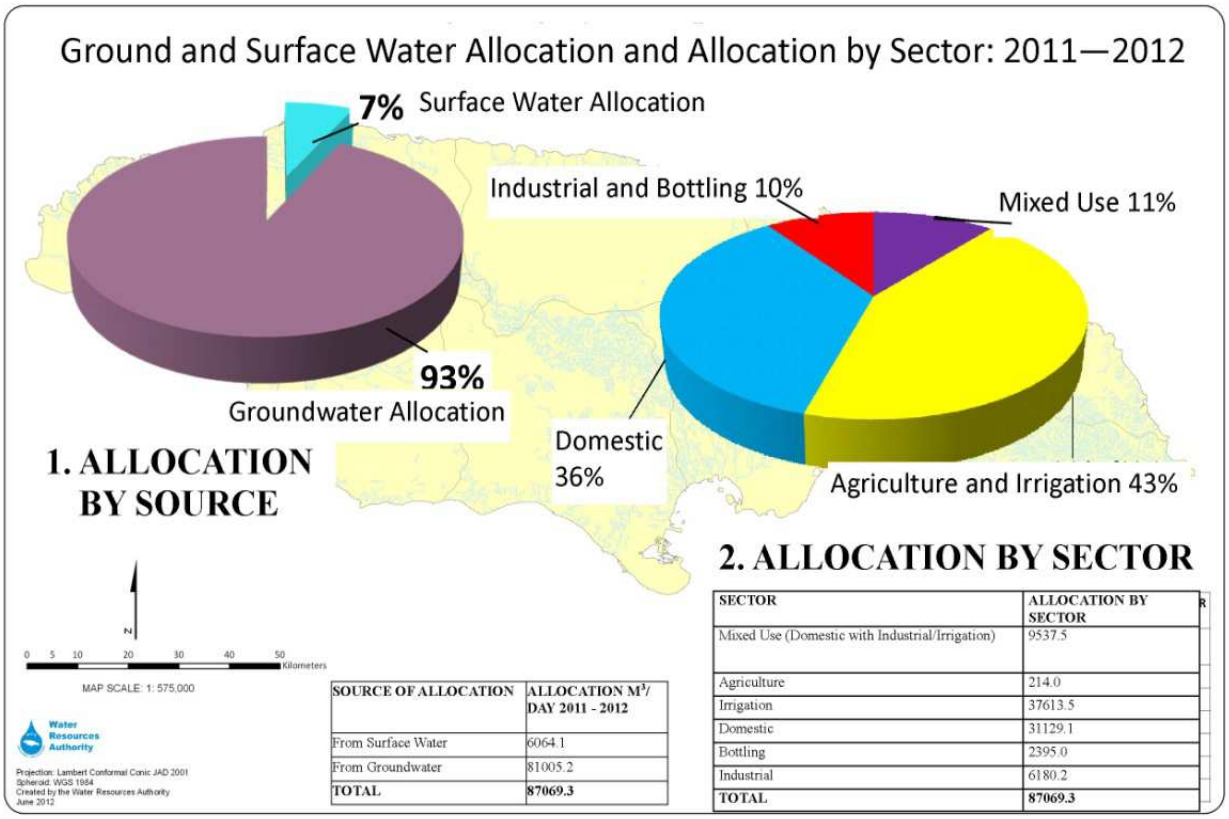
The largest volume of water of 43.4% (37,827.50m^3/d) was allocated for irrigation primarily to regularize existing abstraction to sugar cane and livestock rearing. Domestic use was allocated 35.8% (31,129.10m^3/d for public water supply), industrial 7.1% (6,180.20m^3/d), bottling 2.8% (2,395.0m^3/d) and the multi-users 11% (9,537.50m^3/d for domestic-industrial, and domestic-irrigation). [See Figures 1-2]

The twenty-five (25) licence applications pending were due to the following:

- non-submission of information requested for processing (8),
- requirement for technical investigations and data analysis to be undertaken by the Authority (5),
- Lack of approval by the Board of Directors. The change in the political administration necessitated the appointment of a new Board of Directors which was not done until March 2012. The late appointment of the new Board of Directors also resulted in the low volume of licences granted within the last quarter of the 2011-2012 year.Three (3) renewal applications pending at the end of the review period was due to the non-submission of information requested from the applicant critical to processing, whilst nine (9) renewal applications was pending the appointment of a new Board of Directors for presentation and approval.

Permits-

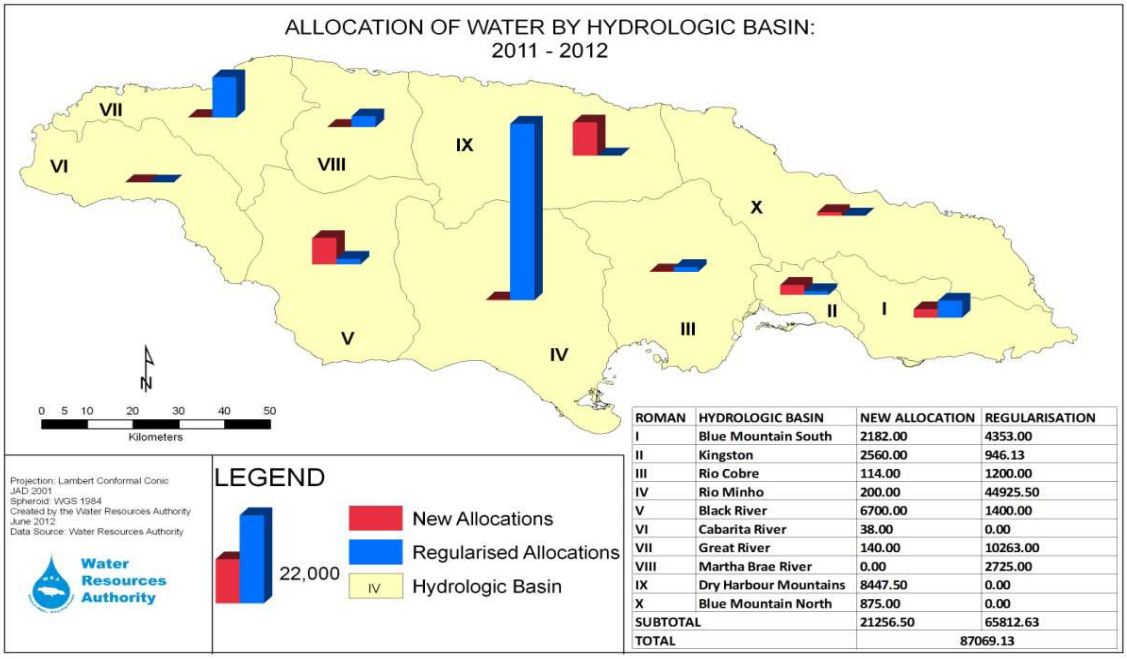
Of the ten (10) permits/consent to drill granted for the period; four (4) were for domestic water supply (Clarendon-National Water Commission, St-Ann-Richmond Development Company and Michael Parodie, St. James-Montego Bay Airports Limited), one (1) for domestic and irrigation purposes (Westmoreland-Sandals Resorts International), two (2) for irrigation (St. Elizabeth-Breds Treasure Beach Foundation, St. Catherine-Stanley Rampair), two (2) for industrial use (St. Catherine-Joseph Gordon, Kingston-Caribbean Cement Company) and one (1) for groundwater exploration (St. Andrew-JAM Island Limited).



SOURCE OF ALLOCATION	ALLOCATION M³/ DAY 2011 - 2012
From Surface Water	6064.1
From Groundwater	81005.2
TOTAL	87069.3

SECTOR	ALLOCATION BY SECTOR
Mixed Use (Domestic with Industrial/Irrigation)	9537.5
Agriculture	214.0
Irrigation	37613.5
Domestic	31129.1
Bottling	2395.0
Industrial	6180.2
TOTAL	87069.3

Figure 1: Water Allocation by Source and Sector



ROMAN	HYDROLOGIC BASIN	NEW ALLOCATION	REGULARISATION
I	Blue Mountain South	2182.00	4353.00
II	Kingston	2560.00	946.13
III	Rio Cobre	114.00	1200.00
IV	Rio Minho	200.00	44925.50
V	Black River	6700.00	1400.00
VI	Cabarita River	38.00	0.00
VII	Great River	140.00	10263.00
VIII	Martha Brae River	0.00	2725.00
IX	Dry Harbour Mountains	8447.50	0.00
X	Blue Mountain North	875.00	0.00
SUBTOTAL		21256.50	65812.63
TOTAL			87069.13

Figure 2: Allocation by Hydrological Basin

Increasing compliance rate of licensees

A notification programme was utilized to increase compliance by 50% of licensees to conditions on the licences/permits and as stipulated by the Water Resources Act 1995. This has been the most challenging task for the unit. Data was collected from 72% of licensees (224/310 valid licensees) and eighty-eight percent (88%) of licensees were notified for renewal of licences for the period. A map of the status of licences for 2011-2012 is below

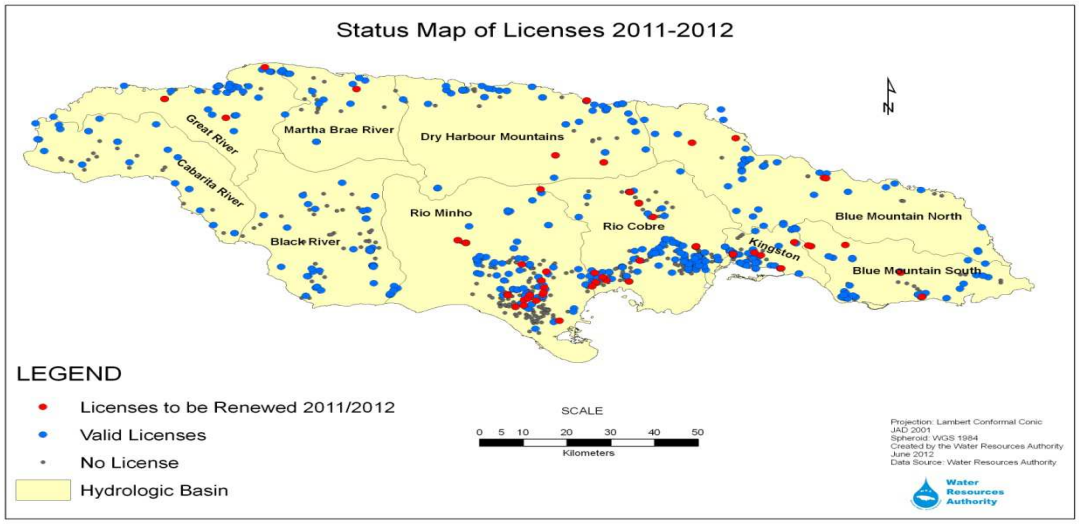


Figure 3: Status Map of Licences 2011-2012

Maintenance of datasets

The unit maintains the following datasets: licence allocation register with sources granted permits/licence, an inventory of production, a listing of the well status and the well records.

Data Sets	*Annual Update*
Licence and Permit Register	61
Abstraction Inventory	579[1]
Well Records	11

[1]Data submitted for 359 unlicensed sources by the National Water Commission

Document Management System (DMS)

The unit embarked on the implementation of a Document Management System (DMS) using DSPACE open source software. The DMS will be utilized to convert the paper application filing system for the permits and licences to digital. This conversion will preserve paper files between 1960's to present, and to allow for optimal management of application files. The hardware (scanner and desktop computer) was acquired in September 2011. In February 2012 seven (7) staff members were trained through the Land Information Council of Jamaica (LICJ) in the optimal use of the DSPACE DMS. Training included the production of a manual for the implementation of the DMS. A workflow document for the Unit has been prepared and scanning of the paper files for upload into the DMS has commenced. The scanning and upload of the files into the DMS is estimated to be completed in December 2013. [See Figures 4-6]

Figures 4 & 5: The scanning process and staff training exercise

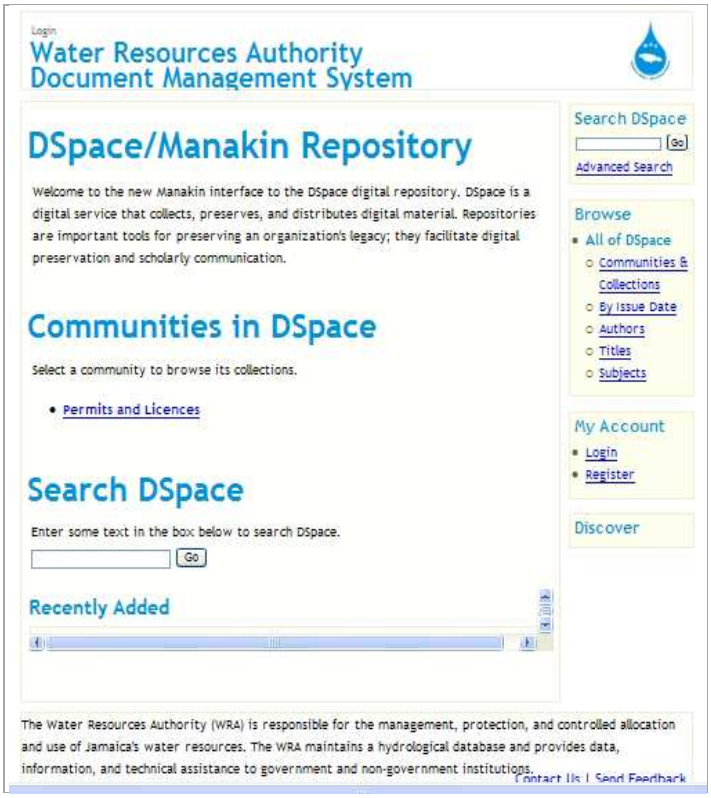


Figure 4: WRA DMS Web interface page

Investigations

Major tasks and targets for the unit were performing technical assistance through site investigations and assessments including down-the-hole camera investigations.

- *Technical Assistance* - The Unit continued to provide technical assistance through seventeen (17) small investigations including monitoring of well drilling activities and yield testing of wells for the public and private sectors. Ninety-five (95) requests for data and information were also provided to the public by the unit.
- *Telelogging* - The Permits and Licences Unit operates the down-the-hole video camera, a diagnostic tool used to evaluate the condition of wells and recommend measures for rehabilitation in support of well applications. A total of seventeen (17) wells were telelogged totaling 1,595.13metres. Invoices totalling $1,742,896.00 have been submitted for payment.

The unit is expecting to continue these activities in the 2012-2013 year.

COMPUTER / GIS

WATER RESOURCES AUTHORITY MANAGEMENT INFORMATION SYSTEM WRAMIS)

During the period under review the Computer/GIS unit, consisting of three (3) members of staff, achieved the following:

Achievements for Period under Review

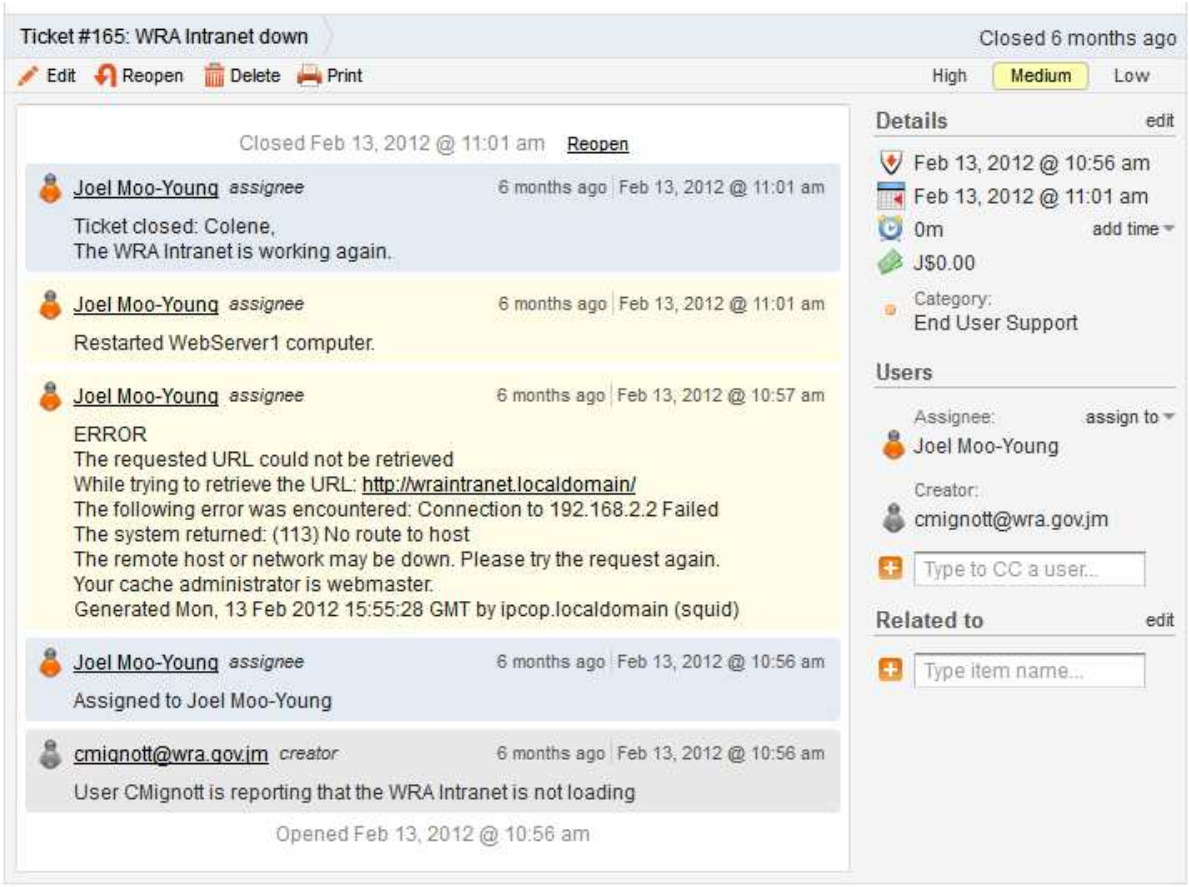
- Special projects
    - Document Management System (DMS):- New desktop computer and a document scanner were purchased. Document Management (Open Source) Software acquired and installed to convert all paper based well licence files and old documents in the Library to digital format.
    - Using GIS to determine Rainwater Harvesting (RWH) Potential for meeting the water demand of Agricultural Lands in Jamaica. In collaboration with the National Irrigation Commission (NIC) and funded by the United Nations Food and Agriculture Organization (UN-FAO), the project output included a detailed report on the methodology for the determination of rainwater harvesting potential at various levels of reliability and over 16 maps highlighting yearly and monthly rainfall across Jamaica, water deficit and classes of potential for RWH of the agricultural lands in Jamaica.
    - Using GIS to assist in determining Rainwater Harvesting (RWH) potential for meeting the demand for domestic water supply. This was executed in collaboration with the National Water Commission (NWC) and as a joint project with the Authority's Planning and Investigation Unit. The output from this exercise included 3 maps highlighting domestic Rainwater Harvesting potential for water supply for communities without potable water facilities or pipeline network.
    - Provided staff support through

- ✓ the creation of training manuals and user videos for GIS Software ArcGIS and the newly introduced Quantum GIS,
- ✓ assisting with several projects and activities which saw over 113 maps being created; and
- ✓ The generation of new datasets and through troubleshooting and problem solving assistance.

