WATER RESOURCES AUTHORITY

MINISTRY OF WATER AND HOUSING

ANNUAL REPORT

2005 - 2006

WATER RESOURCES AUTHORITY

ANNUAL REPORT FOR

PERIOD

1ST APRIL 2005 - 31ST MARCH 2006

WATER RESOURCES AUTHORITY
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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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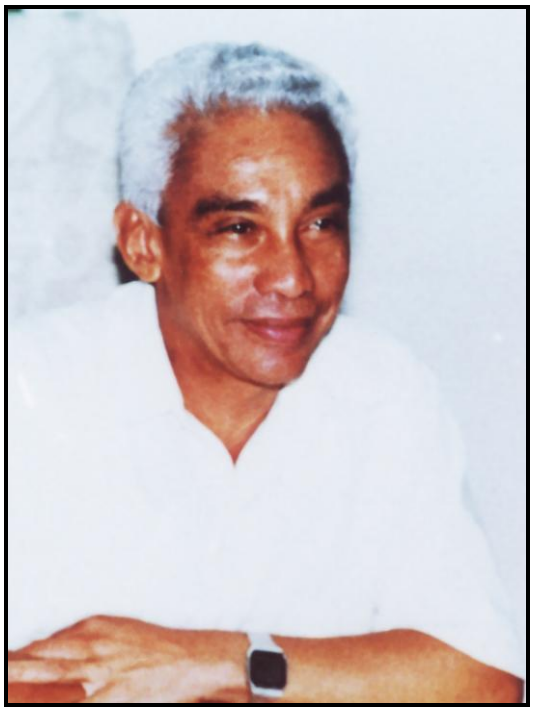
MESSAGE FROM THE CHAIRMAN



It is widely accepted that water is essential for life. However few, by their deeds, acknowledge the indispensability of water to social, economic and environmental sustainability. Once water is available there is little regard for the economic cost of supply and there is a distinct tendency to take it for granted.

Although Jamaica still has an abundance of water it is not evenly distributed across the island. This has become discouraging obvious with the expansion of population and businesses. Because water is assumed to be always available, housing schemes, business malls and industrial complexes are often initiated without knowledge of the quality or availability of water supplies leading to much tension, losses and much pressure on the Authority.

As Chairman, I take this opportunity to remind all concerned that the availability of water must be one of the first considerations undertaken before any form of domestic or business development takes place. Although this is written in regulations, in practice such mandated procedures are often subverted. A meeting to discuss such issues has been on the cards for sometime but has not taken place. This must be corrected with the timelines it deserves. Without the proper allocation of water orderly socio-economic development is impossible.

The recently concluded Fifth Inter-American Dialogue on Water Management has brought home to us the demand and availability of water in the region; the issues of supply and contamination and has demonstrated that the past successes of the Authority and the proposed future actions are in the best interest of maintaining our situation of surplus high quality water.

Arnoldo Ventura PhD
Chairman

MESSAGE FROM THE MANAGING DIRECTOR

The three major events for this year have been the hosting of the Fifth Inter-American Dialogue on Water Management by the Ministry of Water and Housing and the Water Resources Authority, the participation by Jamaica in the Fourth World Water Forum in Mexico and the flooding from Tropical storms Dennis, Emily and Wilma.

The "Dialogue" the premier event of the Inter-American Water Resources Network (IWRN) and the Organization of American States, Unit of Sustainable Development and Environment (OAS-USDE) is held every two years. The objective of the Dialogue, a regional meeting of water experts, is to exchange information and technology on integrated water resources management. The Dialogue, held over the period October 9-14, 2005 at the Half Moon Conference Centre in Montego Bay, was most successful with over 200 participants from 32 countries across the hemisphere. The support for the Dialogue came from the private sector, locally and internationally, as well as from sister agencies within the water sector. The success of the Dialogue was the result of the hard work of the staff of the Authority and the local organizing committee for over 1 year prior to and during the Dialogue. Congratulations to all who worked hard to put Jamaica and the WRA on show for the hemisphere to see what we have accomplished in water resources management and development.

The theme of the Dialogue was "Strengthening Local Capacity to Achieve Global Challenges" and this was specifically selected to complement the theme of the World Water Forum which was "Local Actions for a Global Challenge". The Dialogue was one thematic event that provided recommendations from the Region of the Americas to the World Water Forum which was held in Mexico City, March 16 to 22, 2006.

At the Dialogue we were able to demonstrate the innovative financing methods being used by the NWC for its major water supply projects; illustrate the role of the NIC in the formation of water users association where farmers will be empowered to manage the new irrigation systems; show the success of the community water supply projects as developed by JSIF and indicate the importance of risk management in the management of water resources in Jamaica.

At the forum the NWC gleaned much information on desalination; the NIC garnered information on the success of water users association in Latin America and the varying irrigation rate charges and the WRA had discussion with the WMO and reached an agreement for cooperation in floodwater control.

The second edition of the World Water Development Report, to which the WRA has made contributions, was launched at the forum on March 22-World Water Day. It has been a most successful year for the WRA and the water sector through the strong inter-agency linkages and cooperation for a common cause-the sustainable management of Jamaica's water resources.

The flooding from tropical storms Dennis and Emily in July 2005 was compounded by the heavy rains of tropical storm Emily in October 2005. These severe rainfall events led to flooding at Pedro River and Moneague-St Ann; Harmons, Evergreen and Green Hill-Manchester; Bliss Pasture and Congo Town-Trelawny; Great Bay and Calabash Bay-St. Elizabeth and Kennedy Grove and Nightingale Grove-St. Catherine. The monitoring of these flooded areas placed an extra load on the WRA resources. However the staff responded admirably and the public meetings, press briefings and releases ensured that the public was kept informed. The flooding pointed to the need for a proactive approach to and improved regulation of floodwater control. The WRA is moving to amend the Water Resources Act 1995 to include the responsibilities for Floodwater Control. We know that once this is complete and given the resources the WRA can make a difference in flood management.

Basil Fernandez, OD
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;

    g. 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 EXECUTIVE

Board of the Authority

The Board of the Water Resources Authority remained unchanged, having been reappointed on March 10, 2003. The Board consisted of the following nine appointees:

Dr. Arnoldo Ventura C.D.	Chairman
Mr. Basil Fernandez O.D.	Secretary / Managing Director
Mr. Parris Lyew-Ayee O.D.	Member
Dr. Conrad Douglas	Member
Mr. Donovan Stanberry	Member
Mr Errol Gentles	Member
Dr. Carol Archer	Member
Mrs. Sonia Rickards	Member
Miss Tasha Manley	Member

The term of the present Board expired on March 09, 2006. The Minister with Portfolio responsibility however requested that the Board continue to serve until further notice.

Mrs. Maureen Clarke continued as the Recording Secretary and Mrs. Natalie Ferguson, Hydrogeologist, as Technical Advisor.

Meetings of the Board

The Board of the Authority meets once per month on the third Wednesday. A total of eleven (11) meetings were held in 2005/2006. Average attendance at the meetings was seven (7) members. The Board held no meeting in August 2005 due to the unavailability of the Chairman and other Board Members. Decisions regarding the granting of permits/licences during the month that the Board did not meet were taken by the Secretary and later ratified by the Board.

Management of the Authority

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

Basil Fernandez O.D.	Managing Director
Herbert Thomas	Director, Resource Management
Miss Hermine Downer	Director, Finance and Accounts

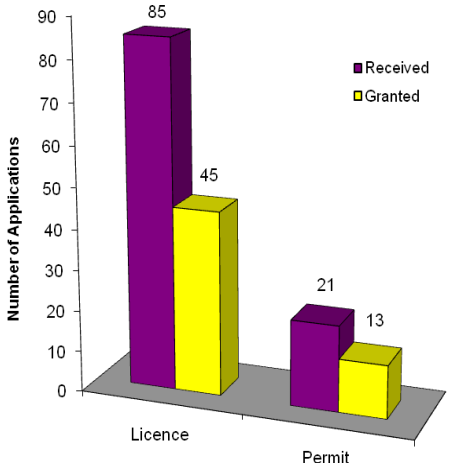
Two positions, that of the Director, Planning and Investigation and Director Administration and Human Resource Development remained vacant for the entire year.

The position of Deputy Managing Director remained vacant up to December 2005. Mr. Herbert Thomas, Director Resource Monitoring was promoted to Deputy Managing Director in January 2006. The position of Director, Resource Monitoring remained vacant after January 2006.

ALLOCATION OF WATER

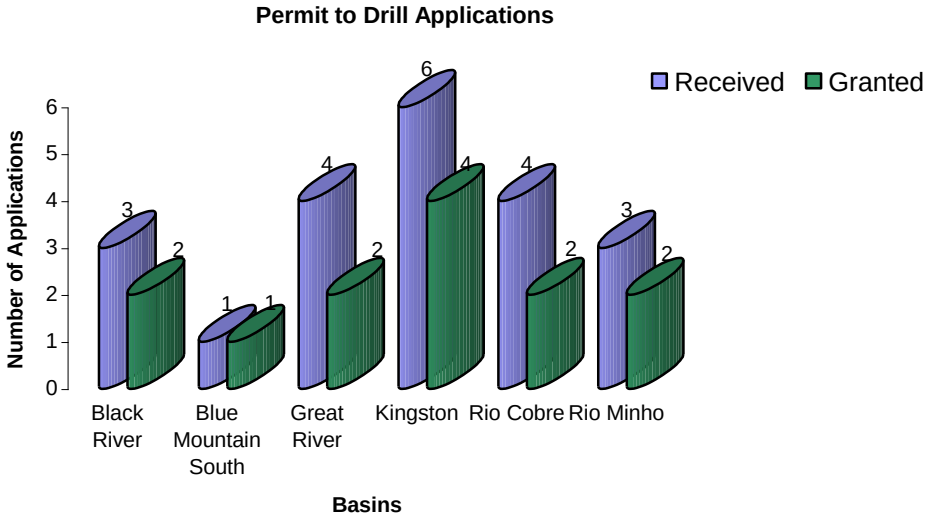
Applications and Abstraction

The Water Resources Authority during the 2005/2006 financial year received twenty-one (21) applications for permits to drill wells and eighty-five (85) applications for licences to abstract and use water. Seventeen (17) applications received in the 2004/2005 financial year were also processed totalling 123 applications.



Permits

Applications for consent/permit to drill were granted for the establishment of thirteen (13) wells in six (6) hydrological basins. The approvals are indicated in the graph below.