- Implemented use of web-based help desk software (SpiceWorks) for tracking user reported computer problems. Use of this software allowed users to be automatically kept abreast via email of the status of their submitted requests Purchased replacement parts which include laptop battery, CPU power supply and repair to the heavy duty laser printer.
- Performed troubleshooting and successfully resolved 155 users reported problems related to our computer hardware, software, and network.
- Extended range of wireless network by acquiring 2 additional wireless access points. Increased Internet download speed by 33 percent to 4 Megabits/second and upload speed by 50 percent to 768 Kilobits/second.
- Secured and isolated the publicly accessible web server computers from the rest of our mission critical data server and workstation computers by placing them on separate network segments. This means that, in the event that a web server computer is compromised, our computers and data on the other network segment cannot be accessed.
- Settled Internet website hosting, maintenance services and ADSL account for period

Help Desk / Technical Support

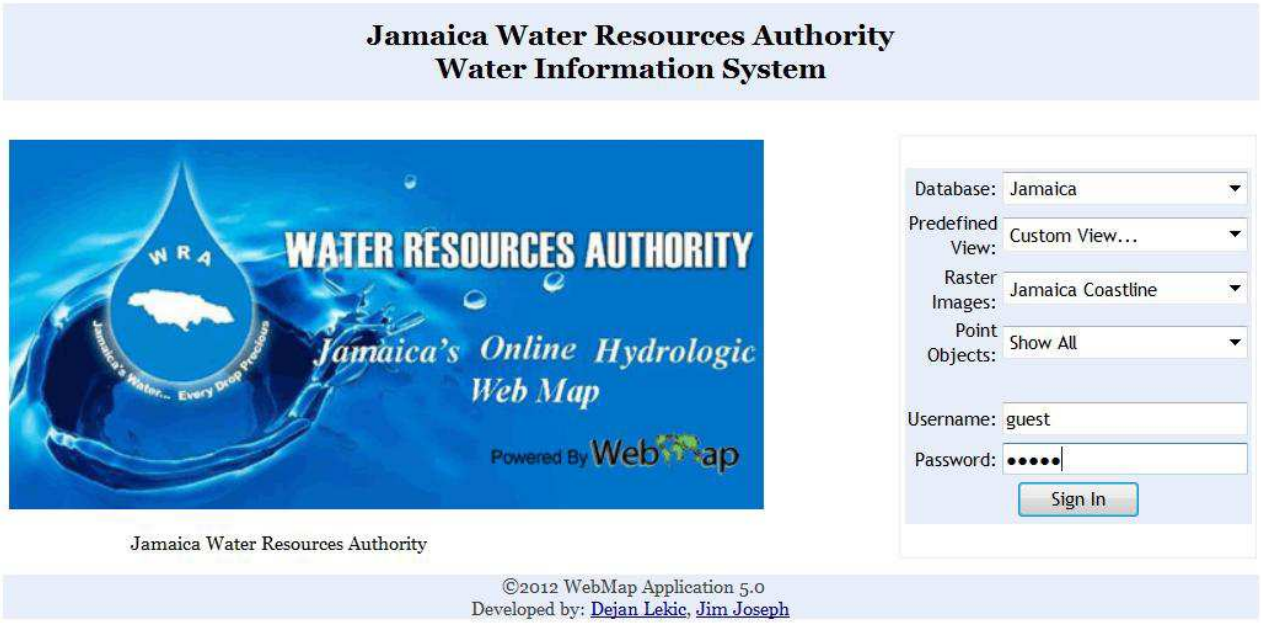
We were able to capture, track and successfully resolve 155 user- reported problems related to our computer hardware, software, and network.

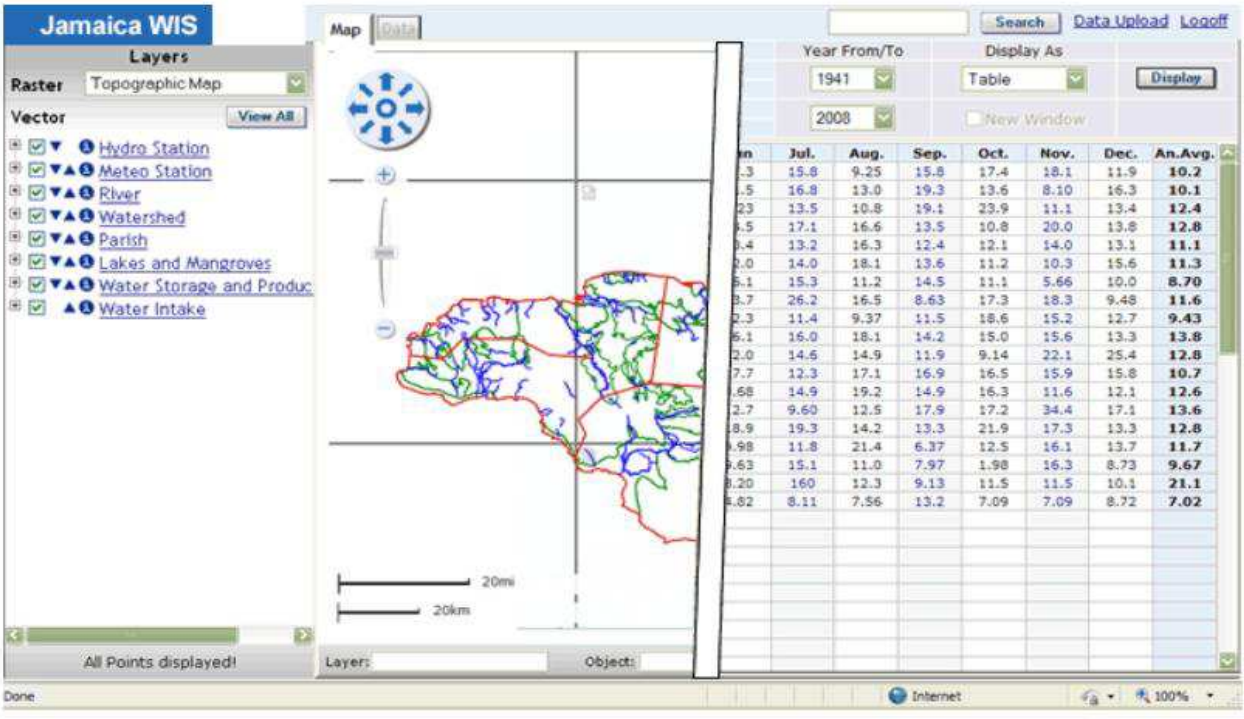


Upgrade Web Database

The improvement over the existing software includes:

a) Multi-Browser Support – Any browser can now open database software
b) Faster Engine
c) User-friendly Database Administration interface
d) Google Earth and Google Map rendering
e) A redesigned interface
f) Dynamic Scaling in GIS interface
g) Improved visitors stats


Jamaica Water Resources Authority
Water Information System
WATER RESOURCES AUTHORITY
Jamaica's Online Hydrologic Web Map
Powered By WebMap
Jamaica Water Resources Authority
Database: Jamaica
Predefined View: Custom View...
Raster Images: Jamaica Coastline
Point Objects: Show All
Username: guest
Password:
Sign In
©2012 WebMap Application 5.0
Developed by: Dejan Lekic, Jim Joseph


Jamaica WIS
Layers
Raster Topographic Map
Vector View All
Hydro Station
Meteo Station
River
Watershed
Parish
Lakes and Mangroves
Water Storage and Produc
Water Intake
All Points displayed!
Map Data
Search Data Upload Logoff
Year From/To 1941 2008
Display As Table
Display
New Window
Jul. Aug. Sep. Oct. Nov. Dec. An.Avg.
15.8 9.25 15.8 17.4 18.1 11.9 10.2
16.8 13.0 19.3 13.6 8.10 16.3 10.1
13.5 10.8 19.1 23.9 11.1 13.4 12.4
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9.60 12.5 17.9 17.2 34.4 17.1 13.6
19.3 14.2 13.3 21.9 17.3 13.3 12.8
11.8 21.4 6.37 12.5 16.1 13.7 11.7
15.1 11.0 7.97 1.98 16.3 8.73 9.67
160 12.3 9.13 11.5 11.5 10.1 21.1
8.11 7.56 13.2 7.09 7.09 8.72 7.02
20mi
20km
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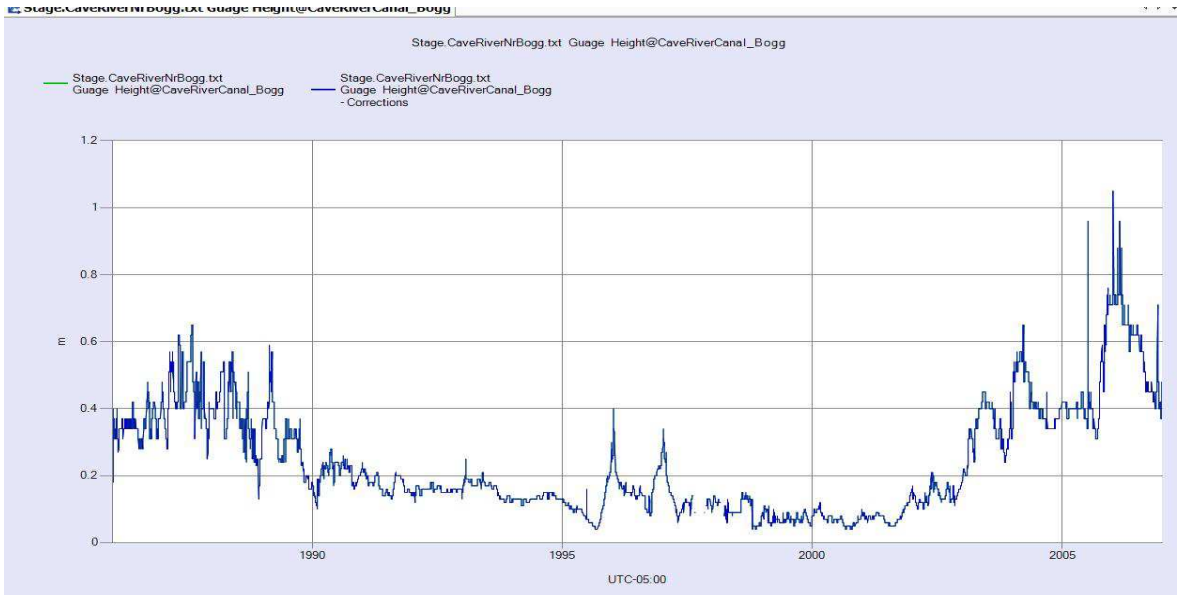
Object:
Done
Internet
100%

Aquarius Software

The Authority has also acquired the following software to enhance the processing of hydrologic field data.

The AQUARIUS software has a major component for the storage and computation of *'raw'* time series data (data not yet processed). For example; time series of unreferenced river stages are the basic data collected in the determination of stream flow time series. Without further processing this data is useless. This data is stored in AQUARIUS and built-in applications allow for corrections to the river stage data and the conversion of that data to river flows, based on stage versus flow relation also developed within the software. In addition missing periods of data in the time series are estimated by built in applications.



Challenges

Frequent and prolong power outages causes' web server to be inaccessible to the public for long periods. This has a negative effected on work flow and project output.
Lack of funding also meant that no temporary employee could be hired to assist with the data preparation for the new version of the web database and general updating of the GIS database.
Difficulty was also experienced in obtaining funding from persons/organizations for requested data preparation and maps, scanning and plotting since certain groups such as students cannot afford to pay for these services. Much of the work done for external purposes is therefore done for free and limits the ability of the department to recover some of the cost for software and equipment maintenance.

Meetings & Seminars

The Authority was represented at the monthly LICJ meetings and CITO MIS Officers Meetings.
The Agency's participation in the annual GIS Day activities was a success. The WRA's booth attracted several visitors including the Minister of Water Dr. Horace Chang, several teachers and students. The event was hosted by the Land Information Council of Jamaica (LICJ) at the UWI in November 2011. During the year staff of the unit attended a number of training courses and workshops. There was the Document Management Training (DMS), Cloud computing workshop hosted by CITO in Kingston and the GeoSUR workshop held in South Dakota, USA.

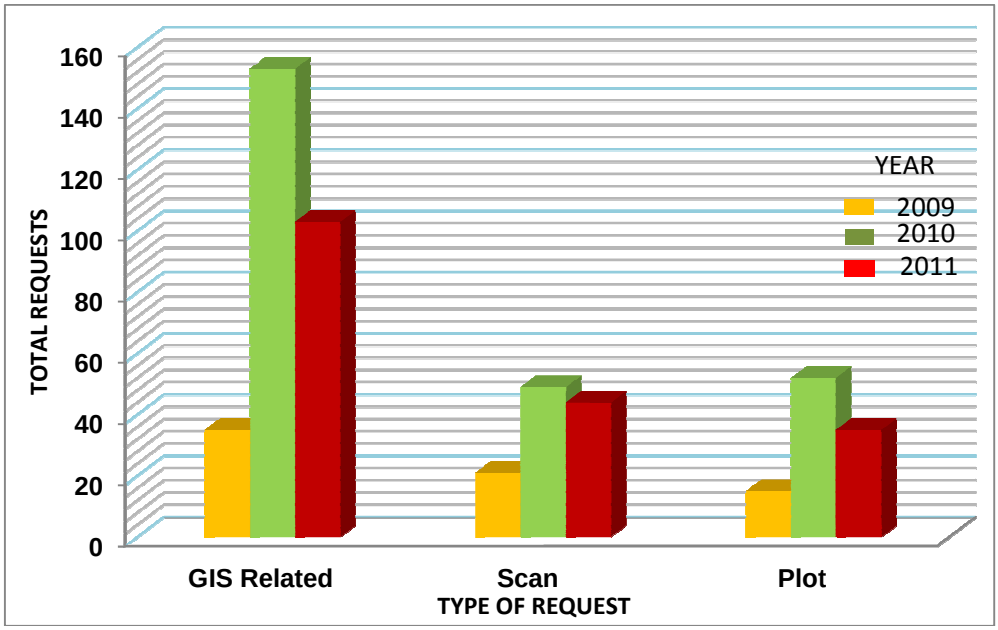
Highlights of the year are the emphases being placed on the way forward in terms of national policies relating to global geospatial information management coming out of a High Level UN Forum held in South Korea and the development of a national book on GIS success stories in Jamaica. Additionally, the LICJ started work on the revision of the National Land Policy Chapter 2, for which a workshop was held at ODPEM during March 2012.

Assistance to External Agencies

The unit assisted several agencies, both public and private, through the provision of large scale maps, scanning, cartographic and other GIS services. Assistance was offered to several government entities such as the UDC, NSDMD, NWC, NEPA and ODPEM through the production and dissemination of maps and GIS Data, GIS based analysis and supplying information by way of questionnaires. Similar assistance was also offered to students from the primary to the university level, persons pursuing masters and doctoral degrees and a number of local and international private entities, chiefly consultants.
More than 100 requests were received for the creation, compilation and dissemination of GIS Data and Maps. Over 77 maps produced and disseminated based on requests and the unit processed 44 scan and 35 plotting requests.

Assistance was offered to NEPA in using GIS to assess water quality in the Black River Basin using the Soil and Water Assessment Tool (ArcSWAT) and ArcGIS. The results included 12 maps at the watershed scale showing hydrologic response units, (combination of land use, soils and slope) and simulated pollutant plumes. However, because this was not a planned project,

time did not allow for further detailed analysis to be done in the basin and it is being planned for 2012/2013 that the project will be revisited and updated



PROJECTIONS (APRIL 1, 2012– MARCH 31, 2013)

The unit is projecting that for the next financial year the following will be accomplished:

- Further enhancement of the capabilities of the WRAMIS.
- Put in place a solar power system to power server room and flood warning system base station.
- Migrate data for 100% of stream flow stations 100% groundwater stations and 100% water quality monitoring points to the upgraded web database
- Use ArcSWAT for water quality assessment in the Rio Minho and the Black River Hydrologic Basins
- Update Jamaica Surface Water Database chiefly rivers and streams, from the previous 1:50,000 Metric Topographic Series to make it current and accurately aligned to the Ikonos and Google Earth Satellite Imagery.
- Acquire new equipment: servers and workstations.

PLANNING AND INVESTIGATION

The Planning and Investigation Unit functions under the Authority's mandate to guide the assessment, management and development of the island's water resources in a context of an integrated framework. In this regard the unit had responsibilities in the following areas:

- Major Projects
- Hydrological Assessments
- Technical Assistance/ Technical Support
- Data Provision

Major Projects

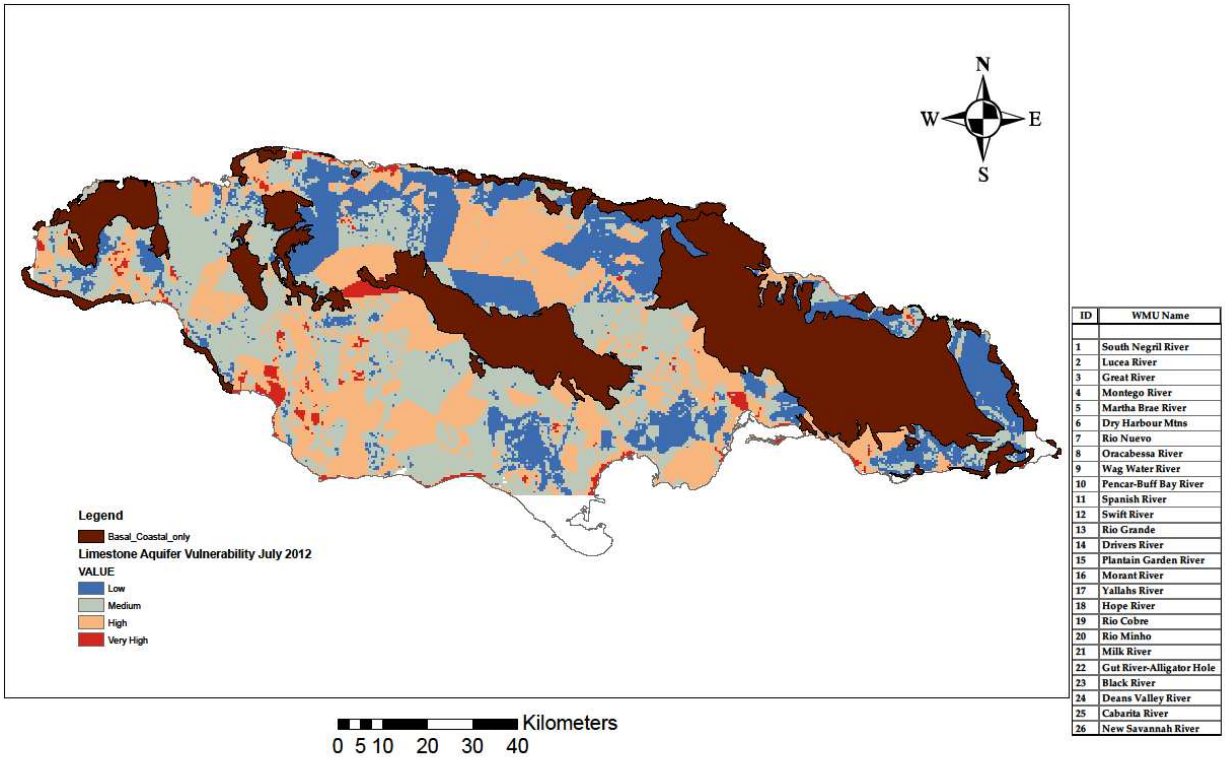
The Major Projects that the unit was involved in 2011- 2012 were:

- Aquifer Vulnerability Mapping
- Development of a groundwater management model of the Yallahs River alluvium aquifer, for assessing climate change impacts on the water resources in the alluvium aquifer.
- Development of a system for the determination of rainwater harvesting potential for agriculture across Jamaica
- Production of flood risk maps and flood control measures for the vulnerable Karst depressions of Jamaica

Aquifer Vulnerability Mapping and the identification of Water Quality Control Zones.

The aim of this project is to develop a groundwater information system for the hydrological basins across the island. It is proposed to employ the groundwater information system **to formulate aquifer protection zones and identify and delineate water quality control zones around selected sources within the hydrologic basins.**

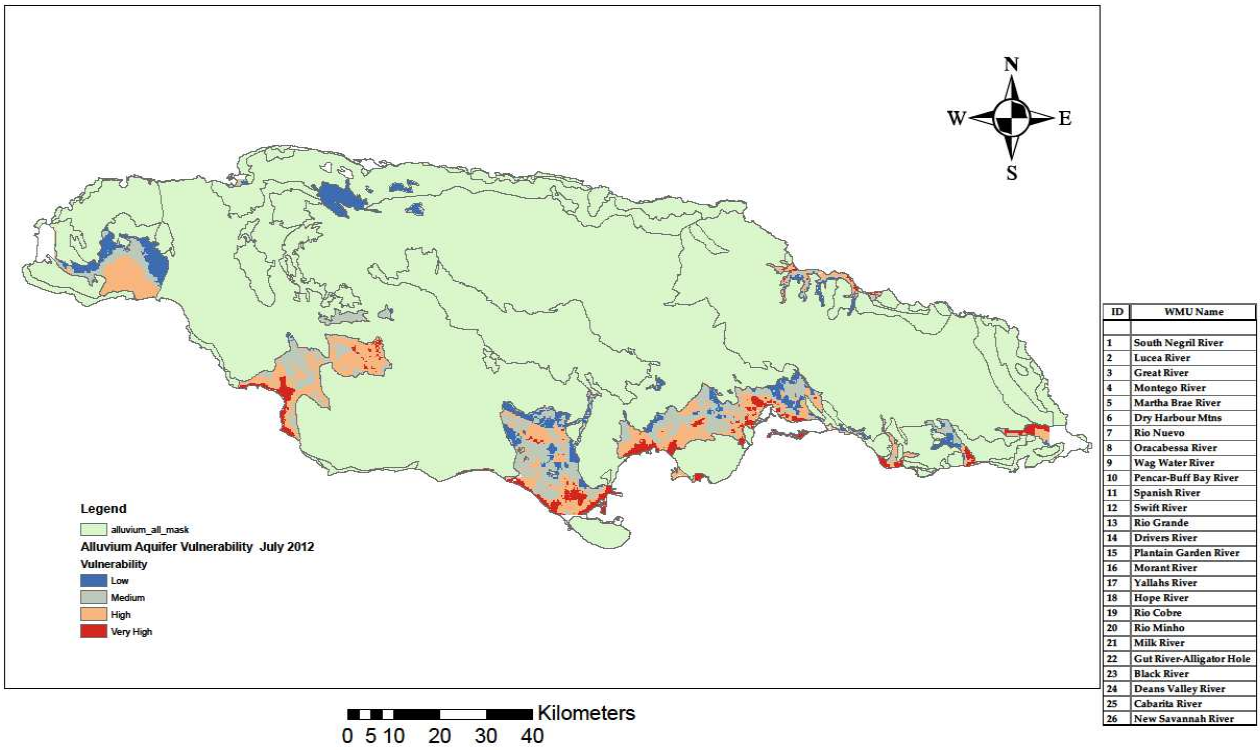
A modified DRASTIC approach in conjunction with the use of ARCVIEW was used in the mapping of aquifer vulnerability. DRASTIC is a groundwater quality model for evaluating the pollution potential of large areas using the hydrogeologic settings of the region. This model employs a numerical ranking system that assigns relative weights to various parameters that help in the evaluation of relative groundwater vulnerability to contamination. In the determination of the vulnerability of the aquifer, the DRASTIC methodology include various factors such as [D] Depth to water table,[R] Recharge (Net),[A] Aquifer Media,[S] Soil Media,[T] Topography (Slope),[I] Impact of Vadose Zone and [C] Conductivity (Hydraulic) have been collated. Each factor has been assigned a weight based on its relative significance in affecting the pollution potential.



ID	WMU Name
1	South Negril River
2	Lucea River
3	Great River
4	Montego River
5	Martha Brae River
6	Dry Harbour Mtns
7	Rio Nuevo
8	Oracabessa River
9	Wag Water River
10	Pencar-Buff Bay River
11	Spanish River
12	Swift River
13	Rio Grande
14	Drivers River
15	Plantain Garden River
16	Morant River
17	Yallahs River
18	Hope River
19	Rio Cobre
20	Rio Minho
21	Milk River
22	Gut River-Alligator Hole
23	Black River
24	Deans Valley River
25	Cabarita River
26	New Savannah River

Fig.1 Aquifer vulnerability Map of the island-Limestone Aquifer

In the previous year 2010/2011 the project completed the aquifer vulnerability map for the island (Fig. 1). In the 2011/2012 period the project has started the breakdown of the island risk vulnerability map by hydrologic basins and on a larger scale and the risk vulnerability of the alluvium aquifers was completed. Figures 1 and 2 below show the risk vulnerability maps for the limestone and the alluvium aquifers respectively. The maps produced outline the areas that exhibit low, medium and high vulnerability.



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19	Rio Cobre
20	Rio Minho
21	Milk River
22	Gut River-Alligator Hole
23	Black River
24	Deans Valley River
25	Cabarita River
26	New Savannah River

Fig.2 Aquifer Vulnerability Map of the Island-Alluvium Aquifer

Based on the development of the risk vulnerability maps the first water quality control zones were identified and delineated. The water quality control zones were set out in a draft report which include an assessment of the water quality (historical and current), hydrogeology and land use. The proposed water quality control zones are for the Fish River, Orange River and Roaring River Catchments in Westmoreland (Cabarita Hydrologic basin). These catchments were identified and selected as they supply water to Lucea-Negril, Savannalamar and surrounding areas and have had significant investment in water supply development over the past 10years. These sources if contaminated would lead to a significant impact on GDP and national development.

The draft report has been reviewed and the comments and recommendations are to be incorporated into the second draft.

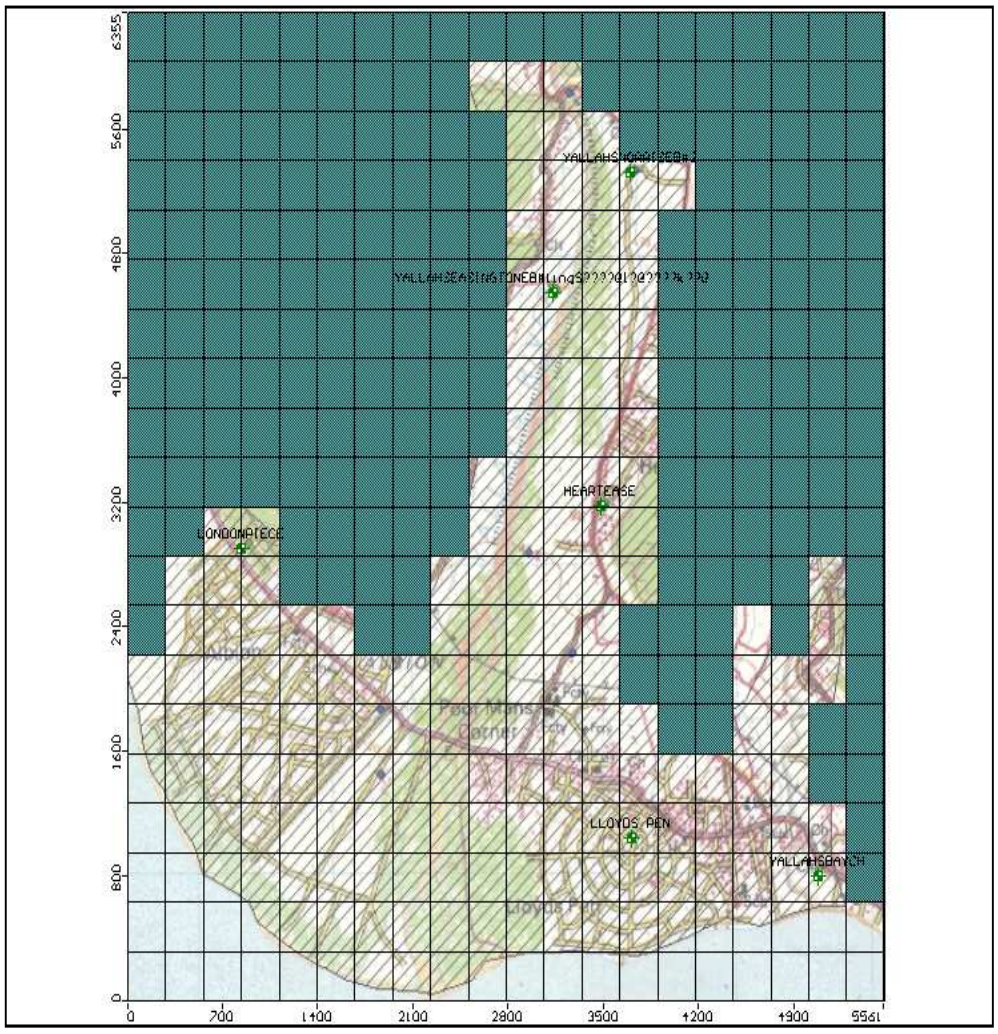
Development of a groundwater management model of the Yallahs River alluvium aquifer, for assessing climate change impacts on the water resources in the alluvium aquifer.

Background

The Alluvium Aquifer of the Yallahs Watershed Management Unit (WMU) covers about 22 km^2 or slightly over 11% of the WMU. The available water resources of the WMU have been quantified at 82.7 Mm^3/yr of which 29 Mm^3/yr is currently being abstracted.

A project funded through UNESCO and a groundwater model using the software MODFLOW was developed to simulate the actual conditions existing in the aquifer (Figures 3, 4 and Fig 5). The Model was run to reflect steady-state conditions. A graph indicating the correlation between the actual water levels and that calculated by the model is shown in Fig 6; the correlation coefficient is 0.98.

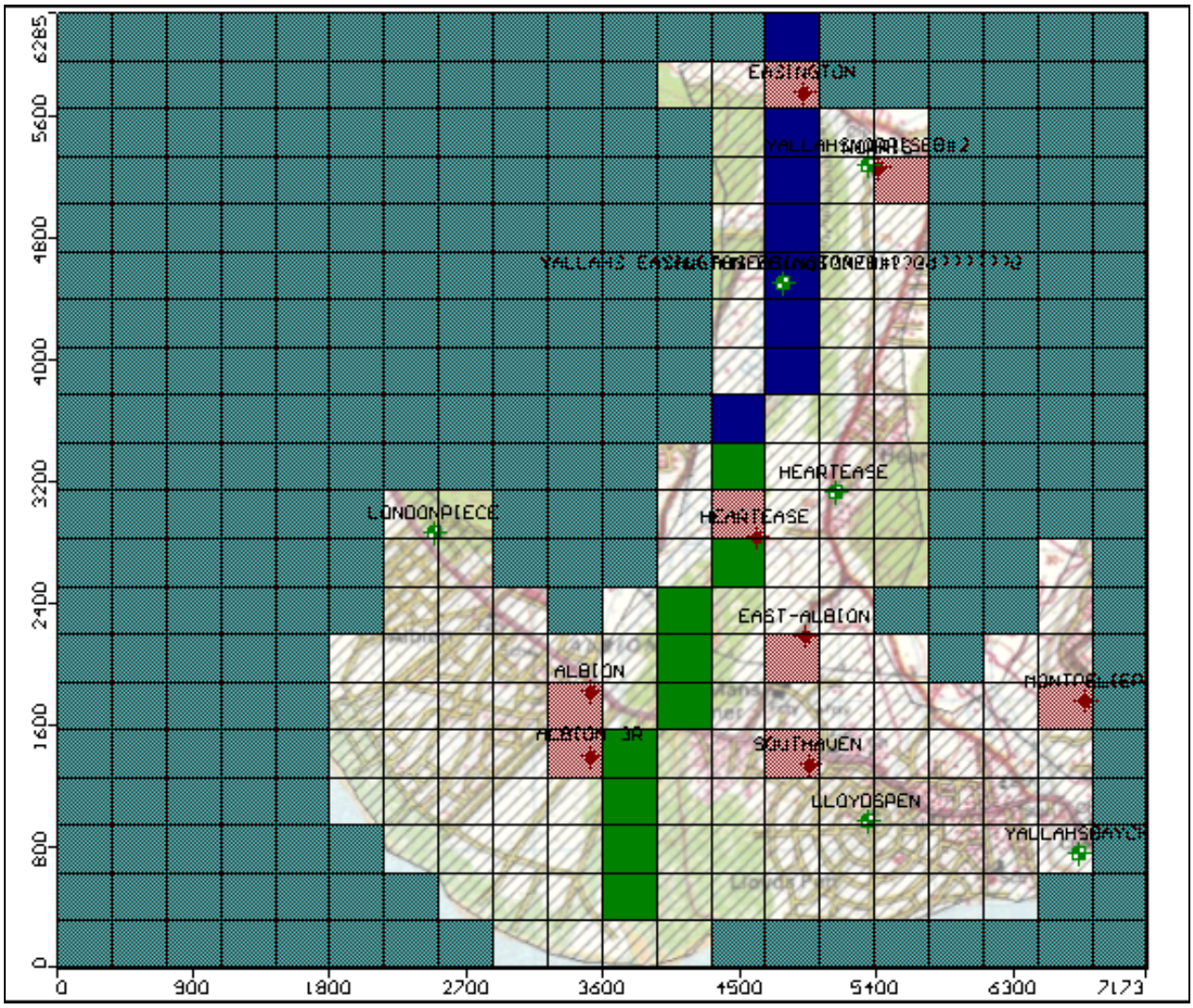
(Fig. 3) Model Area –Yallahs Alluvium Aquifer

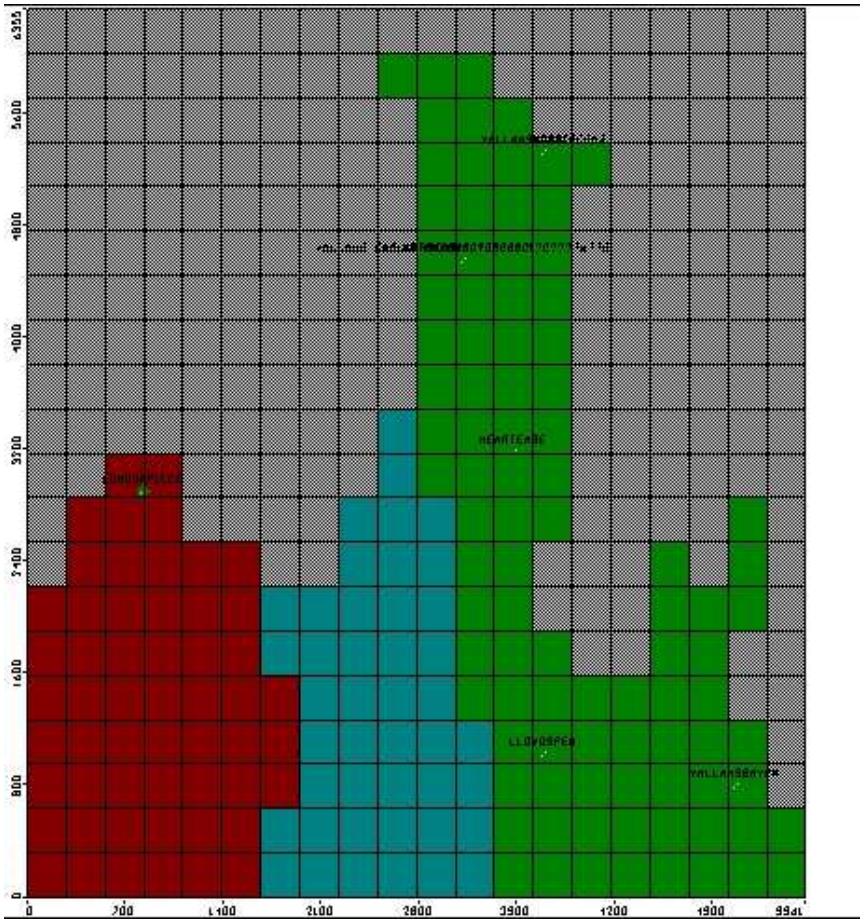


In the model the following boundaries were delineated.

- The southern boundary was designated as a constant-head boundary with the head at sea level.
- Salt marshes in the west were assigned a constant head.
- The Eastern boundary was also considered impervious.
- Boundaries to the northeast and northwest were considered to be impervious.

(Fig. 4) Recharge Zones – direct recharge from rainfall and Yallahs River recharge





(Fig. 5) Hydraulic Conductivity Zones

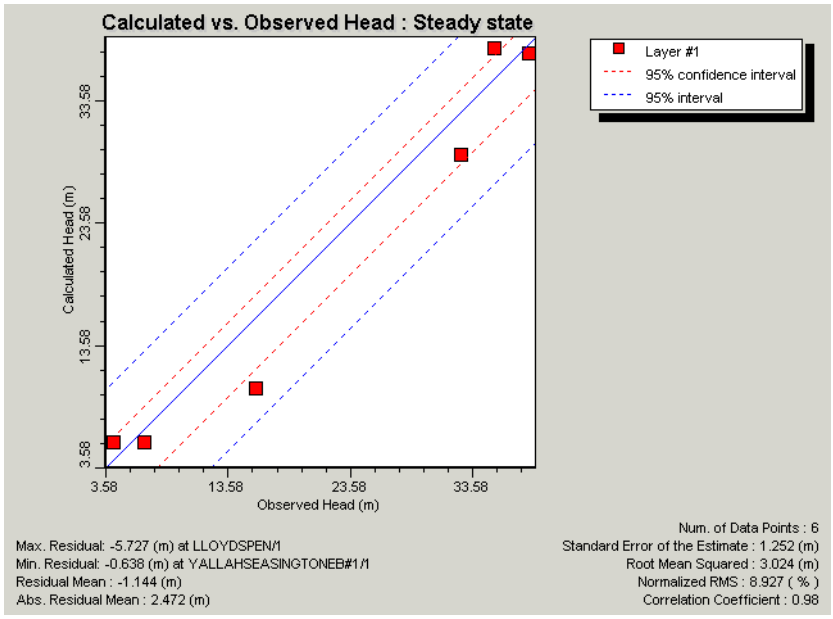


Fig. 6 Calculated vs. Observed Head- Steady State

There have been problems with the sensitivity analysis of the model and a meeting was held in Trinidad in December 2011 with the UNESCO consultant where the model issues have been resolved. Trinidad is also working on a similar aquifer in this joint regional project.