Wells established in the Black River Basin were new allocations for the purposes of irrigation as well as domestic/livestock use. In the Blue Mountain South Basin the well established was for irrigation. Permits for wells drilled in the Great River Basin were for the exploration of domestic water. Permits granted for the exploration of water in the Kingston Basin were for domestic (emergency use), irrigation (football field) and industrial (beverages) use. A permit for one replacement well for an abandoned well representing no new abstraction was also granted. Wells established in the Rio Minho and Rio Cobre Basins were both for industrial (bauxite/alumina dust control, beverages) and domestic uses.

Two (2) permits to drill in the Rio Cobre Basin were refused due to the Moratorium on new abstraction in the Basin as a result of declining yields and the safe yield having been fully committed. Permits granted for drilling in the Rio Cobre Basin were replacement wells, which represented no new/additional abstraction from the basin.

Six (6) of the applications to drill wells were not processed during the financial year as they required the submission of data by the applicants which were not received before the end of the financial year.

Licences

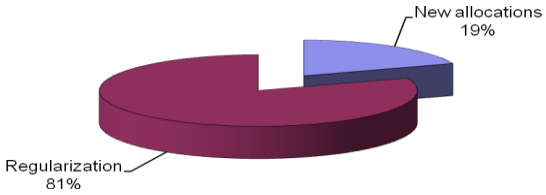
Forty-five [45] applications to abstract and use water were granted during the period 2005-2006 (including applications not processed from 2004-2005); twenty-three (23) represented new sources and twenty-two (22) were for regularization of existing sources. One (1) application was refused. Fifty-seven (57) applications not granted were pending due to a number of reasons, which include:

requirement for applicant to advertise their intent to abstract and use water, and submit proof of same, as required under the Water Resources Act (1)
requirement for additional technical investigations and data analysis to be undertaken by the Authority (42)
non-submission of relevant data as requested by the Authority, such as yield test and water quality data, water demand calculations, proof of right of access to property/water (7); and the Authority unable to complete the processing within the financial year (7)

The forty-five (45) licences granted resulted in the allocation of 248,972.7 cubic metres of water per day. Of the total volume allocated for abstraction, 73% [181,892 cubic metres per day] represented allocation from rivers and springs while 27% [67,080 cubic metres per day] represented groundwater abstracted via wells. It should however be noted that a significant proportion of surface water flow is sustained by groundwater discharge.

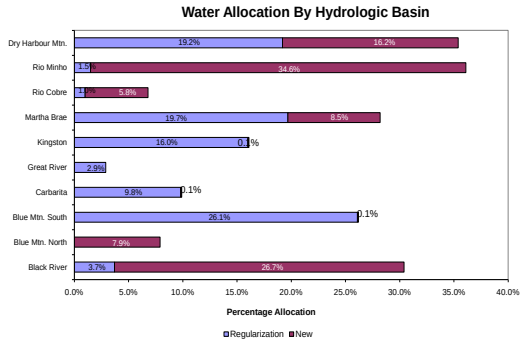
Water Allocation by Hydrologic Basin

Of the total volume of water allocated, 81% (200,716.2 cubic metres per day) represents regularization of existing sources, and as such does not reflect the allocation of new resources. New resources represented 19% (48,256.5 cubic metres per day) of the total allocation.



Regularization of existing abstractors

Regularization of abstraction was distributed across nine (9) hydrologic basins as shown in the graph below. Of the total abstraction regularized, 26.6 % occurred in the Blue Mountain South Basin. The regularization of twelve [12] sources currently used by the National Water Commission accounted for 83.8% of the allocation or 168,160 cubic metres of water daily.

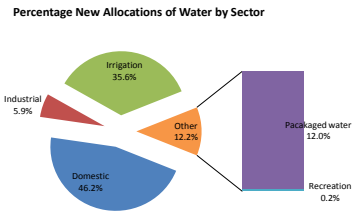


b) New Allocation

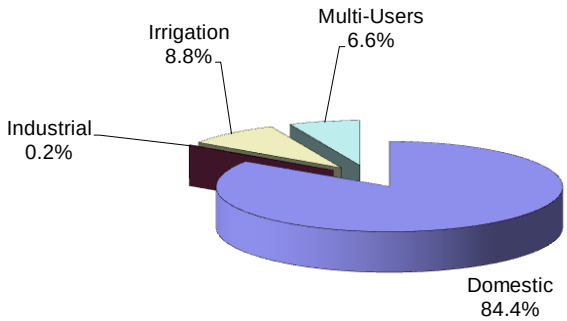
The new resources allocated amounted to some 48,256.5 cubic metres of water daily or 19% of total allocation. Allocation from the Rio Minho basin accounted for 35% of this amount.

Water Allocation by Sector

The domestic sector saw the largest allocation of water (42%) from new sources, and a larger allocation (84.4 %) for regularized sources. The irrigation sector accounted for 28.3% of new allocation and 8.8% of the regularized abstraction. Other sectors receiving new allocations were packaged water, agriculture and recreation. The regularization of multi-users included domestic- irrigation -livestock as well as industrial-domestic uses.



Percentage Regularized Allocation of Water by Sector



SPECIAL CELEBRATIONS / EXHIBITIONS / EVENTS

Fifth Inter-American Dialogue on Water Management

The Water Resources Authority an agency of the Ministry of Water and Housing in the Jamaican Government under the initiative and support of the Inter-American Water Resources Network (IWRN), the Organization of American States (OAS) and UNESCO organized the Fifth Inter-American Dialogue on Water Management (Dialogue V). The theme of the Dialogue was **"**Strengthening Local Capacity to Achieve Global Challenges**"**.

The Dialogue was held October 9-14, 2005 in Montego Bay, Jamaica. Representatives of all governments (Focal Points), members of academia, businesses, private sector, professionals, and members of international institutions with interest in water and environment in the Americas and totaling over 200 attended the Dialogue. The thematic components were

- Water for Sustainable Development (including water for food and the environment)
- IWRM and Governance
- Water and Sanitation for all
- Risk Management

The cross cutting perspectives were

- Knowledge and Capacity Building
- Models for Investing and Financing
- Application of Science and Technology
- Targeting, Monitoring and Assessment

The Dialogue had seven (7) Plenary and nine (9) Concurrent sessions with 55 presentations to cover the most relevant issues all related to water resources in the Americas. Each session was dedicated to a special subject with one hour for presentations and one hour for discussion.

The attached recommendations, which resulted from the Dialogue, were made as a contribution from the Region of the Americas to the Fourth World Water Forum, Mexico City, March 16 – 22, 2006.

Recommendations

From each of the thematic component discussed in the Dialogue, the following were extracted for further work to be done by the IWRN, its alliances such as the World Water Council/World Water Forum 4 (WWC/WWF 4) and the country Focal Points:

1. Establish a programme and a permanent committee to monitor and target the implementation of commitments and formal agreements related to water and the environment entered into by countries, to include new commitments/agreements and to track the degree of fulfillment of commitments, the lessons learned, the constraints faced, the formulation of new needs, and the promotion of new strategies needed for successful implementation.

2. The political will, financial resources and technical capability needed to meet the targets of the MDGs need to be more focused. A status review of the MDGs, at the Dialogue, indicates that, with regard to water and sanitation, the degree of progress is variable and in some countries it is nil.

3. Build on the alliance formed between private enterprise and civil society in obtaining support for sustainable of natural resources that impact on the quantity and quality of water resources. In some cases the necessity of contributing in an equitable manner to the development and management of water resources at the watershed level and within the user sectors is recognized. The phrase used by Coca Cola in this Dialogue: "*Pay now if you don't want to pay much more in the future*" has caught the attention of everybody and this is a road to be followed by all within the areas of water and environment management.

4. Each country should prepare a national water policy and harmonize this with other national policies to ensure that none are counteracting the other and provide the necessary advisory for the countries to fulfill their commitments in accordance with the international principles approved in many formal reunions.

5. The use of Science and Technology must be promoted by all means. It can provide the basis for sound and effective interventions from decision makers and politicians in implementing desired legislation, initiatives and strategies to solve problems and in allocating funds. Decision support systems have been suggested as a means to model and provide unquestionable information in this respect.

6. Utilize the new technology of mega-watersheds to detect, evaluate and develop groundwater stored within the tectonic structure of volcanic rocks. This could be one solution to meeting the MDG goal of access, alleviate poverty and improve life in arid areas where these conditions exist and this water is not counted as part of the hydrologic cycle. This has been successfully done in a SID in the Caribbean.

7. Continue to support and build on the good relationships (including techniques and methodologies) developed between countries involved in transboundary resources management and development. The job being done by the Global Environmental Facility (GEF), via PNUMA and OAS, to support these activities directly with these countries is commendable and it is already showing success in many on going projects such as Project Rio Bermejo - Tarija. This support must be expanded and transferred where applicable. The GEF supported DeltAmerica project implemented by the Organization of American States is an example in this respect and provides support for new strategic planning.

8. The WWF4 should revisit the May 2005 ***"Lima Declaration"*** which summarized and advanced the definition of aspects concerning governability, public participation, legislation and institutions, as well as mechanisms for financing activities of common interest for transboundary watersheds.

9. Carry out an evaluation into the technologies available for desalination in the Caribbean SIDS where water catchments are inadequate and many times result in serious water deficit for life. Desalination of sea or saline water is an alternative to importing fresh water from other localities. However, costs involved indicate the need to promote and continue research in these aspects.

10. Define strategies, support training and capacity building-professional, institutional and community- to reduce the impact of climate variability/change and natural disasters to which the Latin America and Caribbean regions are especially vulnerable in varying degrees. The IWRN, WMO and their alliances should also include these aspects in their operational agendas.

11. Water resources assessment must be carried out to determine available resources and to guide allocation. In all assessments water for the environment must be considered and allocated.

12. Emphasis must be placed on successful, innovative models for financing water supply projects especially where the community is involved. Jamaica has several successful models that can be transferred to other areas.