The next phase, to complete the project, includes:

- Sensitivity analysis of the model to account for the uncertainties in the estimates of aquifer parameters and recharge values.
- Modeling of the various Climate Change Scenarios as predicted by the PRECIS Model (Fig.7) to determine the impact of rainfall variation on the water resources.

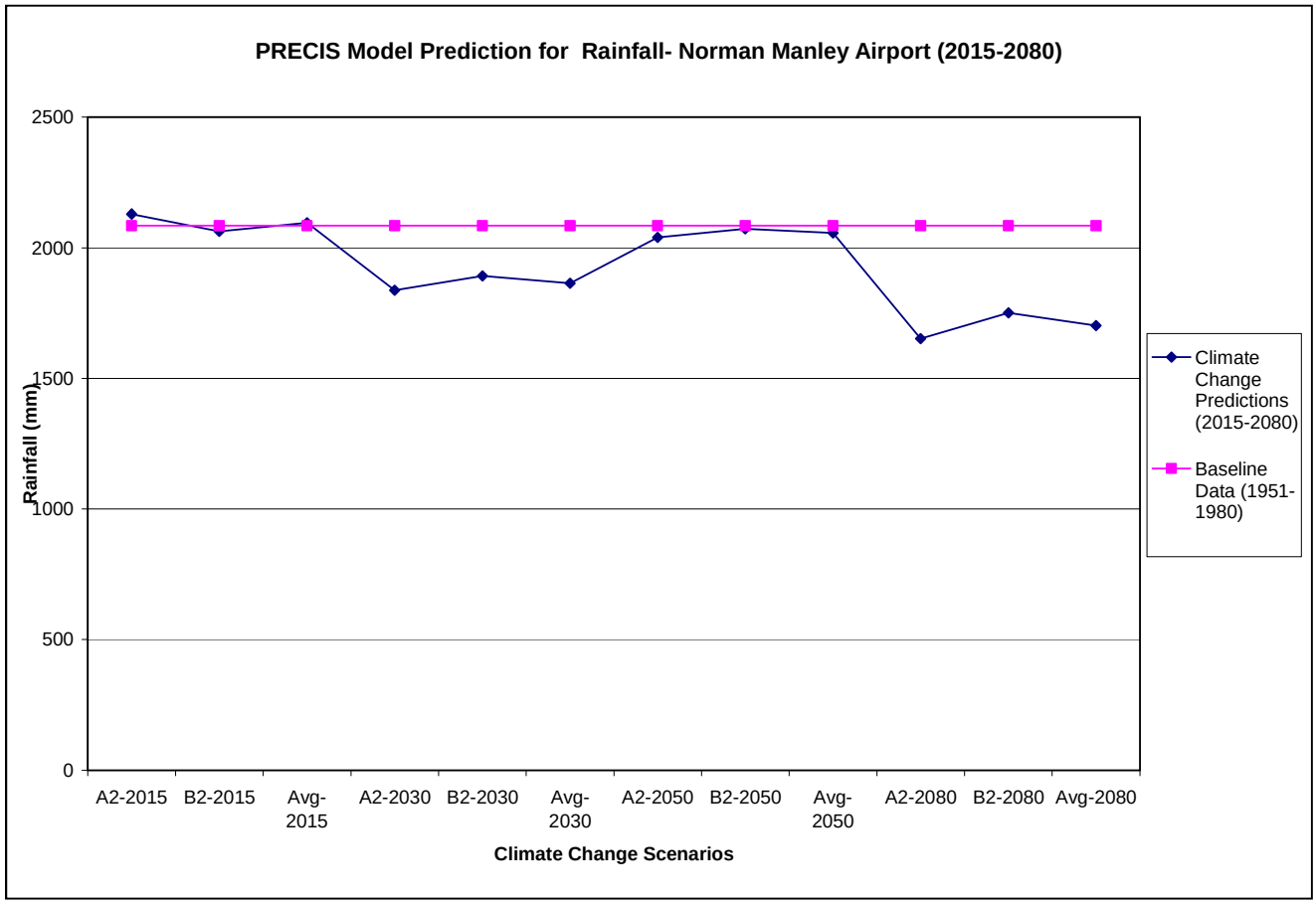


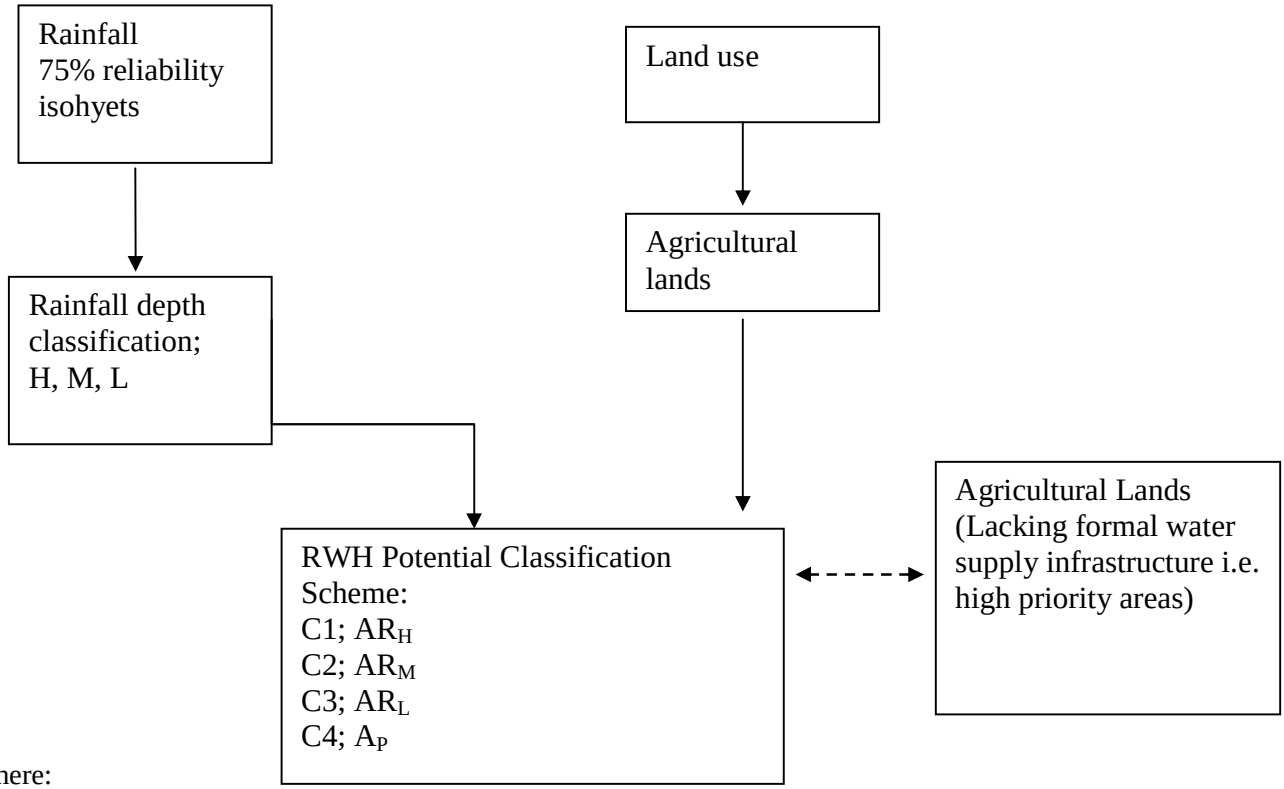
Fig.7 --PRECIS Model Prediction for Rainfall- Norman Manley (2015-2080)

Development of a system for determination of rainwater harvesting potential for agriculture across Jamaica

The Government of Jamaica, through its Food Security Strategy, has identified irrigation as a major input which has the potential to make a significant impact on the production and productivity in agriculture. At the request of the Government of Jamaica, the United Nations Food and Agriculture Organization (UN-FAO) provided assistance in promoting a pilot rainwater harvesting and storage project in south St Elizabeth. The project introduced rainwater harvesting and storage techniques to small farmers for improving water security and the production/productivity of their farms. The Planning and Investigation Unit along with the Computer and GIS Unit of the Authority undertook the task of determining the potential of rainwater harvesting for agricultural purposes across Jamaica.

The objective of this project is to develop and establish a classification of rainwater harvesting potential of agricultural lands with related thematic map as outputs (Fig. 8); and to identify lands that can make more opportune use of rainwater harvesting (Figs 9-10).

Fig. 8---Classification Scheme for RWH Potential of Agricultural Lands



Where:
A = Agricultural Lands
R= P75 Rainfall
H = High; M = Moderate; L = Low; P = High Priority Areas

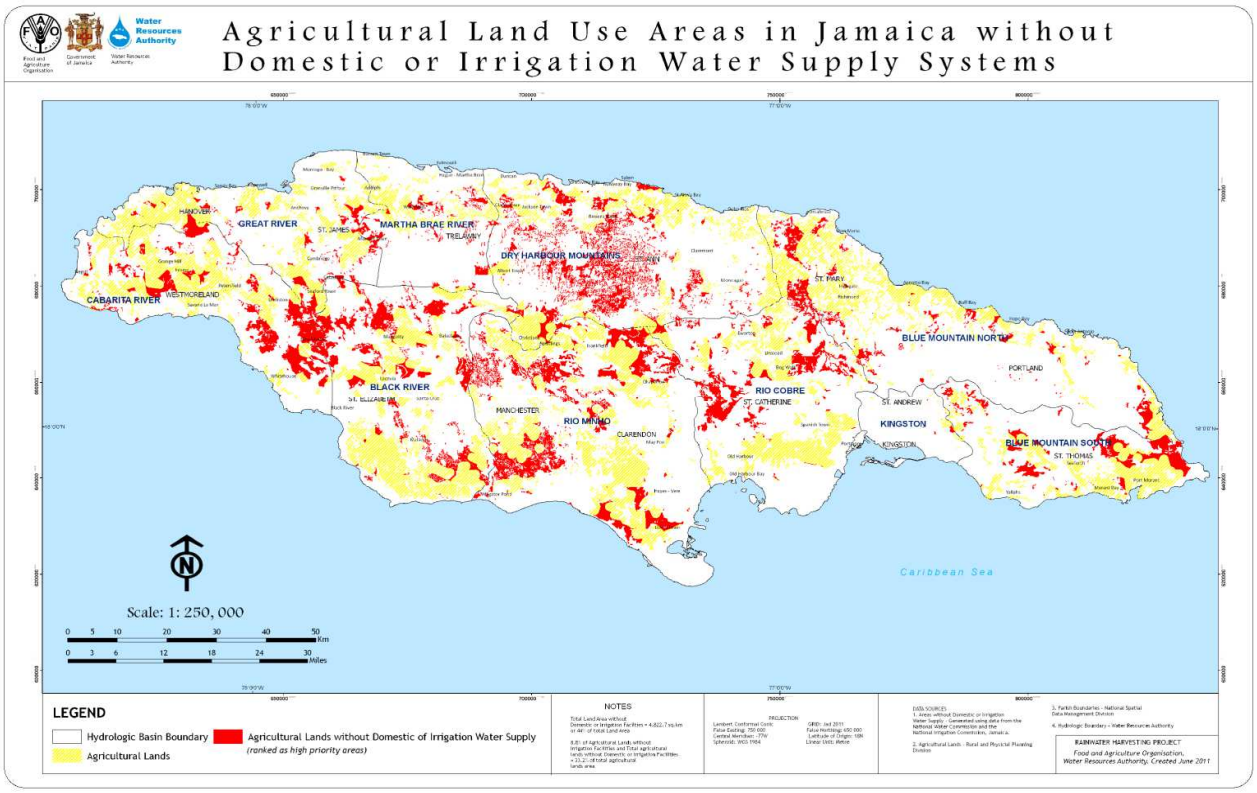
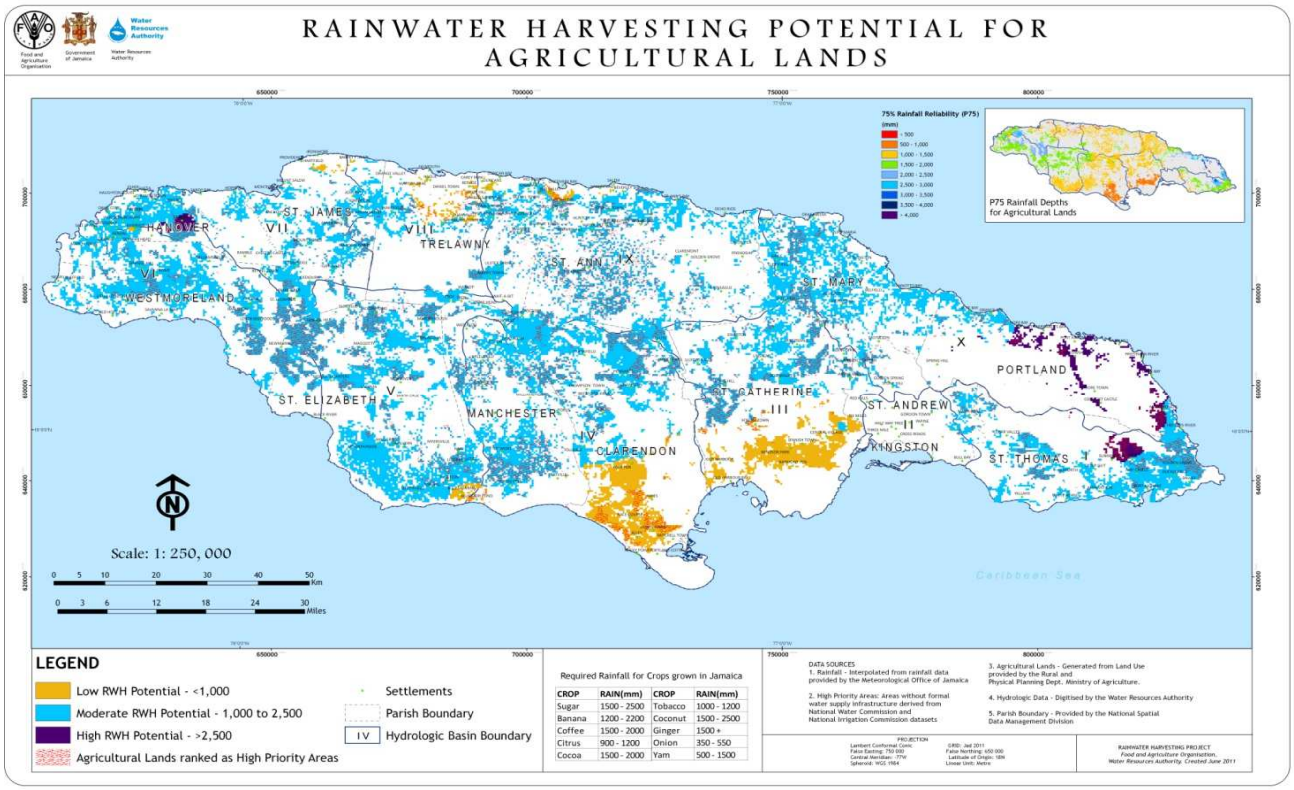


Fig.9:- Agricultural Land Use without Domestic or Irrigation Water Supply Systems



CROP	RAIN(mm)	CROP	RAIN(mm)
Sugar	1500 - 2500	Tobacco	1000 - 1200
Banana	1200 - 2200	Coconut	1500 - 2500
Coffee	1500 - 2000	Ginger	1500 +
Citrus	900 - 1200	Onion	350 - 550
Cocoa	1500 - 2000	Yam	500 - 1500

Fig. 10:-. Rainwater Harvesting Potential for Agricultural Lands

The resulting maps have been presented to UN-FAO,Ministry of Agriculture and the farmers at a workshop held in Mandeville and will be used to guide investment in small scale irrigation to increase production and productivity of agricultural lands.

Production of flood risk maps and flood control measures for the vulnerable karst depressions of Jamaica

The unit has been engaged in a project which has as its objective the production of flood risk maps and flood control measures for the vulnerable Karst depressions of Jamaica. The pilot area is Harmons- Manchester where the entire community was inundated by the flood rains in 2002 and 2005.

The objectives of the Project include:

- Production and plotting of the flood level maps
- Collation of data on existing and proposed land use
- Determination of the effective 10 – 100yr areal rainfall volume contribution to the depression
- Development of storage elevation model for Harmon's' depression

To date the previous flood boundaries were surveyed and plotted (Figs. 11-12) for the area and economic activities mapped and documented.