Fourth World Water Forum

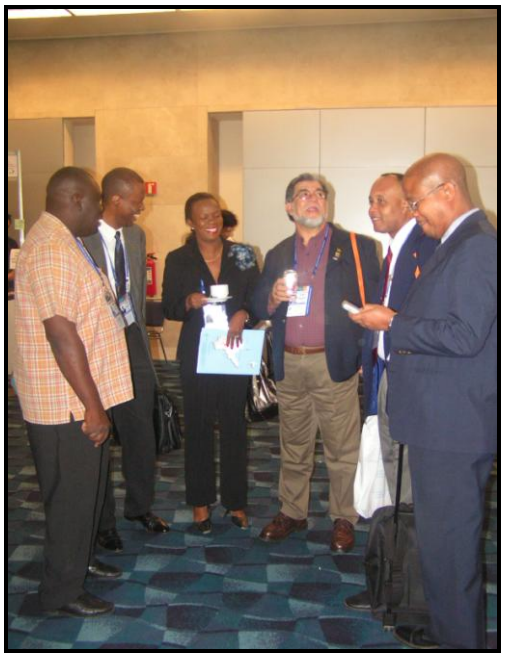
The Government of Mexico hosted the Fourth World Water Forum (WWF4) over the period 16-22 March 2006. The Forum was held at the Banamex Centre in Mexico City. Jamaica's delegation from the Ministry of Water and Housing to the Forum consisted of the following persons:-

1. Hon. Donald Buchanan - Minister of Water and Housing
2. Mrs Genefa Hibbert -Permanent Secretary-MoWH
3. Mr. Desmond Munroe - CTD – MoWH
4. Mr. Basil Fernandez - Managing Director, WRA
5. Mr. Donovan Stanberry - Permanent Secretary MLE and Board Member, WRA
6. Mrs. Sonia Rickards - Board Member, WRA and Communications Consultant MoWH
7. Mr. Donovan Reid - Managing Director, NIC
8. Mr. Steve Lawrence - Engineer, NIC
9. Ms. Judith Reid - MD, Rural Water Supply (formerly CECL)
10. Mr. Courtney Lawes - VP, NWC

In addition the Ministry of Local Government, Community Development and Sports had a delegation consisting of the following persons:

1. Hon Milton Brown -Mayor Of May Pen
2. Mr Patrick Wong -Chief Technical Director-MLGCDS
3. Mrs. Dorothy Delgado -Secretary Manager-St Ann Parish Council

The local media was represented by Mr Mark Thompson of the Sunday Herald Newspaper who was selected from among a group of Caribbean media persons competing for the support from the IDB and Forum organizers.



Forum Theme

The theme of the WWF4 was "Local Actions for a Global Challenge"

Components of the Forum

There were several components to the WWF 4. One of the main components was the presentation and diffusion of a great range of experiences and actions that have been implemented in various regions of the world.
There were 142 sessions at the WWF4 that adhered to the framework themes and cross cutting perspectives.

Regional meetings brought together a larger representation of stakeholders from different countries in a region. For the purpose of facilitating the WWF 4 the World had been divided into five (5) regions.
Americas (includes the Caribbean)
Asia – Pacific
Africa
Europe
Middle East

Thematic meetings discussed parts of the thematic content of the forum which were not specific to one region. These meetings were organized by international organizations such as the IDB, OAS, World Bank and Global Water Partnership (GWP) among others.

Virtual Workshops, a web-based deliberate arena, was utilized to help connect people and share knowledge throughout the globe for those persons unable to attend the Forum in Mexico.

Thematic Component

The content of the thematic component assembled and circumscribed some of the most important challenges and problems faced by the global water polity and included some of the processes and factors that were considered by many to affect the unfolding of local actions worldwide.

Framework Themes

There were five (5) framework themes:

1. Water for Growth and Development: - Water is vital as a basic human need, a necessity for survival and central to enhancing health, productivity and quality of life. Water is also an essential factor in all sections of economic and social development. Adequate, reliable water availability is prerequisite for investment, growth and poverty alleviation.

2. Implementing Integrated Water Resources Management (IWRM): - Water is a finite resource vital for sustaining life on earth. IWRM is a conceptual framework that seeks to enable the coordinated and cost effective management of water and other related natural resources with the overall objective of pursuing sustainable development.

3. Water Supply and Sanitation for all: - Insufficient safe water and sanitation expose people, especially children, to water related diseases.

4. Water Management for Food and Environment: - Irrigated agriculture is the largest user of water in Jamaica and Globally. Water for good for an ever-increasing population is becoming an important challenge. It is necessary to achieve greater irrigation efficiency and water productivity in agriculture while safeguarding the environment - more crop for every drop.

5. Risk Management: - Water security is driven by a vision to protect and care for humanity. Climate variability and change are influencing the incidence of extreme natural events such as floods, droughts, hurricanes etc. The combination of flood control and early warning systems can provide rapid response and adaptation strategies.

Cross Cutting Perspectives

There are five (5) cross cutting perspectives:

1. New Models for Financing Local Water Initiatives.
2. Institutional Development and Political processes
3. Capacity Building and Social Learning
4. Application of Science, Technology and Knowledge.
5. Targeting, Monitoring and Implementation Assessment.

The cross cutting perspectives represented the different factors directly influencing the success of local actions.

Daily Sessions

The participation (registration) fee allowed each member of the delegation access to all sessions and the water fair and expo. The Forum in Mexico was organized on a daily basis- one Framework Theme per day and the Cross-cutting Perspectives dealt with throughout the week and for each Framework Theme.

The sessions were extended over 5 days, March 17- 21, with each day devoted to one theme.

Friday March 17 – Theme 1 – Water for Growth and Development

Saturday March 18 – Theme 2 – Implementing Integrated Water Resources Management (IWRM)

Sunday March 19 – Theme 3 – Water Supply and Sanitation for All

Monday March 20 – Theme 4 – Water Management for Food and the Environment.

Tuesday March 21 – Theme 5 – Risk Management.

The sequencing of the Framework Themes was not random. It was important to start with Framework Theme No1: Water for Growth and Development to lay from the outset the policy context of water policy making, followed by Framework Theme No.2: Implementing IWRM, which represented the means to address the central developmental goals of water policy making. This was followed by more specific elements of the water problem as represented by Framework Themes 3, 4, and 5: Water Supply and Sanitation, Water for Food and the Environment and Risk Management respectively.

During the first part of the Forum mornings the Thematic and Cross-cutting Documents were presented, followed by keynote speakers. Later two periods of parallel Topic-Sessions was held, followed by lunch within the grounds of the venue and continued in the afternoon with

another period of parallel sessions. Then, the day closed with a wrap-up session and some special events such as cultural and water related presentations

Each day of presentations was devoted to one region. The first day, March 17th, was the "Day of the Americas".

The members of the delegation had their special interest and each day was more interesting and important to some than to others.

Day 1–Water for Growth and Development was interesting to all with presentations about policy interventions; empowerment of water users; community involvement in water projects; financing; infrastructure development and groundwater protection among others. On day 1 Mr Basil Fernandez of the Water Resources Authority was a presenter in the session entitled "Cross cutting Issues in Water Policy". Mr Fernandez presented the conclusions and recommendations from the Fifth Inter-American Dialogue on Water Management held in Montego Bay, October 9-14 2005 and for which the WRA was the host. The recommendations were accepted for inclusion in the final report of the Forum.

Day 2–Implementing Integrated Water Resources Management. This session was most interesting to the Ministry and the WRA in particular though the presentations cut across the mandate of the many agencies represented. The presentations included financing IWRM; inclusion of IWRM in national planning; water governance; implementing the Millennium Development Goals (MDGs); Transboundary waters and wastewater management. The National Irrigation Commission found the reuse of treated sewage for irrigation purposes most interesting and useful considering the same is being contemplated for the effluent from the Soapberry Sewage Treatment System being constructed in St. Catherine.

Mr. Basil Fernandez of the WRA chaired a meeting of the Focal Points and Executive Committee of the Inter-American Water Resources Network (IWRN) of which he is the Co-chair. The IWRN is a network of agencies and organizations where information and technology related to water resources is shared. The IWRN has its Secretariat within the Unit for Sustainable Development and Environment (USDE) of the OAS, Washington DC. The meeting discussed the new initiative presented by Brazil for a common action on water resources management for the Latin America and Caribbean Region. Mr. Fernandez was requested and accepted the task of coordinating activities for the Caribbean Focal Points of the network.

Mr. Fernandez also participated in a session as an expert member of a panel. The title of the session was "Transboundary Waters in the Americas-Lessons in IWRM" Mr. Fernandez raised issues of transboundary management versus national management and sovereign right of use of water resources.

Discussions were held with the Global Water Partnership (GWP) on the formation and operation of a regional partner GWP-Caribbean to enhance the inclusion of IWRM in all water resources projects and in national development plans. The GWP Caribbean was launched in April of 2005 in Tobago. However the partnership has failed to live up to the

GWP statutes and has not benefited from the GWP funding for projects. It is intended to re-launch the GWP Caribbean partnership with possible leadership from Jamaica to ensure maximum benefits from funding and technical expertise.

Day 3-Water Supply and Sanitation for All. The NWC and Rural Water Supply (CECL) members of the delegation found the day's presentations on water and sanitation issues most useful. The presentations dealt with the right to water; how to make a difference in low income and inner city areas (with water and sanitation); access to safe water; harnessing local providers; rural water supply and desalination. Mr Basil Fernandez again chaired a meeting of the Executive Committee of the IWRN to plan the way forward for the upcoming two year period as well as the hosting of the next Inter-American Dialogue on Water Management (Dialogue VI) by Guatemala in the third quarter of 2007. Mr Fernandez was nominated to and accepted a position on the planning committee to ensure the experiences of Dialogue V can be utilized to ensure a successful Dialogue VI.

The NWC representative, Mr Courtney Lawes, gleaned much information from the exposition on desalination (replica desalination plant was exhibited), reduction of scaling within pipelines and the financing of water and sanitation projects. In addition he was most impressed with the Project WET (Water Education for Teachers) programme where different modalities for information transfer to schools and the general public were showcased. In fact the WRA had hosted Project WET International in a 2 day workshop in Jamaica 2 years ago and has since been seeking funding to fully establish Project WET Jamaica. The opportunity was taken to continue discussions with Project WET International and an agreement is very near to finalization.

Day 4-Water Management for Food and the Environment. The day's theme was of particular importance to the National Irrigation Commission especially the worldwide experiences in the establishment of Water Users association a policy initiative being pursued by the Jamaican Government. A growing body of international findings shows that Irrigation Management Transfer (IMT) can actually contribute to rural poverty by aggravating existing inequities within irrigation schemes or introducing new ones. Driven largely by financial pressures many governments are transferring full or partial management responsibility for irrigation systems from government agencies to farmers organized into Water Users Associations (WUAs). In most cases improving the situation of poor farmers has been a secondary aim of this reform. But there is increasing evidence that IMT can actually negatively impact the situation of poor farmers and in extreme cases even cause the collapse of irrigation schemes.

The NIC was also interested in the formation of Community Learning Centres (CLCs) which provides an opportunity for farmer training, trainers of trainers and general capacity building for farmers associations.

The NIC also noted that financing of irrigation systems using innovative methods such as recoverable grants and loans indexed to production should be explored in Jamaica.

Day 5-Risk Management. The day's sessions were concerned with extreme events, their impact and management. Events such as flash floods, floods, droughts, hurricanes and tsunami dominated the presentations. Of special interest to the Water Resources Authority and the Ministry of Land and Environment were the experiences of reducing vulnerability to disasters, managing drought risks, risk management assessments and the collaborative approach to flood management. The major presenter was the World Meteorological Organization (WMO) to which the Jamaica Met Office and the WRA is affiliated.

The WRA used the opportunity to meet with Dr Avinash Tygai, Director Hydrology and Water Resources Department of the WMO to discuss assistance to the WRA's efforts in floodwater control and the development of a floodwater master plan. WMO has agreed to provide technical expertise in the development of the legislation, an integrated flood policy and plan as well as training to staff to increase institutional capability to deal with floodwater. The agreement will be formalized through an MOU with the WMO.

Water Fair

The fair was an open space where government, organizations and educational institutions (national and foreign) were able to share their experiences, through
their local actions, on the efficient use of water, as well as the creation of knowledge, diffusion of research and cultural and tourist promotion. The Water Fair featured displays of publications, services and experiences across the globe.

World Water Expo

The World Water Expo was a huge success with over 1200 exhibitors. The new equipment and technology displayed showed how far the solutions for better treatment and delivery of water had come over the past 3 years since the last forum in Japan.

The companies that participated in this exhibition, without precedent, specialized in wastewater treatment, water purification and distribution systems, irrigation control systems, filtration, chemical and hydraulic engineering, generation of electricity, and water pumping, amongst other fields of expertise.

Ministerial Conference

The ministerial Conference was held over two days Tuesday March 21 and Wednesday March 22, 2006. Jamaica was represented at the Ministerial Conference by The Hon Donald Buchanan-Minister of Water and Housing, Hon. Sheila Sealy Monteith-Jamaica's Ambassador to Mexico and Mr Basil Fernandez-Managing Director of the Water Resources Authority.

Day 1 of the conference took place at the Banamex Centre and saw Dialogue between Ministers of over 140 countries on "Financing Local Projects on Water Issues". Here innovative financing options were presented by 48 Ministers across the globe. The conference continued with a "Call for Action" by representatives of the Second Children World Water Forum to save the children of the world who are dying from water borne diseases through the provision of adequate and safe water and sanitation.

The working lunch saw discussions between the Ministers and selected parliamentarians of Latin America and local government authorities of Mexico on water supply and sanitation issues. The main points of the discussions were the need for improved management of resources; the need for improved delivery of water and sanitation services and the need or tariffs that reflected the true cost of the provision of services. The working lunch was followed by a visit of the Ministers to the World Water Expo, while senior officials (Permanent Secretary and Chief Technical Director) and forum participants held dialogue on "Promoting Public Participation in Local Actions and Water Management"

An official dinner for Ministers, Heads of Delegations and Ambassadors closed the day's activities.

Day 2 of the Ministerial conference took place at the Camino Real Hotel and consisted in the morning of six (6) roundtable discussions as follows;

1. Financing local water and sanitation activities
2. Capacity Building for effective water management and basic sanitation at local level.
3. Decentralization process, governance, institutions and the enhancement of all stakeholders' participation in particular local actors including women and young people.
4. Water Efficiency and transfer of water related technologies
5. Development and strengthening of national water monitoring mechanisms and targeting
6. Water and the Environment.

The Honourable Donald Buchanan-Minister of water and Housing elected to participate in roundtable 1-Finanacing local water and sanitation activities. The Honorable Minister was in fact requested to co-chair the roundtable with the Hon Paula Dobriansky Under-Secretary of State from the USA. The excellent job of co-chairing the roundtable by the Minister brought out important discussion points from the participants who were mainly from developing countries.

The roundtable discussions were followed by a plenary session at which the following were presented:

- Reports of the Ministerial Roundtables
- Presentation by UNDESA of the UN Commission on Sustainable Development "Water Actions and Networking Database (UN WAND)" which will transfer information on local actions to all UN Members.
- Intervention by representatives of selected Local Authorities, Parliamentarians and Major Groups.

- Adoption of the Ministerial Declaration
- Awarding of the Kyoto Water Grand Prize; and
- Closing statement.

The next World Water Forum (WWF 5) will be hosted by Turkey in 2009.

Assistance from the Jamaican Embassy

The Embassy of Jamaica in Mexico and in particular the Ambassador, Her Excellency Sheila Sealy Monteith gave tremendous assistance to the Minister and the delegation in registration, orientation and ensuring a successful forum. Mr. Basil Fernandez has, on behalf of the Delegation, sent her an official letter thanking her for her assistance and hospitality.

Conclusions

The Fourth World Water Forum hosted by Mexico over the period March 16 to 22, 2006 was well organized with intense and high quality presentations of experiences in implementing local actions in water and sanitation. There is no doubt that the Jamaican Delegation learned much and benefited from the exposure to new and recent technology, policies and strategies to improve water resources development, supply and management. The many concurrent sessions (13 at any one time) did not deter the delegation as prior to the forum a decision was made at a briefing session at the Ministry of Water and Housing as to what sessions each member of the delegation would be attending. It is highly recommended that Jamaica participates in future water fora as the information learned builds the capacity of the water sector to manage water resources, efficiently deliver water and sanitation solutions and so ensure that we meet the Millennium Development Goals (MDGs) within the UN time frame.

Status Report on Flooding Across the Island as a Result of Tropical Depression/Tropical Storm/Hurricane Wilma

Torrential rainfall associated with Tropical Depression/Tropical Storm/Hurricane Wilma affected the island of Jamaica over the period October 14-18, 2005. Several communities were affected by flooding during this period and while the floodwaters have subsided in some communities, it continues to rise and remain a hazard in others. Approximately one (1) month after the passage of Wilma, the status of flooding in the affected communities is presented herein.

Porus - Harmons, Manchester

Content/Trinity Environs

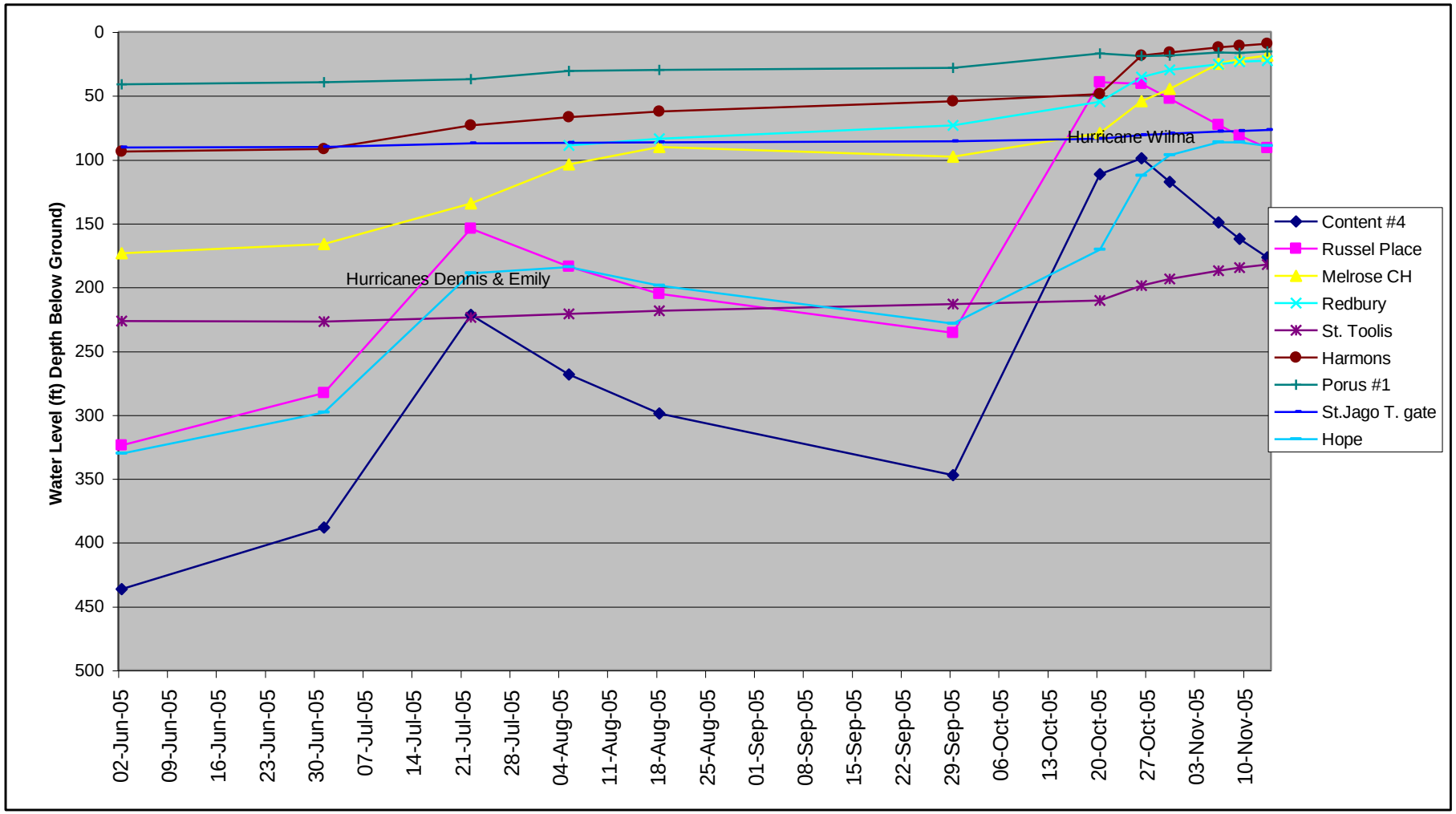
Groundwater levels as at November 13, 2005, in the Porus – Harmons environs in Manchester are presented in the Table 1 below. The data show that the water level is falling in the Content #4, Russell Place and Hope Wells but continues to rise in the other wells. This indicates that the crest of the wave, as it moves through the trough, is now passing the Melrose Bypass area and is confirmed by the upwellings now occurring along the bypass road. Upwellings and overland flow were observed along the Melrose Bypass when the area was visited on Sunday November 13, 2005.