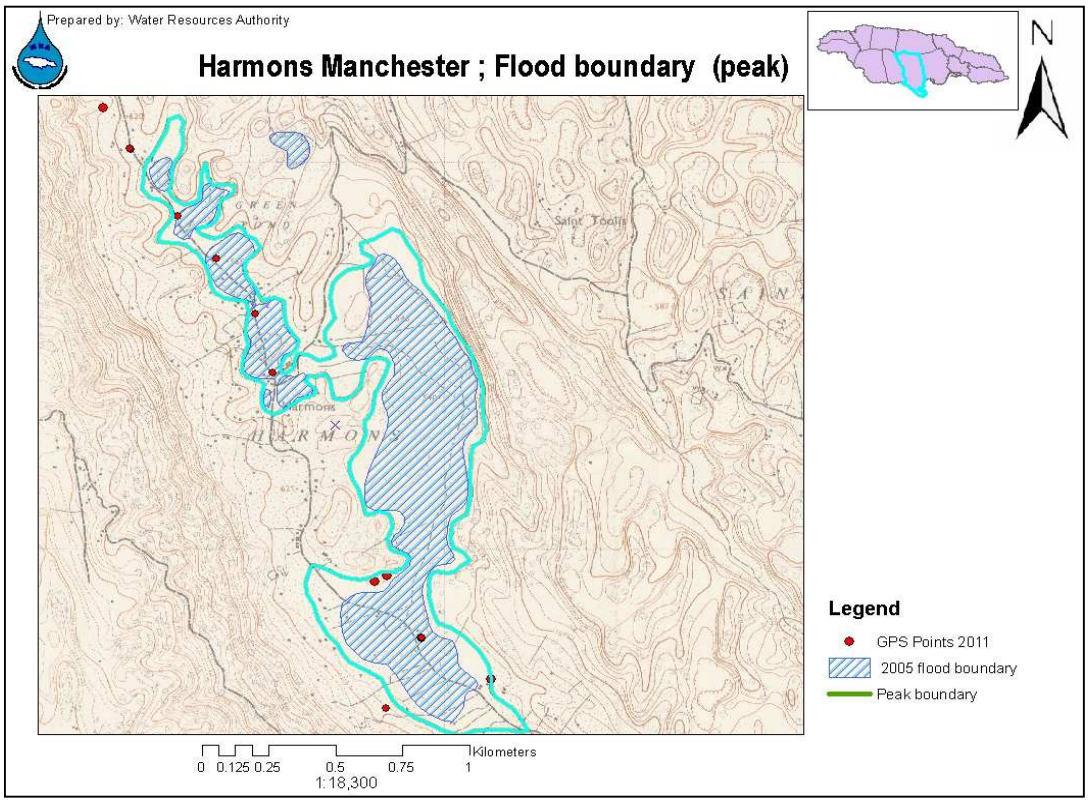


Fig. 11:- Harmons Flood Boundary 1:12,500 map scale

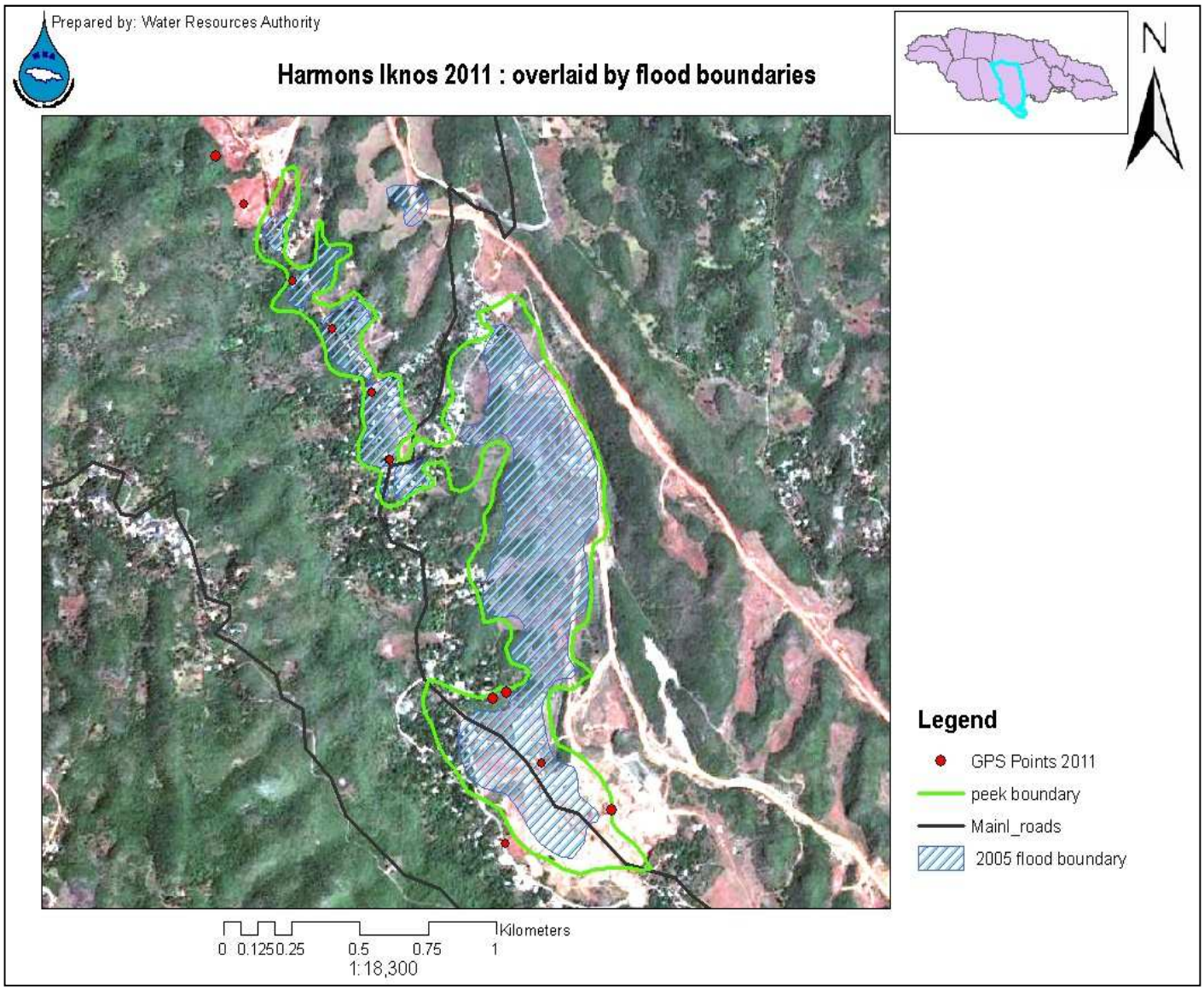


Fig. 12:- Harmons Flood Boundary Ikonos Map

In 2012/2013 the rainfall contribution and the storage elevation model will be developed and the flood structures and mitigative measures will be identified and documented for use to prevent the level of damage and disruption of life as experienced in 2002 and 2005. It is expected that the methodology will be transferred to other areas of the island including Moneague in St Ann and Bliss Pasture in Trelawny.

Hydrological Assessments

The unit conducted twenty four (24) hydrological assessments on behalf of the Authority. These requests were primarily from the private and public sectors where assessments were made on the water development potential of sites and the evaluation of existing surface and ground water sources. Potential domestic water supply sources for Bull Head and Pennants Clarendon and Halls Green, St. Mary were evaluated and monitored over the long term. This was done to assess the reliability of these sources and to determine the feasibility of development for public water supply.

Technical Assistance/ Technical Support

The Unit offered Technical assistance/Technical Support to several government agencies and private sector organizations in support of national development. Some of the investigations required a long-term support from the WRA staff. The unit responded to seventy-one (71) such requests. It must be noted that there has been a consistent increase in requests from the National Housing Trust, Housing Agency of Jamaica, Ministry of Water, Land, Environment and Climate Change and the Rural Water Supply Ltd. where these organizations have requested the WRA's input in determining the feasibility of establishing housing developments and identifying and assessing potential water supply sources.

Data Provision

The unit responded to twenty three (23) requests for hydrologic data. The requests were from government and private agencies where information such as well records, well locations, water levels and groundwater flow direction were provided.

WATER QUALITY AND ENVIRONMENT

REVIEW OF ENVIRONMENTAL PERMIT APPLICATIONS

The Unit continues to pursue the objective of protecting water quality by reducing the risk of contamination which could be caused by development activities. As one of the ***commenting agencies*** in the development application review process, the Water Quality and Environment Unit, received, reviewed and commented on a total of three hundred and eight (308) development applications during this year. Of the total number of applications received, 92% (284) were reviewed and comments dispatched within the requisite thirty (30) day period.

The Unit continues to be constrained by the human resource limitations; however our role in the development application review process is deemed a priority and treated as such. The consequence is that other projects/ programmes which should be advanced by the Unit have either progressed very slowly or have been deferred.

BAUXITE ALUMINA INDUSTRY – SHUT DOWN MODE

At the start of this period, operations at three (3) bauxite/alumina processing plants across the island were shut down. An inter-agency committee was established to oversee and guide the process and activities associated with the closure period. The Unit was directly involved with the Environmental Monitoring Group which had responsibility for ensuring that personnel, operating procedures and necessary resources were put in place to properly monitor and manage waste disposal facilities, during the shut down phase. Routine monitoring of ground and surface water quality and effluent containment systems (i.e. mud lakes and effluent holding ponds) was a requirement. The management strategy for reporting and monitoring during rainy periods was also reviewed in preparation for the rainy seasons.

One of the three alumina plants, Ewarton Works re-opened during this year; consequently several meetings were convened to brief and familiarize the new staff of the alumina company with the environmental management procedures/requirements.

TROPICAL STORM NICOLE - WATER POLLUTION ISSUES

During heavy rainfall events, factories/facilities which operate open wastewater holding ponds are faced with the challenge of maintaining levels below the designed spillways. Often the holding ponds overflow and the effluent reports to sinkholes, rivers and gullies. The threat is contamination of both ground and surface water resources, threatening the integrity of domestic water supply sources and aquatic ecosystems.
During the months of September and October 2010, heavy rains associated with Tropical Storms Nicole created several water pollution incidents at bauxite/alumina facilities and rum distilleries.

The primary pollutant from alumina plants is caustic effluent and caustic red mud, characterized by high pH >10.5 units (alkaline) and high sodium concentrations > 5,000mg/l. The high pH in river systems can lead to fish kills.
High pH is also unacceptable for drinking water treatment plants.
Dunder is a brown liquid organic waste of very high strength, generated from the rum distillery process. It is characterized by a pungent odor and when released into ground or surface waters, reduces oxygen levels in receiving waters and often results in fish kills or degraded aquatic ecosystems.

For each facility/factory, there are established monitoring and reporting procedures aimed at ensuring that all relevant regulatory agencies are informed, the level of impact is assessed and appropriate mitigation measures are instituted in a timely manner.

For the Rio Cobre Basin the Unit was instrumental in monitoring the relevant sites at the Windalco Ewarton Works, evaluating the status of the waste ponds, recommending mitigation strategies to minimize the negative impacts, as well as communicating with the relevant downstream users including the National Water Commission (NWC) and National Irrigation Commission (NIC). Through effective communication and timely updates to all key stakeholders, the impact of the pollution incidents on domestic supplies was minimal. Representatives of the Unit attended several meetings to address the related issues: meetings were held with regulatory agencies, the political directorate, the alumina and rum industries and the affected communities.

Alumina Plant at Jamalco, Hayes, Clarendon

Caustic effluent from the Storm Lake (see photo below) overflowed via the designed spill-way and entered the Webbers Gully, which flows to the Rio Minho.
The Rio Minho River into which the Webbers Gully flows was in spate (high flows) at the time resulting in significant dilution of the contaminants. As such the tests and observation of the river system suggested no evident negative impact.

Photo taken- Oct 2, 2010

Storm Lake:
Stores caustic contaminated runoff water emanating from within the Jamalco alumina plant, Hayes, Clarendon

Photo taken- Oct 2, 2010

Storm Lake:
Showing spill-way with significant free board at the time the photograph was taken – Oct 2, 2010

Rio Minho was experiencing high flow contributing to dilution of the wastewater.

Alumina Plant at Windalco Kirkvine, Manchester

Caustic effluent escaped from a small holding pond (East Pond), flowed out of the plant site, across the main road to Shooters Hill and into a sinkhole in the Content community.
Quick action was taken by Windalco to stop this escape of effluent. The pond was pumped to reduce water levels and a berm constructed to block the outflow.

Alumina Plant at Windalco Ewarton, St Catherine

The Effluent Holding Pond that collects caustic effluent runoff from the drying beds at the Mud Stacking and Drying site at Ewarton Works overtopped the spillway, releasing caustic effluent to the Old John and Byndloss Gullies which drain to the Rio Cobre. The NWC Spanish Town Water Treatment plant is located down gradient of this site and receives water from the National Irrigation Commission's (NIC) main canal below the Rio Cobre diversion dam. The farmers and other users of irrigation water from the NIC canal were also at risk from this incident.

Caustic Effluent in the Holding Pond at Ewarton Works, Charlemont, St Catherine
Exceeds its holding capacity and overflows via the spillway.
Sand bags used to obstruct flow through the spillway.
Photo taken October 2010

In response to the pollution incident, several meetings were convened to discuss the short, medium and long term plans of Windalco for managing and containing its wastewater and reducing the likelihood of pollution incidents. To date, despite these meetings, an effective strategy for containing wastewater during expected rainy seasons has not been proposed or implemented. The reasons sited are cost factors and short term planning horizons of the company.

Contaminated Wastewater Stream from Ewarton Alumina Plant flow through Jericho, St Catherine. The contaminated stream is being diluted by Windalco's Well water as it flows toward the Rio Cobre.
Photo taken October 2010

Alumina Plant at Alpart, Nain, St Elizabeth

September 30, 2010 when contacted by government regulators, Alpart advised of breaches which had occurred at two sections of their waste containment system; the Collection Basin and the Western Expansion of the mud lake. The Collection Basin overflowed near the spillway, releasing effluent which flowed to a sinkhole.
The requisite sampling of designated monitoring wells was not conducted and Alpart was instructed to effect monitoring including sampling of monitor wells immediately.

Collection Basin at Alpart, Nain St Elizabeth

Photo taken- Oct 2, 2010

Collection Basin at Point of Beach
Photo taken- October 2, 2010

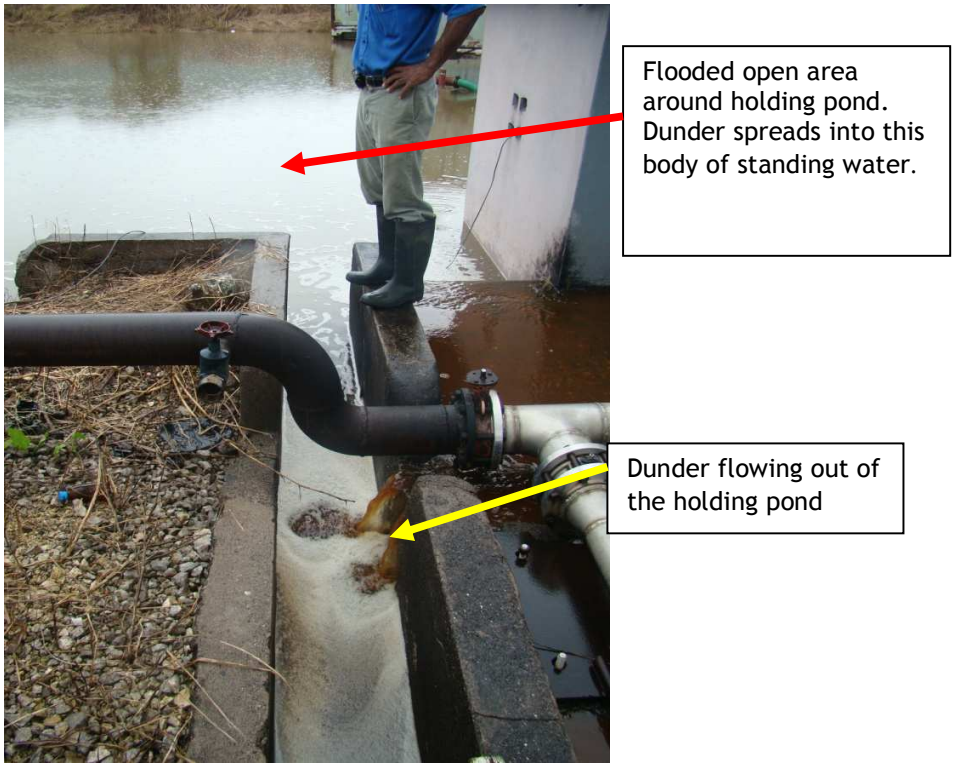
Rum Distillery at Appleton, St Elizabeth

As far back as 2001, the Water Resources Authority advised that the Nassau Valley, the area in which Appleton Rum Distillery and the dunder holding ponds are located, is a natural flood plain for the rivers which flow through it; Black River and One Eye River and as such, open wastewater ponds and high strength organic waste applied to cane fields, would present an unacceptably high risk of contamination of water resources. The rains during this year, again, highlighted the pollution risk associated with the vulnerability of this area to flooding. The dunder ponds were observed to overflow on two separate occasions during this year. The second incident resulted in extensive flooding of the entire area around the holding ponds, as the rivers overtopped their banks and for several days the area was inundated.

Dunder Ponds Exceed Design Holding Capacity and Spill To the Environment
Photo Taken July 2010

Photo taken- October 2, 2010

Dunder Holding Pond Overflowing



Photos taken- Oct 2, 2010

Tanker trucks were used to draw down the level of the wastewater in the pond and the dunder was transported to the New Yarmouth rum distillery in Clarendon and stored in the newly constructed wastewater (dunder) holding ponds.

On the instruction of the Office of the Prime Minister, a permit was issued to Appleton for the construction of two new dunder holding ponds at Appleton and a license to discharge untreated dunder to the canefields (referred to as ferti-irrigation). Further, a decision was taken during this year to establish what is referred to as the Sugarcane Industry Regulatory Committee comprised of eleven (11) agencies (SIRI, NEPA, RADA, PCA, NIC, WRA, EHU, NLA, RPPD, EMD/OPM and Spirits Pool Association SPA). The Draft Terms of Reference indicates that this committee is expected to be the primary oversight body for the industry, with functions including monitoring sugar factories and rum distilleries, assessment of impacts, providing technical guidance, preparing progress reports, providing trouble shooting options and others. During the fourth quarter, the committee has met four (4) times and several subcommittees/working groups have been named to address areas including Land Use and Zoning, Waste Management, Policy, Research and Compliance.
It is interesting to note that the sector being regulated by this committee is also a member of this committee and acts as Chair of one of the working groups. Concern was expressed by WRA to NEPA regarding the conflict of interest.

Sugar Factory at Appleton, St Elizabeth

Approximately eight (8) cane wash ponds are constructed behind the sugar factory and designed to effect some level of treatment of wastewater generated by the sugar factory. Several of these ponds have been completed inundated by the overflow from the Black River and there is no distinction between the river and the holding ponds. (See photo below showing a single body of water spread over a large area, including the canefields).

Several Cane Wash Ponds Behind Sugar Factory at Appleton Completely Inundated by overflow from Black River

Photo taken October 2, 2010

MOUNT ROSSER MUD LAKE CLOSURE PROJECT

The Mt Rosser Red Mud Lake, an abandoned waste containment facility of the alumina plant at Ewarton, is to be formally closed as a waste storage site. As such an environmental permit was obtained and work to close the facility commenced.
The Unit was integral in the development of guidelines, standards and monitoring programmes related to the closure of the Mt Rosser Waste Containment Facility and during this year several meetings and site visits were conducted to monitor the closure activities and assess the impact of the activities on ground and surface water quality.
Generally, the closure activities have been progressing well and the company (Rio Tinto Alcan) has adhered to the established guidelines, monitoring and reporting requirements.

Mt Rosser Mud Lake, St Catherine- Effluent Levels Continue to Fall Exposing More Mud

Photo taken April 2011

Mt Rosser Mud Lake, St Catherine- Effluent Levels Continue to Fall Exposing More Mud

Photo taken April 2011

ALPART MUD LAKE CLOSURE PROJECT

Through several written communications, the Authority has been insisting that the work related to closure of the abandoned red mud pond and other waste containment facilities at Alpart commence, as closure work has been long overdue. During this year, there were further technical reviews of Closure Plans, which were previously deemed unsatisfactory in terms of the approach being proposed by the company. The Unit continued to attend several meetings to highlight the inadequacies of the plan and to press for agreement on appropriate i.e. environmentally sound closure. Coming out of the meetings there was some agreement on the way forward and some closure activity/work has commenced.
The Unit continues to participate in the review and monitoring of the closure activities.