Table 1: Groundwater Levels associated with Hurricane Wilma – Depth Below Ground

WELLS	Water Levels (m) (Last 2 Measurements)		Rise	Rate	Highest WL on record in 2002	WL @ commencement of upwellings 2002
	Date 09.11.05	Date 13.11.05	(m)	(m/d)	(m)	Date 02.07.02
Content #4	162	176.58	-14.58	-3.65	22.95	57.60
Russell Place	81.4	90.8	-9.4	-2.35	10.44	-
Melrose CH	21.52	18.66	2.86	0.72	5.22	4.94
Redberry	23.51	22.5	1.01	0.25	6.56	21.86
St. Toolies	184.6	182.25	2.35	0.59	52.90	67.19
Harmons	10.77	9.15	1.62	0.41	1.87	18.46
Porus #1	16.6	15.35	1.25	0.31	4.06	4.75
Hope	86.36	89.15	-4.44	-1.11	31.14	-

The water level will continue to rise in the Redberry community as the wave continues to move in that direction. Groundwater hydrographs for the wells from the passage of Hurricanes Denis and Emily in July 2005 to present are presented in Figure 1.

Figure 1: Groundwater Level Hydrographs in the Porus – Harmons Environs, Manchester



The upwelling in the Content Depression had stopped and the water fully receded from on or before the 6th of November 2005, however, the Melrose Depression #1 had filled up just about the same time and had started overflowing (see Photos 1 & 2). Water continues to be discharged on the surface from this depression.

Photo 1. Melrose Depression # 1

Photo 2 - Flow from Melrose # 1

Milk River Flow – Manchester
Flow in the Milk River as measured on Wednesday November 9, 2005 was approximately 9.2m3/s or 325ft3/s.

Harmons

The water levels in Harmons continue to rise. Water level measurements on the Harmons Core Hole show the water level to be increasing since Hurricanes Dennis and Emily in July 2005. The rise in the water level in Harmons between November 9 and 13 was 1.62m or 0.41m/day. Photographs of current inundations in Harmons are shown below.

Depression west of Harmons Core Hole.

Depression east of Harmons Core Hole.

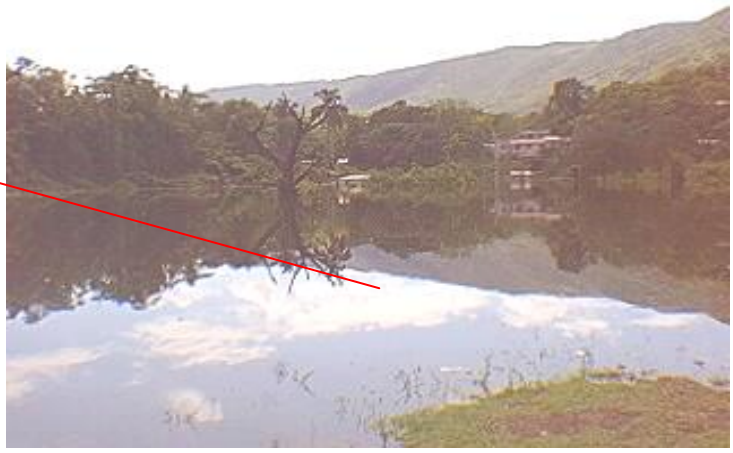
The primary depression which is located at the entrance to Harmons community is filled and spreads out through a trough, then engulfs the football field, a few houses, sections of the main road and another depression on the other side of the foot ball field.

A house and shop covered in Harmons

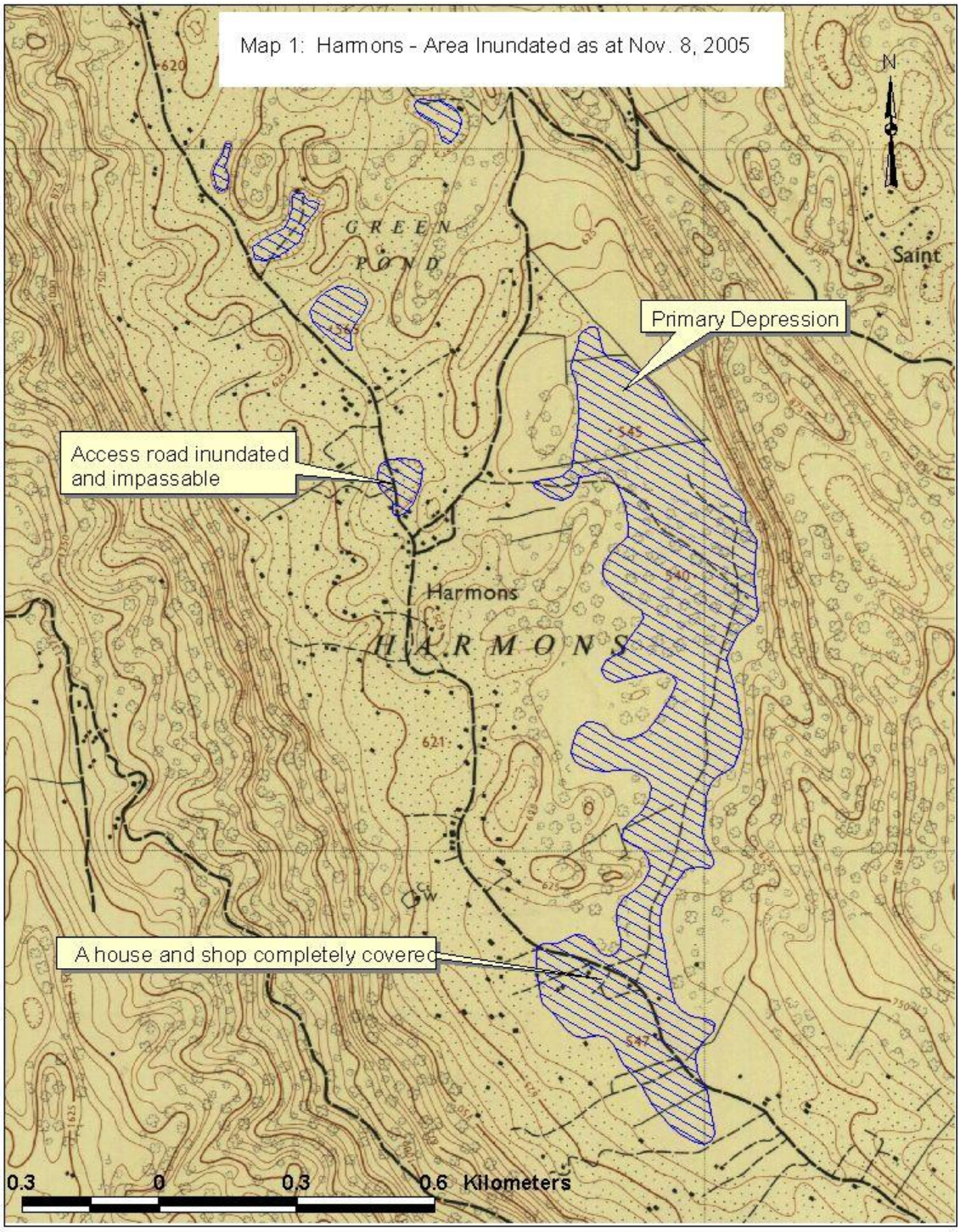
Water on football field from Harmons primary depression

.

There is also a depression 80 meters right of the district square; it too is also filled. Couple of houses & business covered



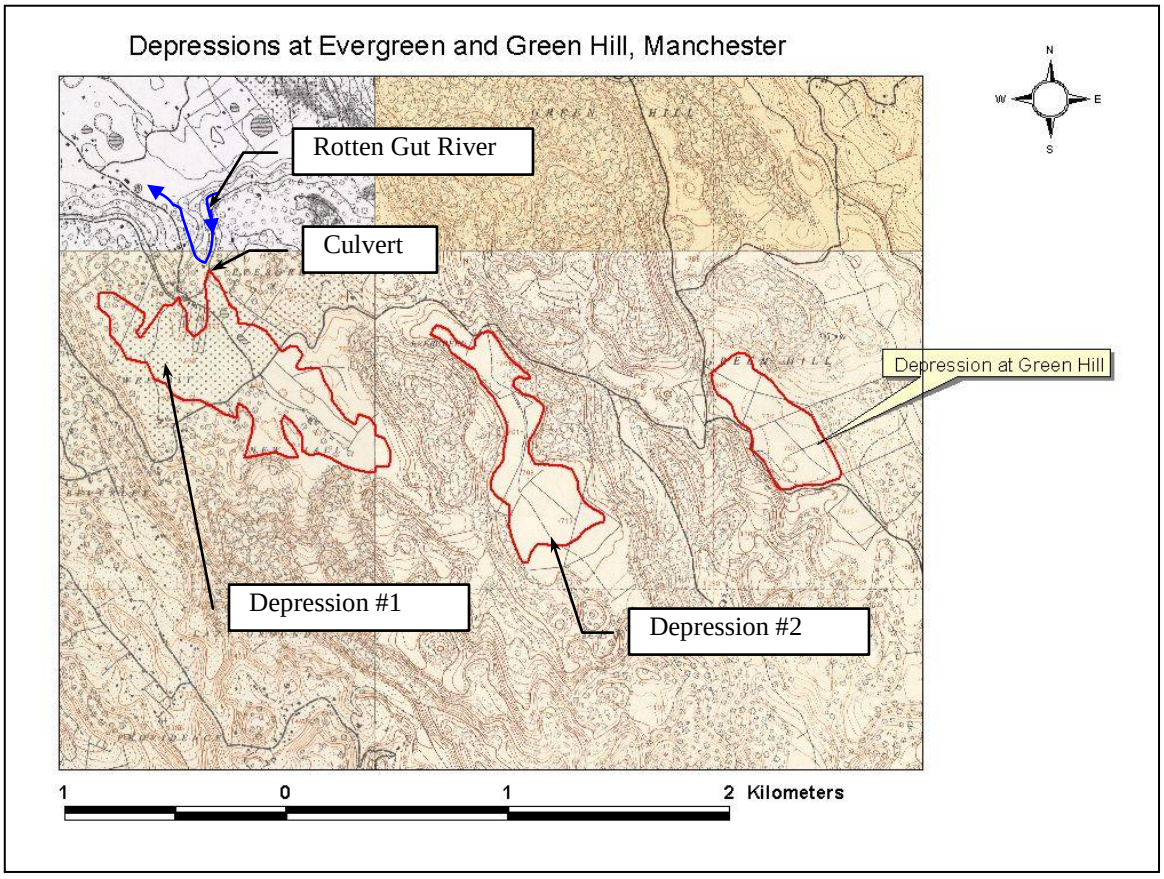
It is anticipated that when the current wave, which is due to Hurricane Wilma, reaches Harmons, flooding in that community is likely to be severely worsened. It is likely that the extent of inundation in Harmons will be greater than in 2002 and the impact more severe. Base on the time of travel of the wave from Content to Harmons in 2002 (approximately 3 months), it is expected that severe worsening of the flood extent and depth of inundation in the community is likely to occur between the middle to the end of December 2005. The necessary precautionary measures needs to be put in place to mitigate the potential impact that the rising waters could cause. Measures, such as evacuating persons from areas likely to be cutoff due to the inundation of access roads. Twice weekly monitoring of the water levels in the area continues. Map 1 shows the extent of flooding in Harmons as at November 8, 2005.