TERTIARY (TREATMENT OF SEWAGE) ZONES- A WATER QUALITY PROTECTION STRATEGY

One of the more significant threats to the quality of Jamaica's freshwater (ground and surface waters) as well as coastal marine waters, is the inadequate treatment and disposal of sewage.

Onsite sewage systems are by far the most common means of sewage disposal in Jamaica, as approximately 82% of the population treats and disposes of sewage via onsite systems. Central sewage will remain impractical due to the economics for the vast majority of the population for several years to come. Therefore, efforts to address the problem must include the 82% of the population served by onsite sewage systems.

Before the 1990s, onsite sewage systems in Jamaica, usually provided primary level treatment and the methods of treatment were limited to a) absorption pits b) a combination of septic tank followed by absorption pit for homes with piped water and c) dry pit latrines for homes without piped water. In several areas across the island, these primary level treatment systems, absorption pits in particular, have been deemed inadequate for the protection of drinking water sources, springs/streams and groundwater quality and even coastal marine water quality.

In an effort to reduce the risk of water contamination as well as the risk to public health, a higher level of sewage treatment, (i.e. tertiary) is being recommended in designated areas. These designated areas are being referred to as tertiary zones.

During this year the Unit continued to research and examine several methods and approaches used to delineate these spatial units/zones, and commenced the application of a methodology for establishing zones designated as requiring the treatment of sewage to the tertiary level.

This proposed water quality protection strategy requires that for any new development

a) which has water closets (i.e. piped water supply to the building/toilets)
b) which generates sewage to be disposed of onsite; and
c) which is located within a *designated tertiary zone*

sewage should be treated to the tertiary level.

Work continued with developing tertiary zone maps for St Catherine and Kingston and St Andrew, however not much progress was made due to the human resource limitations and the priority given to the review of development applications.

DATA & RESOURCE MANAGEMENT

The objective of the Data and Resource Management Unit (DRMU) is to provide timely and accurate hydrological data to guide decisions with regard to the allocation, conservation and protection of the island's water resources as well as to mitigate the impact of floods and droughts.

The primary responsibilities of the DRMU are to:

a) collect, analyze, compile, store and disseminate hydrological data
b) monitor the status of the island's surface and ground water resources
c) update and maintain an accurate and reliable hydrological database
d) maintain the national hydrometric network
e) monitor and report on extreme hydrological events such as floods and droughts
f) maintain and operate the Rio Cobre Flood Warning System (RCFWS)

To achieve these objectives, the island is organized into three monitoring regions as shown in Table 1. Similarly, the DRMU is organized into three teams (4 technicians per team) with each team assigned to one of the regions and tasked with the responsibility to ensure that the objectives as set out above are realized. With respect to surface water monitoring, the teams are assisted by fifty-six (56) "local observers[1]" who read manual staff gauges twice daily primarily where there are no automatic gauging stations. A small stipend is paid quarterly to each observer for carrying out the reading of the gauge. As it relates to the monitoring and assessment of and reporting on extreme hydrological events, other staff members outside of the DRMU are co-opted as required.

In addition to its primary responsibilities, the DRMU also provide technical assistance to other government agencies, NGOs and the general public and educational support to schools. The DRMU through the WRA also from time to time partner with regional and international institutions on training and capacity building projects. The activities and achievements of the DRMU in the financial year 2011/2012 are discussed in the sections below.

[1] A member of the community where the gauge is located who is employed by the WRA to read and record water level data at the gauge twice daily

Table 1

Monitoring Regions, Hydrometric Network and flood Warning/monitoring Systems

Monitoring Regions	*Parishes*	Stream Flow Gauging Stations (+ Spot Measurements)	Groundwater Monitoring Wells	Rainfall Gauges	Flood Warning/Monitoring Systems
Region 1	St. Catherine Clarendon St. Ann Manchester	22 (+14)	135	8	2
Region 2	St. Elizabeth Westmoreland Hanover St. James Trelawny	32 (+2)	87	6	1
Region 3	St. Thomas St. Ann Kingston & St. Andrew St. Mary Portland	34 (+22)	55	5	4
JAMAICA		**88 (+38)**	**277**	**19**	**7**

Water Resources Monitoring

Surface Water

Surface water under normal and extreme (drought and flood) conditions is monitored islandwide where stream gauging stations are located. The stations are generally permanent, can be recording (automatic) or manual and are sited at strategic points to allow the WRA to be able to make reasonable assessments of the status of the surface water resources and determine when hydrologic conditions are changing such as the onset of a hydrological drought or the impact of climate change.

Recording or automatic stream gauging stations monitor water levels 24 hours per day 7 days per week. Manual stations, on the other hand, provide data only when it is read and recorded by a "local observer" who reads the gauge twice per day and when the technician from the DRMU visits the station during the routine monitoring activities. Routine monitoring is carried out monthly so that each station (recording and manual) is visited at least once per month. The spatial distribution of surface water monitoring points across the island is presented in Figure 1.

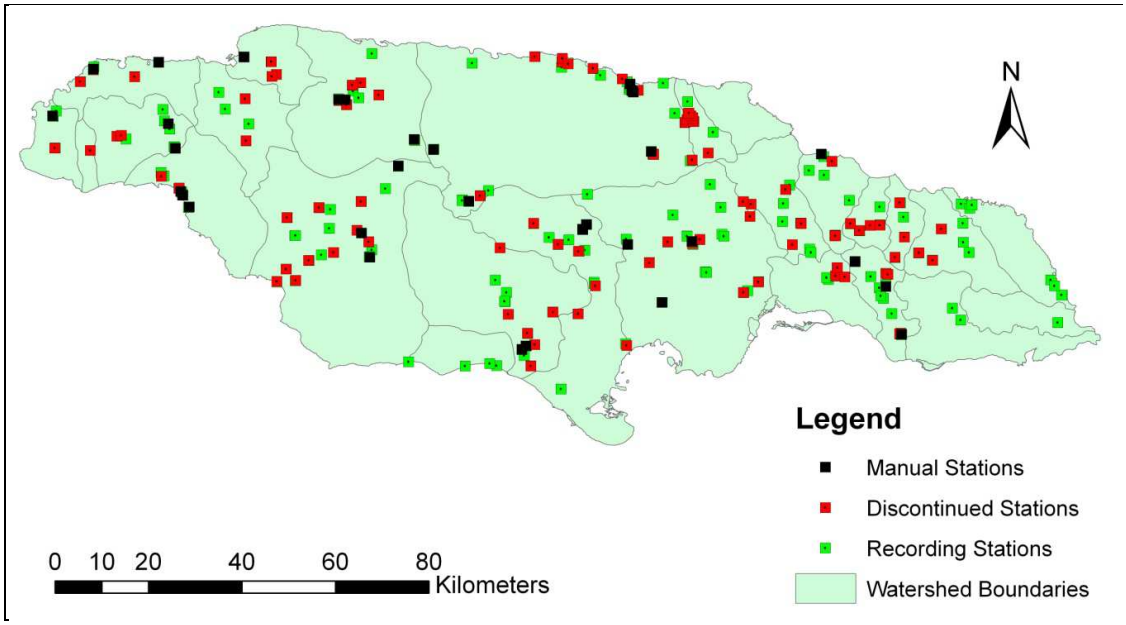


Figure 1: Spatial distribution of surface water monitoring points across the island

During flood conditions, temporary monitoring points may be introduced to monitor the flood levels and discharge. Permanent community flood gauges are also erected in several communities across the island to monitor flood levels. During flood conditions, the frequency of monitoring may be increased to capture data for analysis and to advise the government and the general public as to the status of the event.

The performance of the DRMU as it relates to the monitoring of the island's surface water resources is summarized in Table 2. The table shows that surface water monitoring points in the three regions were visited a total of 1,398 times for the year or 91% of the total visits that were scheduled. This exceeded the performance target of 85% by 6%.

This high performance of the DRMU in its monitoring activities is due to the high priority that is given to data collection as well as the fact that there was no significant diversion of resources to respond to extreme hydrological conditions/events such as flooding. In the 2010/2011 financial year for instance, some 15 high flow measurements were done across the island 5 of which were the highest measurements on record. In the 2011/2012 financial year, there were no extreme rainfall event requiring high flow discharges in the rivers to be measured.

Table 2

DRMU's performance in the collection and processing of stream flow data

Activities	Targets	*Performance Indicator*	*Achievement*
Surface Water Monitoring			
Streamflow measurements	1536 (100%)	1307 (85%)	1398 (91%)
Computed			1398
Groundwater Monitoring			
Water level measurements	3336 (100%)	2836 (85%)	3121 (94%)
Computerization			3121
Blanket Water level Measurements (BWLM)	Wet & Dry season BWLM		Wet BWLM

Groundwater

Groundwater resources are monitored at select (index) wells/coreholes islandwide. Groundwater monitoring is done on a monthly basis and is coordinated with the surface water monitoring programme. In a few instances, groundwater is monitored 24 hours per day 7 days per week using loggers such as are installed in some wells in Porous, Manchester where high groundwater levels can cause significant flooding. The spatial distribution of the groundwater monitoring points is presented below in Figure 2.

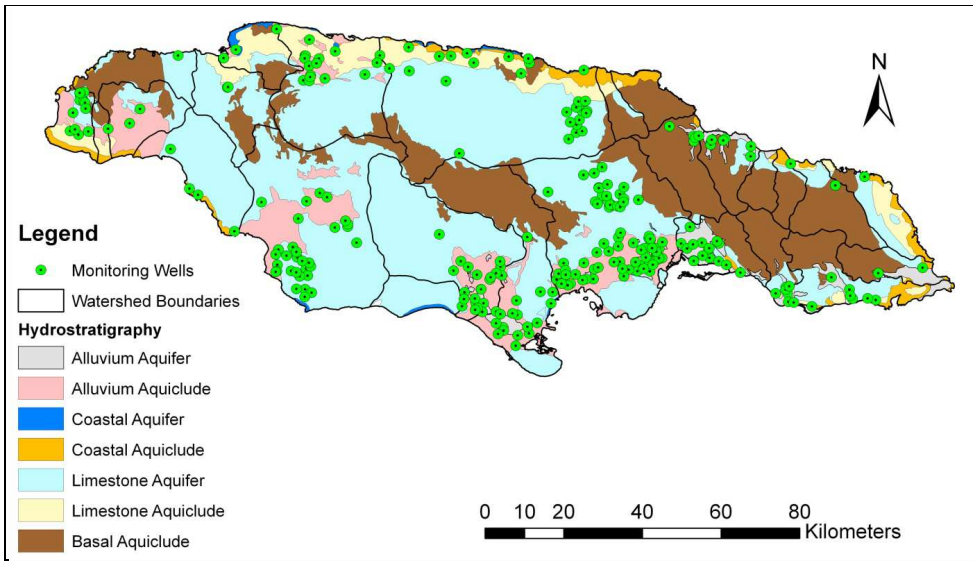


Figure 2: Spatial distribution of groundwater monitoring points across the island

The performance of the DRMU as it relates to the monitoring of the island's groundwater resources is summarized in Table 2. The table shows that groundwater monitoring points were visited a combined 3,121 times for the year or 94% of the total visits that were scheduled. This exceeded the performance target by 9%. A wet blanket water level

measurement exercise was also undertaken in November 2011. A dry blanket water level measurement was also scheduled for the 4th quarter of the financial year however this was not done due to the loss of one of the fleet vehicles and the involvement of staff in other high priority project namely the construction of a new stream gauging station on the Wag Water River in St. Mary and major repairs to the stream gauging station at Dam Head. Islandwide blanket water level measurements require the full involvement of the DRMU and the fleet of vehicles.

The high performance of the DRMU in its monitoring of groundwater resources is also due to the high priority given to these activities and the inclusion of the blanket water level measurements to the database.

Rainfall Monitoring

The DRMU currently maintains a network of twenty one (21) rainfall stations islandwide to monitor rainfall in select locations and to support flood warning systems in some instances. These should increase to between 26 and 30 stations in the 2012/2013 financial year as at least 5 rainfall gauges will be installed through the Carib-HYCOS Project. Another 3 to 4 installations could take place through other projects with the Caribbean Institute of Meteorology and Hydrology (CIMH) in Barbados. The spatial distribution of rainfall gauges maintained by the WRA/DRMU is presented in Figure 3.

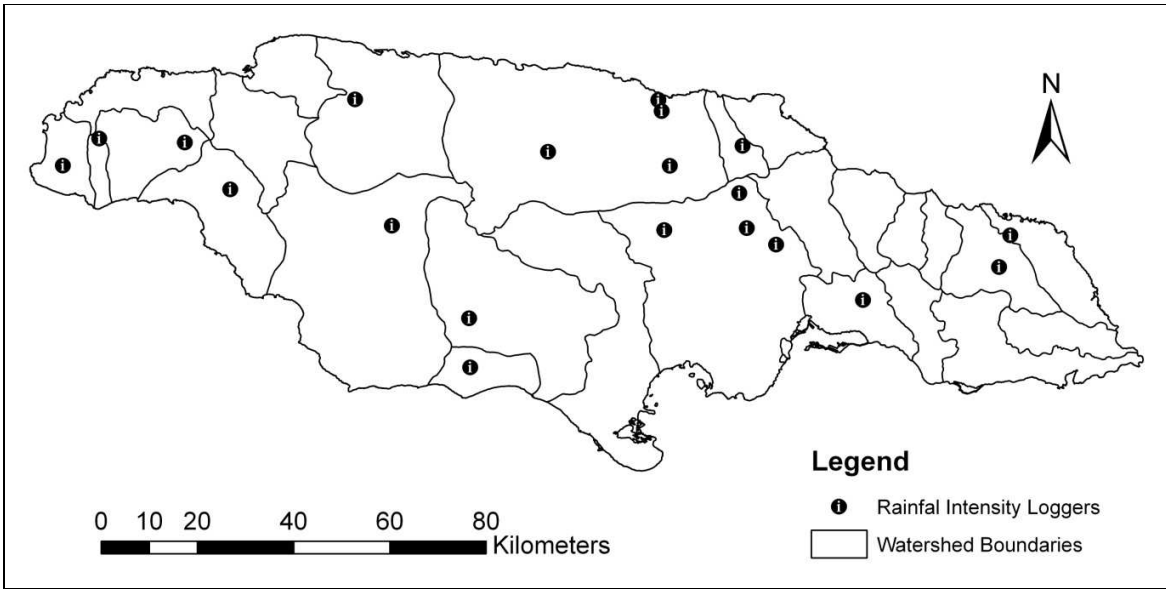


Figure 3: Spatial distribution of rainfall gauges across the island

Flood Warning/Monitoring

There are currently two operational flood warning systems (FWS) in the island; the Rio Cobre Flood Warning System (RCWFS) in St. Catherine which is a real-time system maintained and operated by the WRA and the Pedro River FWS in St. Ann which is operated by the Pedro River community. Both of these systems have gates (on major roadways) which are closed during flood events to prevent the public from accessing inundated areas that could pose a threat to life and property. There are other flood monitoring systems in select communities across the island which allows for the monitoring of flood levels by the community and the commuting public (Table 1).

The upgrade of the Rio Cobre flood warning system which had started back in 2008 was completed in the July 2011. Delay in its completion was due to technical problems which was resolved in 2008. There were no warnings issued during the financial year 2011/2012 due to a subdued rainfall and hurricane season.

Collaborations with Regional/International Partners

Carib-HYCOS Project

The Carib-HYCOS Project is a regional project to create a network of stations within the Caribbean that will transmit data into a regional database held at the IRD in Martinique and accessible via the internet. Jamaica is a signatory under the project and was expected to benefit from an upgrade of some of its hydrometric stations as well as new hydrometric database software.

The project has had many delays which included the delay of equipment to the WRA. Equipment was received in the 4th quarter of the financial year 2011/2012 and hence installation and data collection was not possible. Equipment received, included 1 stream gauging station and 5 rainfall stations, to be installed by the end of the 2nd quarter of the 2012/2013 financial year. Other portable equipment included 2 laptops, surveyor set, 6 GSM modems, 3 flow meters and 1 water quality equipment.

The proposed hydrometric database has not worked due to several technical problems which were beyond the control of the WRA. Two officers of the Authority were trained to use the hydrometric database software and another two were trained to use and maintain the equipment received.

The project should have been completed by June 2012 but it received an extension to December 2012. The further extension was granted to allow for time to determine an agency that was willing and capable of hosting the project and providing follow up support.

Collaborating with CIMH in Flood Forecasting

The Authority is collaborating with the CIMH and Trans-Jamaica Highway to install real time stream flow monitoring equipment on the bridge over the Rio Cobre River at the Highway 2000 (H2K) crossing. A sensor is to be installed which will allow for the monitoring of high flows that pass under the bridge. This data is of interest to the WRA, CIMH and Trans-Jamaica Highway.

The installation of the sensor was delayed as the sensor that was bought by CIMH had insufficient range. A new sensor with adequate range was subsequently bought and will be installed in the 2012/2013 financial year.

The project is to facilitate the collection of data to ground-truth models CIMH have developed to forecast flooding in the Caribbean and elsewhere. The Rio Cobre Watershed was chosen because of the existing data collection infrastructure and database maintained and operated by the WRA.

Requests for Data and Technical Assistance

The DRMU received and responded to 51 of 53 requests for data and technical assistance throughout the financial year 2011/2012 within the specified time limit. These included representation on committees overseeing major infrastructure projects including the NWAs Comprehensive Drainage and Flood Control Scheme and NROCCs Flood Management along Highway 2000 Projects.

Rehabilitation, Upgrade and Expansion of the National Hydrometric Network

The national hydrometric network was expanded by one new stream gauging station constructed on the Wag Water River nr Broadgate in St. Mary. Major repairs was also carried out on the Rio Cobre @ Dam Head stream gauging station with 9 other stations undergoing minor repairs. These works were facilitated by *"Appropriations in Aid"* funds as there was no budgetary allocation for Capital A projects for the 2011-2012 financial year,

.

Investigation of Long-Term Trends in Hydrological Data*Long term trends are evaluated via bulletins for 26 rivers and 178 wells (see Water Resources Review).*

Requests for Technical Training and Educational Support

The WRA hosted the Caribbean Institute for Meteorology and Hydrology (CIMH) lecturers and students for 2 weeks practical training in hydrometry and data computations and quality assurance testing. This is an ongoing collaboration between the WRA and the CIMH whereby, at the request of the CIMH, the WRA provides practical training to its students and lecturers in hands on streamflow measurement and data processing and computations.

The Unit also responded to the following requests for educational support:

- ✓ World Water Day Activities
- ✓ ODPEM's Hurricane Awareness Week
- ✓ GIS Day activities at WRA
- ✓ Wolmer's Boys High School
- ✓ Oberlin High School

Participation in Local/International Seminars/Workshops/Conferences

One officer attended the 2nd Meeting of the Working Group on Urban Waters under UNESCO IHP/LAC in Uraguay and two officers participated in the workshop titled "Hazard Risk Assessment & Calculation for the Caribbean" held in Trinidad & Tobago.