Map 1: Harmons - Area Inundated as at Nov. 8, 2005
N
GREEN
POND
Saint
Primary Depression
Access road inundated
and impassable
Harmons
HARMONS
A house and shop completely covered
0.3
0
0.3
0.6 Kilometers

Evergreen – Manchester

The WRA visited the Evergreen area on October 21, and November 9, 2005. On October 21, 2005, water had accumulated in depressions #1 and #2 as indicated in the Map 2 below. Since that time, water rose in a third depression east of Depression #2 at Green Hill and sometime between Wednesday November 9 and Monday November 14, the water flowed onto and inundate the Mile Gully to Oxford main road forcing the closer of the road by the NWA.

A culvert cut to drain water from Depression #1 into the Rotten Gut River had resulted in more than a 0.3m (1ft) drop in the water level in that depression in less than 24 hours when the area was visited on November 8, 2005. The road, nonetheless, was still inundated and impassable at the time of visit. It is likely that there has been significant reduction in the water level since the last visit on November 8.



Bliss Pasture in Wakefield, Trelawny

The Water Resources Authority carried out a field visit to the communities of Bliss Pasture and Congo in Wakefield, Trelawny on Thursday October 10, 2005 to investigate the occurrence of flooding in those communities with a view to determining the cause of the flooding.

Findings

- The high rainfall associated with Tropical Depression/Tropical Storm/Hurricane Wilma has filled the limestone aquifer within the Queen of Spain Valley in the Martha Brae Hydrologic Basin.

- Groundwater level measurements taken on three wells in the Wakefield area indicate that since the Wilma rains groundwater levels had risen between 12 and 15 metres above the pre-Wilma levels.

- Between October 27 and November 10, 2005, heavy rainfall associated with a weather system caused the groundwater levels to rise by approximately 3 metres (10ft).

- A review of the groundwater levels in the Wakefield area since January 2005 showed that the groundwater levels rose after Hurricanes Dennis and Emily in July and never returned to the pre-hurricane Dennis/Emily levels.

- The flooding in Bliss Pastures is caused primarily by water rising from the limestone aquifer and feeding the Wakefield Pond, which in turn overflows. It was estimated that the peak flow from the pond into Bliss Pastures was in the region of 16,000 to 17,000m3/day.

- By November 10, 2005, the flow into Bliss Pastures had fallen to an estimated 5,000 cubic metres per day and the water marks indicated that the flood levels had crested and the water was beginning to recede. The water level was still rising slowly in the Community of Congo on November 10.

- A contact in the Bliss Pastures community reported that the water had fallen by 3 to 4ft between November 10 and 15, 2005. This represent a rate of fall of between 0.6 and 0.8ft/day

- Another field visit is planned for Wednesday November16 to measure all the wells in the area and to determine the changes in flood levels.

St. Elizabeth

New Market

As at November 10, 2005, there was water in the main depression, however neither houses nor the road network were being affected. There was free movement of traffic in and out of the community.

Great Bay - Calabash Bay.

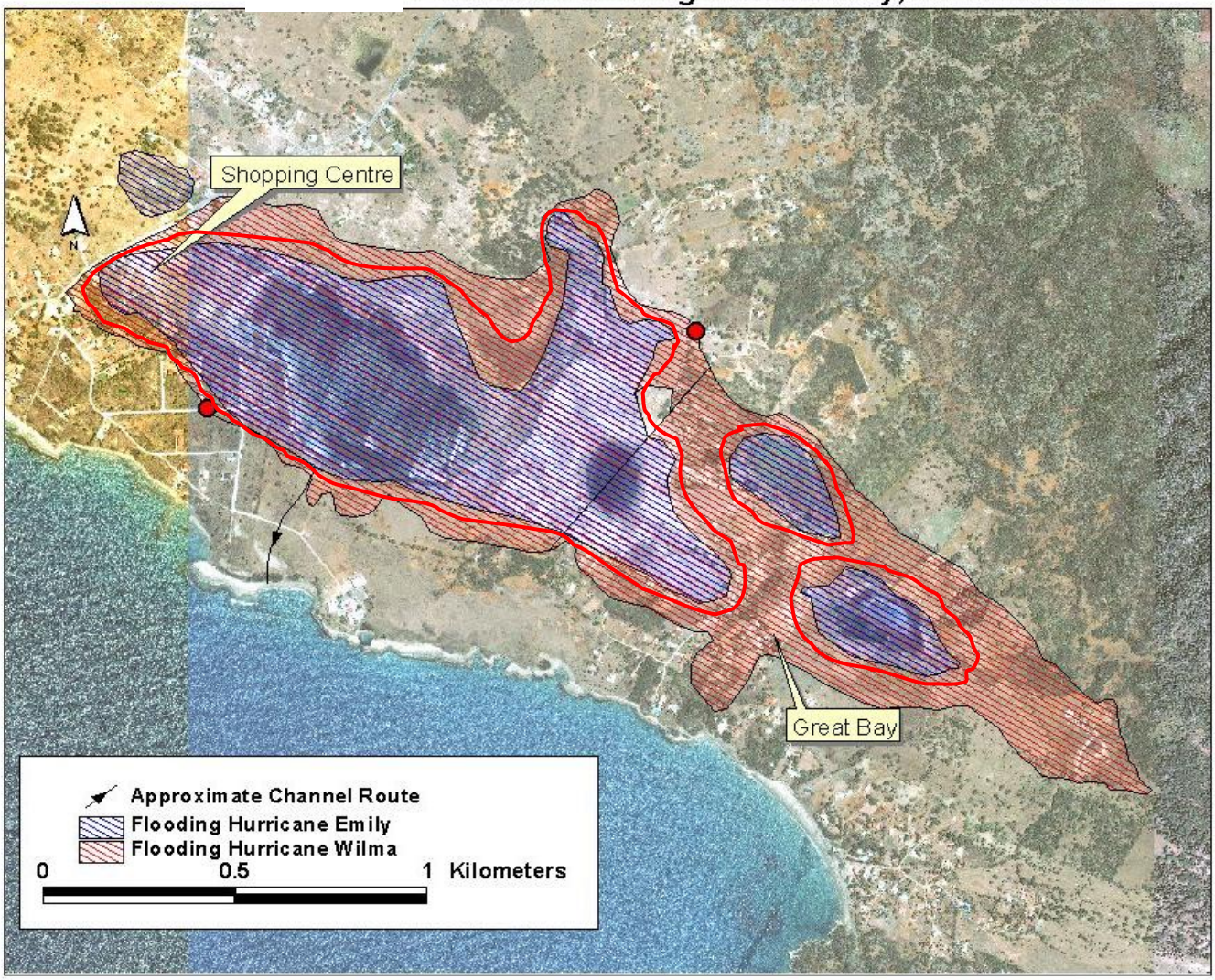
As at November 10, 2005, sections of the Great Bay and Calabash Bay areas were still being affected by the floodwaters as well as silt that have been deposited in the community. The Great Bay area appears to be the more severely affected at this time based on the number of houses that are still affected. Approximately twenty (20) houses in the Great Bay community were still affected in some way by the floodwaters. Most of these houses were surrounded by the floodwaters or had water on their lower floors.

The Great Bay Road, which was impassable after the Great Pedro Pond overtopped and merged with smaller ponds east of the road, is now accessible by vehicular traffic despite water being present in the road. The Great Pedro Ponds are no longer connected to the smaller ponds east of the road as indicated in Map 2.

At least 2 homes in the Calabash Bay region had water as high as the windows while another 4 had water in the houses at a lower level. A shopping plaza in this area was still badly affected, as there was water in and around most of the shops.

Two pumps were being used at the time of visit to pump water from the depression. The rate at which these pumps were being operated is not known. These pumps had been in service since Sunday November 06, 2005 according to a resident from the community. It was reported that since the pumping began November 6, the water level had fallen by approximately 0.61m (2ft) as at November 10, 2005. The extent of flooding in Great Bay is presented in Map 2. The flood level as at November 10, 2005 is illustrated by the red line.

MAP 2: Extent of Flooding at Great Bay, St. Elizabeth



St. Ann

Pedro River

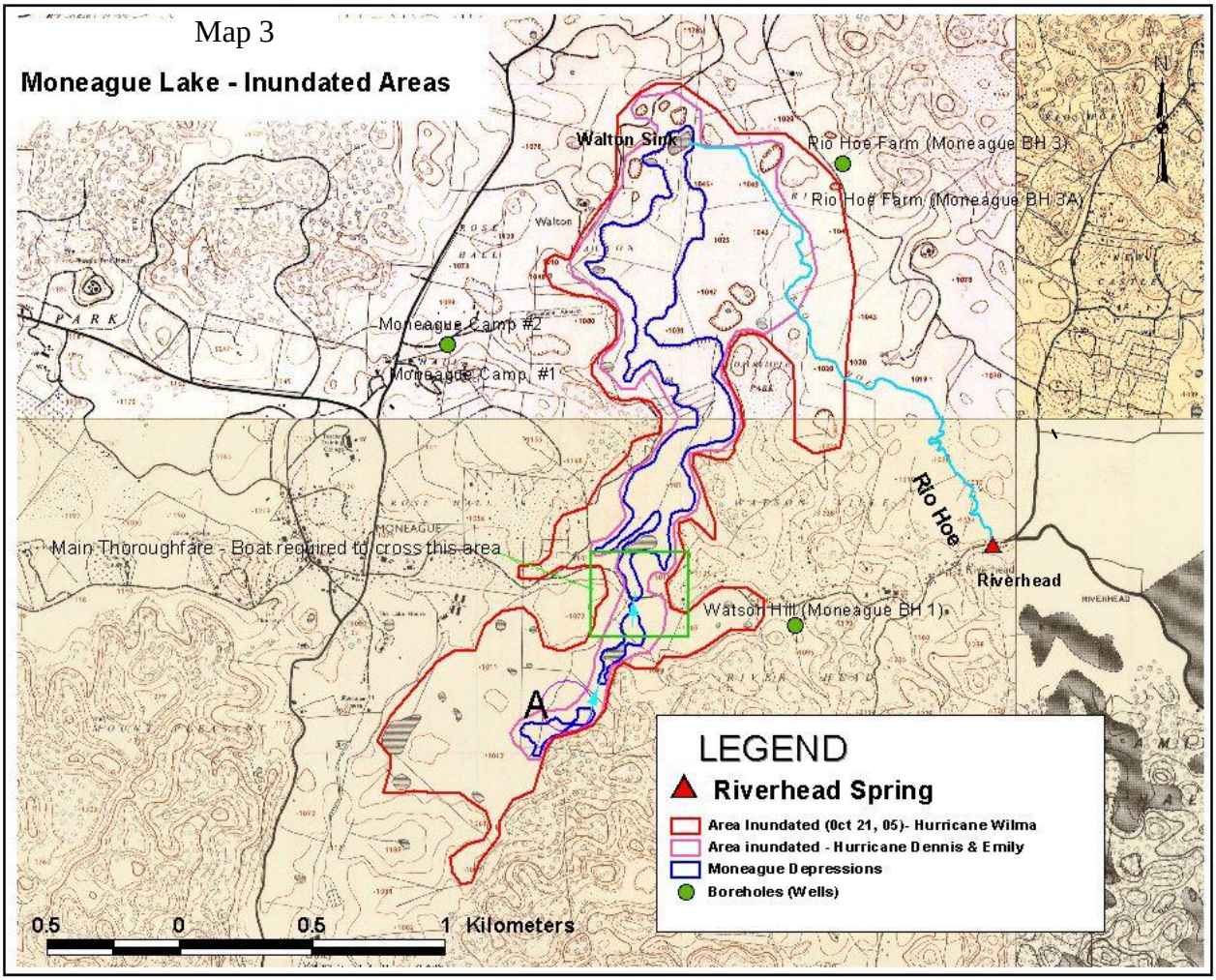
The water level in the Pedro River community has receded from the access roads as well as from the monitoring gauges that forms part of the Pedro River Flood Warning System. Water, nonetheless, remains in the depressions and is expected to continue to recede barring any significant and prolonged rainfall.

Moneague

The Moneague Lake continues to rise. The lake rose by approximately 0.2m between November 10 and 16, 2005 at a rate of 0.03m/day. The water surface elevation of the lake now stands at between 310 to 320m a.m.s.l. Because the water is still rising, a precise time for the water to fully recede cannot be forecasted at this time. This will be done when the crest water level is determined.

Boats are currently being used to access the communities cut-off by the floodwaters. The Map 3 below shows the areal extent of inundation in the area when compared to Hurricanes Dennis and Emily in July 2005. The changes in the areal extent of inundation due to the 0.3m rise did not show any significant difference due to the scale of the map.

As the water continues to rise, any significant rainfall in the area, before the current levels have significantly reduced, that is to say to pre – Hurricanes Dennis and Emily levels where the water level was below the road surface, will cause the lake to rise further and at a faster rate.

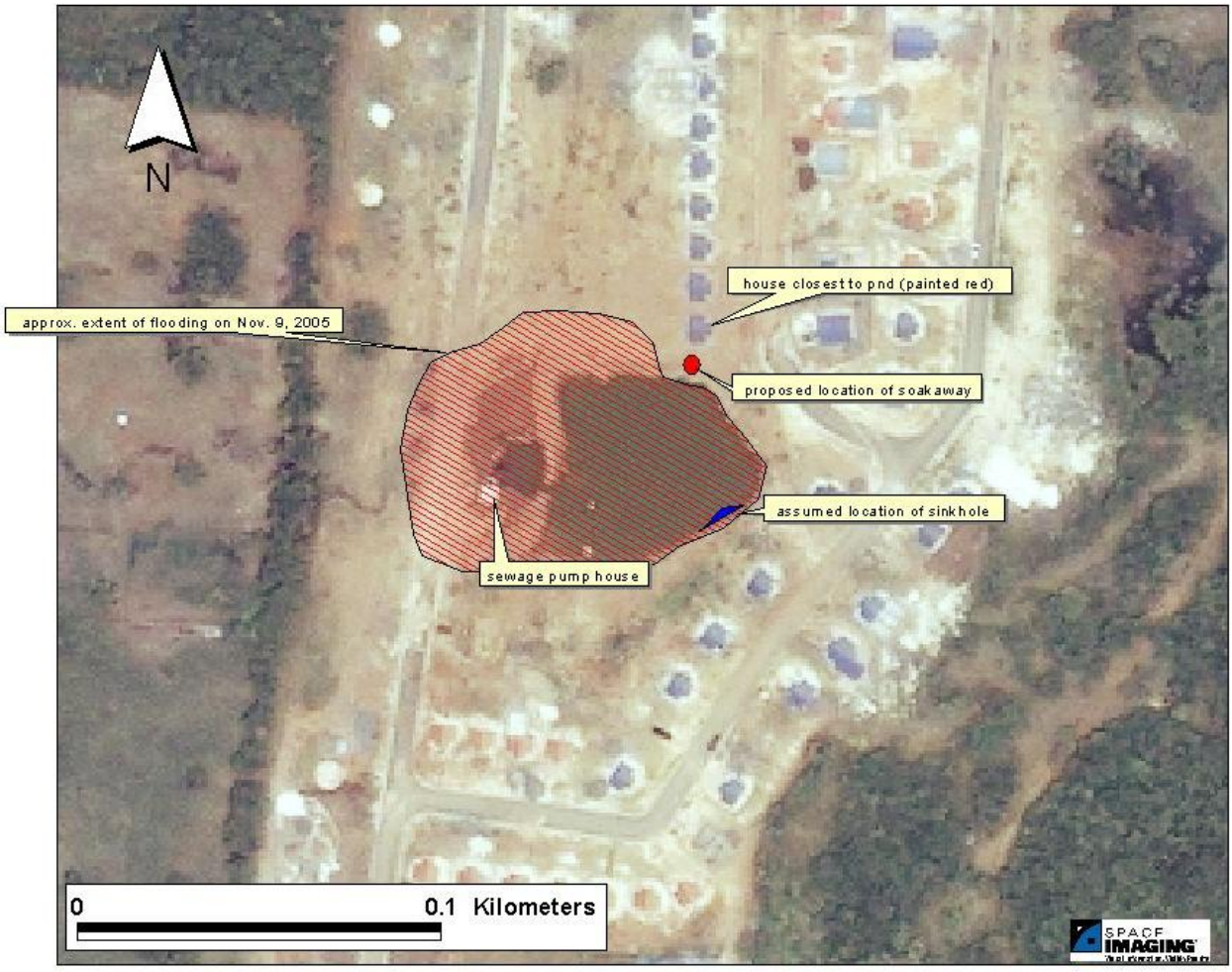


NB: Areal inundation due to Hurricane Wilma is preliminary, as only a small area was mapped using GPS technology. The other areas were estimated using the contour lines.

Kennedy Grove – Clarendon

This update on flooding in the Kennedy Grove community is based on a site visit on November 9, 2005. The water level had receded by approximately 1m between November 1 and 9, 2005. This represents a rate of fall of approximately 0.1m/day (4in/day). The house located closest to the pond (painted dark red) is now freely accessible but the road along the western section of the scheme is still under water by an estimated 1.5 m (Map 4).

Kennedy Grove Scheme, Clarendon
Proposed Location of Soakaway



ADMINISTRATION AND HUMAN RESOURCE DEVELOPMENT

On 31st March 2006 there were forty-nine (49) members on the Water Resources Authority's Staff. One person resigned and two were recruited.

Resignation

Miss Sharon Wood, Hydrogeologist and head of the Permits and Licences Unit resigned effective 26 April 2005. She has migrated to Canada.

Recruitment

The following persons were recruited to fill vacant positions within the technical units of the organization.

- Miss Shonel Dwyer as a Hydrogeologist in the Planning and Investigation Unit with effect 01 April 2005
- Mr Orayne James as a Technical Assistant in the Data Unit with effect from 01 November 2005

Change in Responsibility

Mrs Natalie Ferguson, Hydrogeologist, was appointed Head of the Permits and Licences Unit and Technical Advisor to the Board with effect from 01 April 2005. Mrs Ferguson replaced Miss Sharon Wood.

Seminar/Training/Workshop

Mr Lawrence Barrett, Engineer/Hydrologist, attended

UN/Austria/ESA Symposium – "SPACE SYSTEMS: PROTECTING AND RESTORING WATER RESOURCES" – Graz, Austria – 13-16 September 2005.

Mr Kevin Chambers, Technical Assistant, successfully completed

The Junior Technicians Hydrology Course at the Caribbean Institute of Meteorology and Hydrology (CIMH), Barbados – 2 September 2005 to 24 February 2006.

Mr Basil Fernandez, Managing Director, attended

The International Symposium on "Water Resource Management in Transboundary River Basins" and "Meeting of the IWRN Focal Points for Latin America and the Caribbean", Lima, Peru – 16-20 May 2005.

The National Conference on Environment Sustainable Development - "The Myths and Realities" – 15-17 June 2005.

The Foundation Self-Discovery Workshop – "Leading From Above the Line" at The Forum Management Institute for National Development (MIND) – 15-17 September 2005.

Miss Angella Graham, Hydrogeologist, attended

The Regional Workshop "To Develop a Strategy for Rainwater Harvesting in the Caribbean", Tortola, British Virgin Islands – 28-29 March 2006.

Mr Andreas Haiduk, Water Resources Engineer, attended

"Vulnerability Capacity Assessment Workshop", St. Lucia – 10-11 October 2005.

The Third International Conference in "Early Warning", Bonn/Germany – 27-29 March 2006.

Miss Anika Sutherland, Assistant Hydrologist, attended

"Technical Exchange for Technology Transfer and Calibration of Models", San Antonio, Texas – 15-28 May 2005.

Mr Herbert Thomas, Director Resource Management, attended

International Workshop on "Flash Flood Forecasting", San José, Costa Rica – 13-17 March 2006.

Mr Bernard Williams, Systems Manager, attended

Workshop in "Arc IMS and the Establishment of Geo Servers" Panama City, Panama – 12-17 March 2006.