DOCUMENTATION CENTRE

The WRA's Documentation Centre/Library is home to over 3500 volumes consisting of books and journals. The Doc. Centre/Library is a member of the Scientific and Technical Information Network (STIN) and the Library and Information Association of Jamaica (LIAJA).Through 2011/2012 the Doc Centre efficiently carried out its stated objective of disseminating and collecting all relevant information relating to Jamaica Water Resources.
For the Financial Year 2011/2012

- Launched automated catalogue to allow persons to search the Doc Centre's catalogue via the Authority's website.

- 300 requests for information were received and dealt with satisfactorily.
- Increased points of access to accommodate not only walk in clients but via telephone and email.
- Commenced 2 year project to digitize reports to allow clients to access these reports via the Authority's website.

Financial constraints curtailed the purchase of new publications; however, 22 new publications were received from international agencies and local donors.

The Doc Centre also participated in 11 exhibitions across the island in a quest to increase awareness regarding the work of the organization and Jamaica's water resources.

The Doc Centre also provided training for one student from the University of the West Indies, Department of Library and Information Studies.

ADMINISTRATION & HUMAN RESOURCES

Training

YEAR	DATE	NAME		CONFERENCE/COURSE/SEMINAR/WORKSHOP & VENUE
2011	2011 February 2-3	*Pitter-Mignott*	*Colene*	Introduction to the GOJ Procurement Policies and Procedures - MIND
	2011 February 9	*Pennant*	*Joseph*	Workshop: "Rio Tinto Mt Rosser Closure" - Ocho Rios, Jamaica
	2011 February 9	*Watts*	*Michelle*	Workshop: "Rio Tinto Mt Rosser Closure" - Ocho Rios, Jamaica
	2011 March 14-15	*Graham*	*Angella*	Workshop organized by UNESCO-IHP/IMET - Port of Spain, Trinidad & Tobago
	2011 March 22-23	*Marshall*	*Geoffrey*	Capacity-Building Workshop on Climate Change Adaptation and Water Resources - Port of Spain, Trinidad and Tobago
	2011 April 8	*Rodriques*	*Tricia-Rae*	Seminar: Geospatial Network GeoSUR - Knutsford Court Hotel
	2011 April 11-15	*Blake*	*Clyde*	Carib-HYCOS Project Workshop - Caribbean Institute for Meteorology & Hydrology (CIMH), Barbados
	2011 April 11-15	*Henry*	*Uton*	Carib-HYCOS Project Workshop - Caribbean Institute for Meteorology & Hydrology (CIMH), Barbados
	2011 April 11-15	*Sawyers*	*Christopher*	Carib-HYCOS Project Workshop - Caribbean Institute for Meteorology & Hydrology (CIMH), Barbados
	2011 June 2	*Morgan-Johnson*	*Avian*	Workshop: Wastewater and Water Conservation and Energy Reduction Principles - National Water Commission (NWC), Kingston, Jamaica
	2011 June 2	*Pennant*	*Joseph*	Workshop: Wastewater and Water Conservation and Energy Reduction Principles - National Water Commission (NWC), Kingston, Jamaica
	2011 June 7-10	*Thomas*	*Herbert*	CEHI Workshop: Regional Water Resources Information Management, St. Lucia
	2011 June 10	*Barrett*	*Lawrence*	Seminar: Hazard Mitigation Seminar 2011: Taking Responsibility
	2011 July 4-9	*Morgan-Johnson*	*Avian*	Natural Resources Valuation Training
	2011 July 4-9	*Pennant*	*Joseph*	Natural Resources Valuation Training
	2011 July 26 - August 4	*Rodriques*	*Tricia-Rae*	Course: "New Technologies for the Development of Geoservices for Planning Purposes in Mesoamerica and the Caribbean" - Sioux Falls, SD, USA
	2011 August 8-12	*Barrett*	*Lawrence*	"2nd Meeting of the Working Group Urban Water" - Montevideo, Uruguay
	2011 August 19	*Barrett*	*Lawrence*	Seminar: "Protecting our Tourism Infrastructure"; Presentation: "Flood Mitigation Measures: Nightingale Grove Case Study" - Pelican Grill, Montego Bay, St. James

Training Cont'd

2011	2011 August 26 - 2012 April 6	***Sawyers***	***Christopher***	Hydrological Technicians Course HT 20/11 - Caribbean Institute for Meteorology & Hydrology (CIMH), Barbados
	2011 October 26	***Douglas***	***Chrisendeen***	Seminar: "Writing Minutes and Meeting Notes" - Knutsford Court Hotel, Kingston
	2011 October 26	***James***	***Charmaine***	Seminar: "Writing Minutes and Meeting Notes" - Knutsford Court Hotel, Kingston
	2011 November 3	***Fernandez***	***Basil***	Presentation: The Role of the WRA and the Water Resources of Jamaica - Chinese Delegation Visit to WRA
	2011 November 3	***Graham***	***Angella***	Presentation: The Involvement of the WRA in Various Projects - Chinese Delegation Visit to WRA
	2011 November 9	***Barrett***	***Lawrence***	Lecture: Holy Childhood High School Visit to WRA
	2011 November 9	***Ferguson***	***Natalie***	Lecture: Holy Childhood High School Visit to WRA
	2011 November 9	***Roper***	***Horace***	Lecture: Holy Childhood High School Visit to WRA
	2011 November	***Fernandez***	***Basil***	Panel Discussion for the Environmental Health Course - Master of Public Health (MPH) Programme
	2011 November 16	***Rodriques***	***Tricia-Rae***	Event: GIS Day 2011
	2011 November 16	***Reece***	***Rohan***	Event: GIS Day 2011
	2011 November 16	***Moo-Young***	***Joel***	Event: GIS Day 2011
	2011 December 14-16	***Fernandez***	***Basil***	Workshop: Management of Coastal Aquifers and Adaptation Measures to Climate Change - Crowne Plaza Hotel, Port of Spain, Trinidad
	2011 December 14-16	***Graham***	***Angella***	Workshop: Management of Coastal Aquifers and Adaptation Measures to Climate Change - Crowne Plaza Hotel, Port of Spain, Trinidad
2012	2012 January 10	***Fernandez***	***Basil***	Lecture: "Earthquake Forecasting and its Applications" - UWI Mona, Mona Campus
	2012 February 7-8	***Fernandez***	***Basil***	GEF CReW Official Launch & Wastewater Management Seminar - Terra Nova Hotel, Kingston
	2012 February 7-8	***Scott***	***DeMarsh***	GEF CReW Official Launch & Wastewater Management Seminar - Terra Nova Hotel, Kingston
	2012 March 5-9	***Henry***	***Uton***	Training Course in Hydrometry: "Installation and Management of Hydrological Data Collection Platform (DCP)" - St. Lucia
2012	2012 March 5-9	***Samuels***	***Michael***	Training Course in Hydrometry: "Installation and Management of Hydrological Data Collection Platform (DCP)" - St. Lucia

Offical Travel

YEAR	DATE	NAME		CONFERENCE/COURSE/SEMINAR/WORKSHOP & VENUE
2011	2011 March 14-15	*Graham*	*Angella*	Workshop organized by UNESCO-IHP/IMET - Port of Spain, Trinidad & Tobago
	2011 March 22-23	*Marshall*	*Geoffrey*	Capacity-Building Workshop on Climate Change Adaptation and Water Resources - Port of Spain, Trinidad and Tobago
	2011 April 11-15	*Blake*	*Clyde*	Carib-HYCOS Project Workshop - Caribbean Institute for Meteorology & Hydrology (CIMH), Barbados
	2011 April 11-15	*Henry*	*Uton*	Carib-HYCOS Project Workshop - Caribbean Institute for Meteorology & Hydrology (CIMH), Barbados
	2011 April 11-15	*Sawyers*	*Christopher*	Carib-HYCOS Project Workshop - Caribbean Institute for Meteorology & Hydrology (CIMH), Barbados
	2011 June 21-22	*Fernandez*	*Basil*	Carib-HYCOS Project Steering Committee Meeting - Trinidad
	2011 June 27 - July 2	*Fernandez*	*Basil*	IX Meeting of the Chairmen of UNESCO IHP National Committees in the Caribbean and the GRAPHIC Workshop - Santo Domingo, Dominican Republic
	2011 July 8 - August 19	*Dwyer*	*Shonel*	Presentation: Rainwater Harbesting and Utilization - Gansu Research Institute for Water Conservancy, Lanzhou, China
	2011 July 26 - August 4	*Rodriques*	*Tricia-Rae*	Course: "New Technologies for the Development of Geoservices for Planning Purposes in Mesoamerica and the Caribbean" - Sioux Falls, SD, USA
	2011 August 8-12	*Barrett*	*Lawrence*	"2nd Meeting of the Working Group Urban Water" - Montevideo, Uruguay
	2011 September 13-17	*Ferguson*	*Natalie*	Presentations: "Sustaining The Blue Planet Global Water Education Conference" - Bozeman Montana, USA
	2011 December 14-16	*Fernandez*	*Basil*	Workshop: Management of Coastal Aquifers and Adaptation Measures to Climate Change - Crowne Plaza Hotel, Port of Spain, Trinidad
	2011 December 14-16	*Graham*	*Angella*	Workshop: Management of Coastal Aquifers and Adaptation Measures to Climate Change - Crowne Plaza Hotel, Port of Spain, Trinidad
2012	2012 March 5-9	*Henry*	*Uton*	Training Course in Hydrometry: "Installation and Management of Hydrological Data Collection Platform (DCP) - St. Lucia
	2012 March 5-9	*Samuels*	*Michael*	Training Course in Hydrometry: "Installation and Management of Hydrological Data Collection Platform (DCP) - St. Lucia

Recruitment

YEAR	DATE	NAME		POSITION	COMMENTS
2011	2011 November 1	***Evans***	***Shane***	Technical Assistant	Temporary
	2011 November 1	***Morrison***	***Rasheef***	Technical Assistant	Temporary
2012	2012 April 1	***Yearwood***	***Kadian***	Senior Secretary	Permanent

Termination of Service

YEAR	DATE	NAME		POSITION	COMMENTS
2011	2011 March 31	***Haiduk***	***Andreas***	Chief Hydrologist	Resigned
	2011 September 30	***Watts***	***Michelle***	Senior Environmental Officer	Resigned
2012	2012 January 04	***Williams***	***Gloria***	Senior Secretary	End of Contract

Promotions

YEAR	DATE	NAME		POSITION	
				FROM	TO
2011	2011 September 1	***Cyril***	***Leslie***	Senior Technical Assistant	Assistant Hydrologist
	2011 September 1	***Lobban***	***Clive***	Assistant Hydrologist	Senior Assistant Hydrogeologist
	2011 September 1	***Morris***	***Damion***	Technical Assistant	Senior Technical Assistant
		Murphy	***Francis***		
		Samuels	***Michael***	Senior Technical Assistant	Acting Assistant Hydrologist
		Sawyers	***Christopher***	Technical Assistant	Acting Senior Technical Assistant

WATER RESOURCES AUTHORITY
FINANCIAL STATEMENTS
YEAR ENDED MARCH 31, 2012

C.R. Hylton & Co.
CHARTERED ACCOUNTANTS
CHARLTON R. HYLTON, F.C.C.A.
HAYSEWORTH HYLTON, A.C.C.A.
SUNIL I.R. DANIELS, A.C.C.A.
47 Hall Boulevard, Kingston 8, Jamaica, W.I. ~ Tel: 925-1857 ~ Cell: 386-2618 ~ Email: crhylton@yahoo.com

Report on the Financial Statements

We have audited the accompanying financial statements of Water Resources Authority which comprise the balance sheet as at 31 March 2012, the income statement and cash flow statement for the year then ended, and a summary of significant accounting policies and other explanatory notes.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with International Financial Reporting Standards and the Companies Act 2004. This responsibility includes the design, implementation and maintenance of internal controls relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error; the selection and application of appropriate accounting policies; and the making of accounting estimates that are reasonable in the circumstances.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with International Standards on Auditing. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance that the financial statements are free from material misstatement. An audit involves performing procedures to obtain audit evidence regarding the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditors consider internal control relevant to the entity's preparation and fair presentation of the financial statements 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 entity's internal controls.

REPORT OF THE INDEPENDENT AUDITORS - CONT'D

TO THE SHAREHOLDERS OF

WATER RESOURCES AUTHORITY

Opinion

In our opinion, the financial statements give a true and fair view of the financial position of the Authority's affairs as at 31 March 2012 and of its financial performance and its cash flows for the year then ended in accordance with International Financial Reporting Standards and comply with the provisions of the Jamaican Companies Act 2004 and the Water Resources Act 1995.

Report on additional requirements of the Companies Act

We have obtained all the information and explanations which, to the best of our knowledge and belief, were necessary for the purposes of our audit.

In our opinion, proper accounting records have been maintained, so far as appears from our examination of those records, and the accompanying financial statements are in agreement therewith, and give the information required by the Companies Act 2004 and the Water Resources Act 1995 in the manner so required.

C.R. HYLTON & CO
CHARTERED ACCOUNTANTS
47, Hall Boulevard
Kingston 8
Jamaica

6th October, 2012

FINANCIAL STATEMENTS

WATER RESOURCES AUTHORITY

31 MARCH, 2012

C.R. HYLTON & CO.
CHARTERED ACCOUNTANTS
JAMAICA

WATER RESOURCES AUTHORITY
YEAR ENDED 31 MARCH, 2012

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FINANCIAL STATEMENTS

Water Resources Authority Page 2
Statement of Comprehensive Income
Year ended 31 March 2012

	Note	**2012** $	**2011** $
Income			
Subventions		130,125,811	138,153,442
Other Operating Income	13	7,193,902	6,584,423
		137,319,713	144,737,865
Expenditure			
Administrative & other expenses	14	142,697,178	147,482,654
Comprehensive loss for the year, being total recognized gains and losses for the year		(5,377,465)	(2,744,789)

Water Resources Authority

Balance Sheet

31 March 2012

	Note	2012	2011
		$	$
Assets			
Cash and cash equivalents	5	31,801,952	39,962,321
Investment securities	6	3,944,294	3,638,895
Accounts receivable	7	5,973,025	6,481,415
Prepayments		904,653	1,272,694
Intangible assets	4a	2,526,285	426,220
Property, plant and equipment	4	111,521,947	105,769,205
Total Assets		156,672,156	157,550,750
Reserves			
Reserves and Accumulated Funds			
Capital project subvention	8	1,849,444	804,966
Capital project grant	9	3,589,137	3,589,137
Other projects fund	10	1,127,813	1,586,350
Accumulated surplus	11	28,052,857	44,830,322
Capital reserve	16	12,474,434	-
Revaluation reserve	17	103,000,000	103,000,000
		150,093,685	153,810,775
Current liabilities			
Payables & accruals	12	6,578,471	3,739,975
		6,578,471	3,739,975
Total Reserves and liabilities		156,672,156	157,550,750

Approved for issue on behalf of the Board of Directors on October 6, 2012 and signed on its behalf by:

Parris Lyew-Ayee-Chairman

Basil Fernandez-Managing Director

Water Resources Authority Page 4

Notes to the Financial Statements

31 March 2012

	Note	2012 $	2011 $
Cash Flows from Operating Activities			
Deficit for the year		(5,377,465)	(2,744,788)
Adjustments			
Depreciation		5,222,249	5,990,901
Transfer to capital projects		(11,400,000)	-
Depreciation transferred from capital grant		-	(135,358)
Adjusted surplus for the year		(11,555,216)	3,110,755
Decrease/(Increase) in current assets			
Receivables		508,390	(1,589,185)
Prepayments		368,041	(424,812)
Short-term investment		(305,399)	(185,691)
Increase in current liabilities			
Payables and accruals		2,838,495	(1,945,017)
Net cash flow from operation		(8,145,689)	(1,033,950)
Cash Flows from Investing Activities			
Additions to property, plant and equipment		(13,075,056)	(701,752)
Net cash flow from investing activities		(13,075,056)	(701,752)
CASH FLOW FROM FINANCING ACTIVITIES			
(Decrease)/Increase in capital projects subventions		1,044,478	(2,142,536)
Increase in other reserves		12,474,434	-
Decrease in other projects fund		(458,537)	948,575
Net cash flow from financing activities		13,060,375	(1,193,961)
Increase / (Decrease) in cash resources		(8,160,370)	(2,929,663)
Cash and Cash Equivalent at Beginning of Year	5	39,962,320	42,891,983
Cash and Cash Equivalent at End of Year	5	31,801,950	39,962,320

31 March, 2012

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 objectives were to promote the conservation and proper use of underground water resources and to control the exploitation of such water resources.

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 for the Authority. Water Resources Authority is currently being funded by subventions from the Ministry of Water and Housing.
The registered office of the Authority is situated at Hope Gardens, Kingston 7, Jamaica.

2. Adoption of Standards, Interpretations and Amendments:

Interpretations and amendments to published standards effective in the current year:

Certain new interpretations and amendments to existing standards have been published that became effective during the current year. The Plan has assessed the relevance of all such new interpretations and amendments and has put into effect the following IFRS, which are immediately relevant to its operations.

IAS 1 (Amendment) – Presentation of financial statements.

The amendment changes the disclosure of items presented in other comprehensive income (OCI) in the statement of comprehensive income.

The amendment does not address which items should be presented in OCI and the option to present items of OCI either before tax or net of tax has been retained.

IAS 12 (Amendment) – Deferred tax accounting for investment property at fair value.

The IASB amended IAS 12, 'Income taxes', to introduce an exception to the existing principle for the measurement of deferred tax assets or liabilities arising on investment property measured at fair value.

The IASB has added another exception to the principles in IAS 12: the rebuttable presumption that investment property measured at fair value is recovered entirely by sale. The rebuttable presumption also applies to the deferred tax liabilities or assets that arise from investment properties acquired in a business combination, if the acquirer subsequently uses the fair value model to measure those investment properties.

The amendments also incorporate SIC 21, 'Income taxes – Recovery of revalued non-depreciable assets', into IAS 12, although this guidance will not be applied to investment property measured at fair value. The SIC 21 guidance has been included because it is applied by analogy in a number of situations.

2. Adoption of Standards, Interpretations and Amendments (Cont'd):

Interpretations and amendments to published standards effective in the current year (Cont'd):

IAS 19 (Revised) – Employee Benefits.

The IASB has revised IAS 19, 'Employee benefits', making significant changes to the recognition and measurement of defined benefit pension expense and termination benefits, and to the disclosures for all employee benefits. The changes will affect most entities that apply IAS 19.

The key changes are as follows:

• *Recognition of actuarial gains and losses (remeasurements):* 'Actuarial gains and losses' are renamed 'remeasurements' and will be recognised immediately in 'other comprehensive income' (OCI). Actuarial gains and losses will no longer be deferred using the corridor approach or recognised in profit or loss. Remeasurements recognised in OCI will not be recycled through profit or loss in subsequent periods.

• *Recognition of past service cost/ curtailment:* Past-service costs will be recognised in the period of a plan amendment; unvested benefits will no longer be spread over a future-service period. A curtailment now occurs only when an entity reduces significantly the number of employees. Curtailment gains/losses are accounted for as past-service costs.

• Measurement of pension expense: Annual expense for a funded benefit plan will include net interest expense or income, calculated by applying the discount rate to the net defined benefit asset or liability.

• *Presentation in the income statement:* There will be less flexibility in income statement presentation. Benefit costs will be split between

- the cost of benefits accrued in the current period (service cost) and benefit changes (past-service cost, settlements and curtailments); and
- finance expense or income. This analysis can be in the income statement or in the notes.

• *Disclosure requirements:* Additional disclosures are required to present the characteristics of benefit plans, the amounts recognised in the financial statements, and the risks arising from defined benefit plans and multi-employer plans. The objectives and principles underlying disclosures are provided.

2. Adoption of Standards, Interpretations and Amendments (Cont'd):

Interpretations and amendments to published standards effective in the current year (Cont'd):

IAS 19 (Revised) – Employee Benefits (Cont'd)

• *Distinction between 'short-term' and 'other long-term' benefits:* The distinction between short- and long-term benefits for measurement purposes is based on when payment is expected, not when payment can be demanded. However, the amendment does not alter the balance sheet classification of the liabilities recorded in respect of the benefit obligation.

• Treatment of expenses and taxes relating *to employee benefit plans:* Taxes related to benefit plans should be included either in the return on assets or the calculation of the benefit obligation, depending on their nature. Investment management costs should be recognised as part of the return on assets; other costs of running a benefit plan should be recognised as period costs when incurred.

• *Termination benefits:* Any benefit that has a future-service obligation is not a termination benefit. A liability for a termination benefit is recognised when the entity can no longer withdraw the offer of the termination benefit or recognises any related restructuring costs.

• *Risk or cost sharing features:* The measurement of obligations should reflect the substance of arrangements where the employer's exposure is limited or where the employer can use contributions from employees to meet a deficit. This might reduce the defined benefit obligation in some situations.

IFRS 1 (Amendment) – Exemption for severe hyperinflation and removal of fixed dates.

The amendment creates an additional exemption when an entity that has been subject to severe hyperinflation resumes presenting, or presents for the first time, financial statements in accordance with IFRSs. The exemption allows an entity to elect to measure certain assets and liabilities at fair value; and to use that fair value as the deemed cost in the opening IFRS statement of financial position.

IFRS 1 (Amendment) – Government loans.

The amendment aligns IFRS 1 with the IAS 20 requirements (after its revision in 2008) to prospectively fair value government loans with a below-market rate of interest.

The Board has added an exception that allows a first-time adopter to use its previous GAAP carrying amount for such loans on transition to IFRS. The exception applies to recognition and measurement only.

Management should use the requirements of IAS 32, 'Financial instruments: Presentation', to determine whether government loans are classified as equity or as a financial liability.

2. Adoption of Standards, Interpretations and Amendments (Cont'd):

Interpretations and amendments to published standards effective in the current year (Cont'd):

IFRS 7 and IAS 32 (Amendments) – Offsetting requirements and converged disclosures.

The IASB has issued an amendment to the application guidance in IAS 32, 'Financial Instruments Presentation', to clarify some of the requirements for offsetting financial assets and financial liabilities on the statement of financial position.

The IASB has also published an amendment to IFRS 7, 'Financial instruments: Disclosures', reflecting the joint requirements with the FASB to enhance current offsetting disclosures. These new disclosures are intended to facilitate comparison between those entities that prepare IFRS financial statements to those that prepare financial statements in accordance with US GAAP.

The amendments clarify that the right of set-off must be available today – that is, it is not contingent on a future event. It also must be legally enforceable for all counterparties in the normal course of business, as well as in the event of default, insolvency or bankruptcy.

The amendments also clarify that gross settlement mechanisms (such as through a clearing house) with features that both:

(i) eliminate credit and liquidity risk and

(ii) process receivables and payables in a single settlement process,

are effectively equivalent to net settlement; they would therefore satisfy the IAS 32 criterion in these instances.

The amendments require more extensive disclosures than are currently required under IFRS and US GAAP. The disclosures focus on quantitative information about recognised financial instruments that are offset in the statement of financial position, as well as those recognised financial instruments that are subject to master netting or similar arrangements irrespective of whether they are offset.

IFRS 7 (Amendments) – Disclosure of transfers of financial assets.

The new disclosure requirements apply to transferred financial assets.
The amendment has different requirements for:

- transferred assets that are not derecognised in their entirety (for example, in a typical sale and repurchase ('repo') of a security for a fixed price, or on the transfer of assets to securitisation vehicles that are consolidated by the transferor); and
- certain transferred assets that are derecognised in their entirety (for example, factoring of trade receivables with no recourse).

2. Adoption of Standards, Interpretations and Amendments (Cont'd):

Standards, interpretations and amendments to published standards that are not yet effective

At the date of authorisation of these financial statements, certain new standards, amendments and interpretations to existing standards have been issued which are mandatory for the company's accounting periods beginning on or after 1 January 2011 or later periods, but were not effective at the reporting date, and which the Authority has not early adopted. The Authority has assessed the relevance of all such new standards, interpretations and amendments, has determined that the following may be relevant to its operations, and has concluded as follows:

Effective for annual periods Beginning or after

IFRS 9	Financial Instruments: Classification and Measurement	1 January 2013
IFRS 10	Consolidated Financial Statements	1 January 2013
IFRS 11	Joint Arrangements	1 January 2013
IFRS 12	Disclosure of Interest in Other Entities	1 January 2013
IFRS 13	Fair Value Measurement	1 January 2013

Water Resources Authority

Notes to the Financial Statements

31 March, 2012

3. Statement of Compliance, Basis of Preparation and Significant Accounting Policies:

Statement of compliance

The Authority's financial statements have been prepared in accordance and comply with International Financial Reporting Standards (IFRS) and the relevant requirements of the Pension's (Superannuation Fund and Retirement Schemes) Act, 2004.

Basis of preparation

The Financial statements have been prepared under the historical cost basis, except for certain financial instruments that are measured at revalued amounts or fair values as explained in the accounting policies below. Historical cost is generally based on the fair value consideration given in exchange for assets.

These financial statements are expressed in Jamaican dollars.

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

The Authority invests in Jamaican securities that provide a high return compared with other products available in Jamaican dollars. The performance of the Authority is measured and reported to the trustees in Jamaican dollars. The trustees consider the Jamaican dollar as the currency that most faithfully represents the economic effects of the underlying transactions, events and conditions. The financial statements are presented in 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 yearend exchange rates of monetary assets and liabilities denominated in foreign currencies are recognized in the statement of changes in net assets available for benefits. At the yearend date, monetary assets and liabilities denominated in foreign currency are translated using the closing mid-point rate of exchange. Unrealized foreign exchange differences on unsettled foreign currency monetary assets and liabilities are recognized in the statement of changes in net assets available for benefits.

3. Statement of Compliance, Basis of Preparation and Significant Accounting Policies(Cont'd.) :

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 recognized valuation techniques.

(c) Revenue recognition

Revenue is recognized 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 recognized.

Contributions

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

Interest income

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

Dividend income

Dividend income is recognized when the right to receive payment is established.

(d) Receivables

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

3. Statement of Compliance, Basis of Preparation and Significant Accounting Policies (Cont'd.):

Summary of accounting policies (Cont'd.)

(e) Expenses

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

(f) Financial investments

(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

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

(iii) Measurement

Financial investments are initially recognized 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. Unrealized gains and losses are recognized 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 yearend date. The quoted market prices used for financial assets held by the Authority is current bid price.

3. Statement of Compliance, Basis of Preparation and Significant Accounting Policies(Cont'd.) :

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 judgements

The preparation of financial statements in accordance with International Financial Reporting Standards requires the Board of Trustees 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 Trustees' 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 contribution pension scheme, the assets of which are held separately from those of the Authority. Contributions to the Scheme by the Authority are charged to the statement of income and expenditure when due.

j) Property, plant and equipment:

(i) Items of property, plant and equipment are stated at cost, less accumulated depreciation and impairment losses. The directors however, revalued the building during the current year to show its true value which was materially understated.

(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 balance sheet date.

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Notes to the Financial Statements
31 March 2012

4. Property, Plant and Equipment

	Opening Cost $	Closing Cost $	Opening Accumulated Depreciation $	Charge for the year $	Closing Accumulated Depreciation $
At cost :					
Building	108,383,635	108,383,635	8,941,349	2,709,591	11,650,940
Furniture & fixtures	8,492,107	8,541,122	6,471,749	334,877	6,806,626
Computer Hardware	15,242,143	16,686,056	14,127,437	1,143,084	15,270,521
Stations	-	4,990,000	-	124,750	124,750
Technical & Scientific Equipment	6,779,226	10,845,073	3,596,784	474,330	4,071,114
Motor Vehicles	8,969,165	8,969,165	8,959,753	9,400	8,969,153
	147,866,276	158,415,051	42,097,072	4,796,032	46,893,104

	Opening Net Book Value $	Closing Net Book Value $
Building	99,442,286	96,732,695
Furniture & Fixtures	2,020,358	1,734,496
Computer Hardware	1,114,706	1,415,535
Stations	-	4,865,250
Technical & Scientific Equipment	3,182,443	6,773,959
Motor vehicles	9,412	12
	105,769,205	111,521,947

4a. Intangible Assets:

	Opening Cost $	Closing Cost $	Opening Accumulated Depreciation $	Charge for the year $	Closing Accumulated Depreciation $
At cost :					
Computer Software	5,889,463	8,415,745	5,463,243	426,217	5,889,460
	5,889,463	8,415,745	5,463,243	426,217	5,889,460

	Opening Net Book Value $	Closing Net Book Value $
Computer Software	426,220	2,526,285
	426,220	2,526,285

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Notes to the Financial Statements

31 March 2012

5. Cash and Cash Equivalent

	2012 $	2011 $
Bank of Nova Scotia - Current Account	9,994,338	5,881,555
Bank of Nova Scotia - Savings Accounts :		
Motor Vehicle Repair Loan SavingsAccount	4,279,811	4,944,538
Capital Projects Account	11,143,486	22,605,384
Petty Cash	10,000	10,000
Foreign Currency Savings Account	5,416,605	5,392,438
Computer Loan- Savings Account	942,857	1,113,578
TCC Savings Account	14,855	14,828
	31,801,952	39,962,321

6. Investment Securities

Investments comprise the following:

	2012 $	2011 $
Held to maturity -		
Government of Jamaica -		
Local Registered Stock	3,944,294	3,638,895
	3,944,294	3,638,895

7. Accounts Receivable

	2012 $	2011 $
Motor vehicle repair loans	3,230,023	4,325,394
Computer loans	473,305	264,322
Staff loans	180,134	139,172
Withholding tax recoverable	730,279	659,919
Interest receivable	219,730	440,905
GCT refundable	752,079	462,052
Other contrubution-GCT	192,574	-
Other receivables	194,901	189,651
	5,973,025	6,481,415

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Notes to the Financial Statements

31 March 2012

8. Capital Projects Subvention

	Note	2012 $	2011 $
Balance of Subvention Funds at April 1, 2011		804,966	2,947,502
Add : Fund Received		12,142,624	-
		12,947,590	2,947,502
Less : Projects Expenditure for year			
Appropriation in Aid	18	(9,947,326)	-
Carib Hyco		(168,850)	(44,921)
Caberita Hydrological Basin		(386,490)	(1,326,414)
Hydrometric Network Upgrade		(537,654)	(9,861)
Cariwin project		(6,300)	(155,207)
IMET Project		(51,526)	(606,133)
		(11,098,146)	(2,142,536)
Balance for Capital Funds - Projects		1,849,444	804,966

9. Capital Project Grant

	2012 $	2011 $
Balance at beginning of year	3,589,137	3,724,495
Less : Transfers to other income :		
Other Assets	-	(767)
Hubert Chin Building	-	(134,591)
	3,589,137	3,589,137

These represent 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.

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Notes to the Financial Statements

31 March 2012

10. Other Projects Fund

	Note	2012 $	2011 $
UNDP/GOJ Project		428,420	428,420
MACC		694,944	694,944
UNDP Radar		-	(3,336)
MACC Project - Clarendon		(665,513)	(665,513)
Rainwater Harvesting-FAO		669,962	385,875
Hounslow Project		-	745,960
		1,127,813	1,586,350

11. Accumulated Fund

	Note	2012 $	2011 $
Balance at beginning of year		44,830,322	47,575,110
Transfer to capital projects	18	(11,400,000)	-
Operating Deficit for the year		(5,377,465)	(2,744,788)
		28,052,857	44,830,322

12. Payables and Accruals

	2012 $	2011 $
Insurances	-	-
Credit Union	-	-
Audit fees	375,000	511,000
Projects	4,555,151	1,802,000
Administrative expenses	1,648,320	1,426,975
	6,578,471	3,739,975

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Notes to the Financial Statements
31 March 2012

13. Other Operating Income

	2012 $	2011 $
Transferred from capital project	-	135,358
Investment Income	219,454	342,135
Other Income	615,526	109,595
Well applicant fees	3,270,000	2,985,000
Reimbursements	2,437,536	2,095,579
Interest Income	651,386	916,756
	7,193,902	6,584,423

14. Administrative and Other Expenses

	2012 $	2011 $
Salaries and related costs	84,699,096	89,561,275
Staff Benefits	7,313,746	7,252,593
Pension- employer's contributions	7,976,371	7,916,024
Accommodation and Machine Rental	1,395,745	1,587,203
Telephone	680,504	784,173
Utility expenses	3,538,255	3,380,786
Motor vehicle expenses	3,597,561	3,155,360
Repairs, materials and related expenses	1,206,726	2,180,645
Cleaning & sanitation	125,277	-
Construction materials	70,244	164,578
Haulage	138,750	-
Security	1,348,538	1,252,039
Postage, Stationery and printing	1,749,573	1,513,469
Donations and Subscriptions	7,000	116,033
Consultants Fees	610,633	448,848
Accounting Fees	(112,037)	370,039
Licences & taxes	143,188	-
Foreign Travel	1,497,459	151,085
Travel and subsistence	18,440,703	19,366,215
Bank Charges	152,933	73,080
Meals & entertainment	364,603	-
Miscellaneous purchases	556,716	495,740
Depreciation	5,222,249	5,990,901
Insurance - property	1,482,160	1,385,326
Advertising	491,184	337,242
	142,697,178	147,482,654

15. Restatement

The financial statements for the years 2011 and 2010 were reflect the impact of revaluing own use property to reflect market value.
The prior years fixed asset value, depreciation charge and revaluation reserve accounts were affected.

16. Capital reserve

This represents a valuation of stations built by the Authority previously excluded from the accounts. Values were obtained from internal valuators.

17. Revaluation reserve

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

	2012	2011
	$	$
Opening balance	103,000,000	95,000,000
Change during the year	-	8,000,000
Closing balance	103,000,000	103,000,000

18. Revaluation of property

The directors valued the buildings as at the end of 31 March 2011.
They were of the view that the property market was as such that the values did not change during the year ended 31 March 2012.

19. Appropriation in Aid

During the year, management obtained permission from the Ministry of Finance to utilize $11.4m of accumulated interest earned on the Capital Projects savings account. These funds were used for capital projects and the subvention was reduced accordingly by the Ministry of Finance.
This resulted in the establishment of an Appropriation in aid account which records the expenditure of these monies.

Water Resources Authority
Notes to the Financial Statements
Year Ended 31 March 2012

20 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 arms 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 available and regularly available from an exchange, dealer, broker, industry group, pricing service, or regulatory agency, and those prices represent actual and regularly occuring market transactions in an arms length basis. However, market prices are not available for a significant number of the financial assets and liabilities held and issued by the company.Therefore, for financial instruments where no market prices are 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.

(11) 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.

(111) The fair value of variable rate financial instruments is assumed to approximate their carrying amounts.

(1V) Equity securities for which fair values cannot be measured readily are recognised at cost less impairment.

Instruments measured at fair value are required to be classified into three levels.

Level 1 includes those instruments which are measured based on quoted price in active markets for identical assets and liabilities. These mainly comprise of equity and preference shares traded on regional stock exchanges and are classified as available for sale and financial assets at fair value through profit and 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 maximise 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 available, 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.

20. Fair value estimation (Cont'd.)

The instruments measured at fair value are classified into their respective levels in the following table:

	Level 1 $	Level 2 $	Level 3 $	**Total $**
Financial instruments at fair value-				
Issued by Govt. of Jamaica	-	3,944,294	-	3,944,294
	-	3,944,294	-	3,944,294

21. 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 minimize 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:

(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.

The carrying amounts of the Authority's foreign currency denominated monetary assets at the reporting date are as follows:

21. Financial risk management (Cont'd.)

(i) Currency risk (Cont'd.)

	2012		2011	
	US$	**J$ Equivalent**	**US$**	**J$ Equivalent**
US$	33,842	2,931,387	27,077	2,314,278

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 plan to cash flow interest risk whereas fixed interest rate instruments expose the plan 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 plan:

	2012 **$**	**2011** **$**
Government of Jamaica	3,944,294	3,638,895
Bank Saving Accounts	21,807,614	34,070,766
Total	25,751,908	37,709,661

The sensitivity analysis below has been determined based on the exposure to interest rates for non-derivative instruments at the end of the reporting period. For floating rate assets, the analysis is prepared assuming the amount of assets held at the end of the reporting period was held throughout the year.
If interest rates had been 100 basis points higher/lower and all other variables were held constant, the Authority's surplus for the year ended 31 March, 2012 would increase/decrease by $257,519. This is mainly attributable to the Authority's exposure to interest rates on its investment securities.

21. Financial risk management (Cont'd)

(a) Market risk (Cont'd)

(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.

(a) 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.

(b) 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 AND SENIOR EXECUTIVE COMPENSATION

2011/2012

DIRECTORS COMPENSATION 2011-2012

Position of Director **Board Members**	Fees ($)	Motor Vehicle Upkeep/Travelling or Value of Assignment of Motor Vehicle ($)	Honoraria ($)	All Other Compensation including Non-Cash Benefits as applicable ($)	Total ($)
Dr. Parris Lyew-Ayee	**136,000.00**	**-**	**-**	**-**	**136,000.00**
Camiek Blair	**65,000.00**	**7,000.00**	**-**	**-**	**72,000.00**
Sandra Buchanan	**69,000.00**	**4,200.00**	**-**	**-**	**73,200.00**
Dr. Geoffrey Williams	**52,500.00**	**107,800.00**	**-**	**-**	**160,300.00**
Willard Pinnock	**88,500.00**	**-**	**-**	**-**	**88,500.00**
Cheyenne McClarty	**72,500.00**	**14,350.00**	**-**	**-**	**86,850.00**
Alexander Williams	**75,500.00**	**6,720.00**	**-**	**-**	**82,220.00**

Notes

1. **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 EXECUTIVE COMPENSATION 2011-2012

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 ($)
Managing Director	5,847,572.52	-	398,250.00	-	-	-	6,245,822.52
Deputy Managing Director	3,672,541.77	-	796,500.00	-	-	-	4,469,041.77
Director Finance & Accounts	3,164,035.62	-	796,500.00	-	-	-	3,960,535.62