COMPUTER AND GIS UNIT

During the period under review the GIS/Computer unit achieved the following:

Water Resources Authority Management Information System (WRAMIS)

- Further enhancement to the capabilities of the WRAMIS in particular the management tools and Dataset:-
    - Improved the printing capability with the procurement of a heavy duty high capacity printer. HP Colour Laser Printer Model 5550DTN.
    - Procured main network computer server with faster speed and larger storage capacity
    - Procured 12 new computers with Windows XP operating system, with ultra-sharp imaging flat screen (21-Inch) and design to save on desk space.
    - Upgrade the three network hubs with high performance switches
    - Signed contract to upgrade the WRA website.
    - Purchased replacement parts which include monitors, processors, hard drives, keyboards and mouse
- For period under review the WRA Local Area Network (LAN) ran for 365 days and was up in excess of 97% of the time.

Challenges

A shortage of personnel in the Computer Unit contributes to some project deadlines not being met.

Training

One staff member was approved to receive computer training online for Microsoft Office Certification.

Meetings and Seminars

- The Systems Manager represented the Authority at the monthly LICJ meetings.
- The Systems Manager represented the Authority at the CITO Summit at the Jamaica Pegasus Hotel.

Provided Technical Support for Capital Projects

Technical support in the form of GIS, Cartographic and System Support was provided for the following in house projects.

- Provide GIS support for IDB/GOJ Water Resources Development Master Plan – Editing of maps
- Produce hydrologic maps for several water resources assessment projects
- Provide support to Flood Early Warning/Alert System

Assistance to External Agencies

The unit assisted several agencies, both public and private, through the provision of large scale map scanning, GIS and cartographic services. These include:

- National Environment and Planning Agency
- Planning Institute of Jamaica
- National Water Commission
- National Irrigation Commission
- Urban Development commission
- Mines & Geology Division
- Jamaica Bauxite Institute
- University of The West Indies
- University of Technology

In providing assistance to tertiary students and other external agencies the unit scanned over 150 maps, drawings and photographs.

The unit participated in GIS Day activities, November 2005 hosted by the Land Information Council of Jamaica (LICJ).

Projections (April 1, 2006 – March 31, 2007)

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

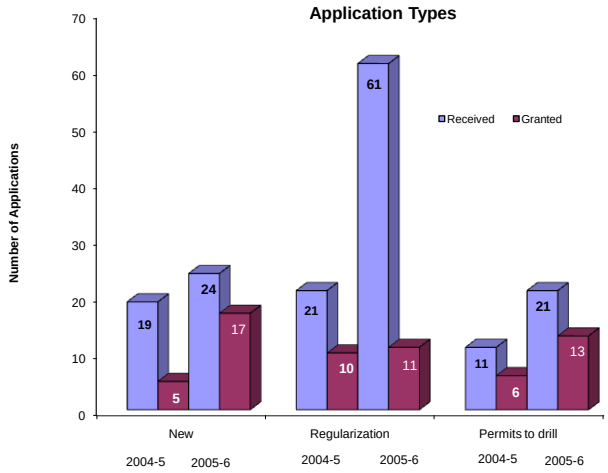
- Further enhancement the capabilities of the WRAMIS.
- Launching of new website.
- Acquisition of additional network storage
- Acquisition of updates to the IKONOS satellite images
- Facilitation of greater use of GIS processes and tools in Water Resources Management by technical staff.
- Acquisition of updates to existing software to improve data analysis
- Provision of on-going GIS and Computer training to technical and professional staff
- Acquisition of GIS and Image Processing software modules for WRA digital dataset
- Acquisition of more GIS Tools to improve the productivity of the technical and professional staff.

PERMITS AND LICENCES UNIT

The Permits and Licences Unit continues to play a vital role in the management of the islands water resources through the processing of applications for permits to drill wells and licences to abstract and use water.

There has been an increase in the number of applications received during this financial year compared to the previous year as seen below. The high percentage (74%) of applications submitted for regularization of sources underlines the Authority's thrust towards having all abstractors (both government and private) operating in compliance with the Water Resources Act (1995).

Of the eighty-five [85] applications received in 2005-2006 only to abstract and use water, twenty-one [61] were for the regularization of existing sources; twenty-three [23] of which were received from the New Yarmouth Estates in Clarendon and seventeen (17) were received from the National Water Commission for a number of major surface and ground water systems islandwide.



A number of core functions have continued despite the shortage of staff for the Unit. The databases containing the well records, abstraction records and licence allocation register have been 100 % updated. Letters stating that licences have expired were sent out for delinquent abstractors in Hanover, Kingston and Manchester. Letters were sent to abstractors in Clarendon, Kingston, Portland, Manchester and Hanover for outstanding abstraction data.

The Unit continued to provide advice on, and conduct monitoring of, well drilling activities and yield testing of seven [7] wells for the public sector, as well as conduct technical investigations for private and governmental organizations.

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 twelve (12) wells were logged, which is less than the number logged in the previous year. The unit logged nine (9) wells for the National Water Commission amounting to 676.8metres. The deepest well logged was 223metres located at Little Park, St Elizabeth (Black River basin) while the shallowest well logged was 11metres located at Low Ground, Clarendon (Rio Minho Basin). The logging of these twelve (12) wells earned J$0.76 million to date, with J$0.46 million in outstanding payments.

The execution of the abovementioned tasks will continue into the next year.

DATA COLLECTION & RESOURCE MANAGEMENT UNIT

The objective of the Data and Resource Management Unit 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 flood disasters and droughts.

The primary responsibilities of the Unit are as follows:

1. To collect, analyze, compile, store and disseminate hydrological data
2. To monitor the status of the island's surface and groundwater resources
3. To update and maintain an accurate and reliable hydrological database
4. To maintain the national hydrometric network
5. To monitor and report on extreme hydrological events such as floods and droughts

The Unit was involved in the following activities during the financial year 2005/2006:

- The Routine monitoring of surface and groundwater under normal and extreme conditions
- The Maintenance, rehabilitation, upgrade and expansion of the national hydrometric network
- Improved licensing and control of water resources
- Response to requests for data and technical assistance
- Response to requests for technical training and educational support
- Strengthening technical capabilities through subject-specific training
- Participation in local/international seminars/workshops/conferences
- Celebration of special water/environment days
- Rio Minho River Floodplain Mapping and Flood Warning Projects.
- Update of the Water Resources Development Master Plan.

Routine Monitoring of Surface and Ground Water under Normal and Extreme Conditions

The WRA, through its Data and Resource Management Unit, monitors the island's surface and groundwater resources with monthly visits to each monitoring point (stream gauging stations and monitoring wells) under both normal and extreme hydrological conditions. During extreme hydrological conditions, temporary monitoring points may be introduced and the frequency of monitoring may be increased at existing or permanent monitoring points to capture data for the analysis of the hydrological event and to advise the government and the general public as to the status of the event.

In addition to the monitoring of the surface and ground water resources, the WRA monitors nine (9) rainfall stations and seven (7) Flood Warning Systems across the island. The Rio Minho Flood Warning System in Southern Clarendon was established in 2005 under the UNDP funded project entitled "UNDP/GOJ Community-Based Disaster Management Project JAM/01/002". Plate 1 shows the newly installed flood gauge on one of the piers of the Railway Bridge at May Pen which is used to monitor water levels at May Pen and initiate flood warning, when critical levels (indicated by the different colours) are met, to communities such as Lionel Town and Portland Cottage etc. in the flat Southern Clarendon Plains.

Plate 1: Flood Gauge at May Pen Railway Bridge (part of Rio Minho Flood Warning System)

Three teams comprising 13 technicians carried out routine monitoring activities across the island. Monitoring activities are organized into three monitoring areas as shown in Table (a). The teams were assisted by fifty one (51) local observers, in relation to surface water monitoring (collection of stream flow data), 3 of who were employed specifically to assist with monitoring floods associated with Hurricane Wilma and other weather systems that impacted the island in 2005.

Table (a)
Monitoring Areas and Hydrometric Network

Monitoring Areas	Parishes	Stream Flow Gauging Stations (+ Spot Measurements)	Groundwater Monitoring Wells	Rainfall Gauges	Flood Warning Systems
Area 1	St. Catherine, Clarendon, St. Ann Manchester	32(+12)	136	4	2
Area 2	St. Elizabeth, Westmoreland, Hanover, St. James, Trelawny	31 (+1)	82	Nil	1
Area 3	St. Thomas, St. Ann, Kingston & St. Andrew, St. Mary, Portland	25 (23)	56	5	4
	JAMAICA	88 (+36)	274	9	7

The year 2005 was characterized by an unprecedented hurricane season, in terms of the number of named systems, whereby three hurricanes (Dennis, Emily and Wilma) and other unnamed weather systems resulted in the flooding of a number of communities by virtue of the heavy rainfall. Some of the most severely impacted communities were Moneague and Clapham (from the rising of the Moneague Lake and Lake Tadmore) and Pedro River in St. Ann; Bliss Pastures and Congo Town in Wakefield, Trelawny; Coral Gardens and Montego Bay in St. James; Great Bay, Treasure Beach, New Market and New River in St. Elizabeth; Harmons, Green Hill, and Evergreen in Manchester; Big Pond in St. Catherine and Kennedy Grove, Nightingale Grove and Portland Cottage in Clarendon. Plates 2 – 4 capture some of the activities of the Unit during the financial year.

Photographs of Floods/Activities in some communities

Plate 2: WRA officers collecting flood data on the Rio Cobre at Bog Walk and Rio Minho at May Pen

Plate 3: Flooding in Bliss Pastures and Congo Town in Wakefield, Trelawny

Plate 4: WRA receiving assistance from two residents of the Moneague community to install flood gauge in the Moneague Lake

This period was very challenging for the WRA as it sought to maintain its routine monitoring programme while at the same time monitoring the multitude of flooded communities to ensure that all the areas were adequately covered and that the information was disseminated

in a timely and coherent manner to the affected communities, relevant government agencies and other interested parties. Although the year was a very challenging one for the Unit and the WRA generally, in relation to the extreme hydrological conditions, a satisfactory level of output, in respect of surface and ground water monitoring, was achieved. The Unit was able to complete 74% of its monthly surface water (streamflow) measurements and 78% of its monthly groundwater measurements. These figures represented marked increases over measurements in the 2004/2005 when monthly monitoring activities was curtailed to once every two months due to government budgetary constraints. Monthly monitoring of surface and ground water restarted in May 2005. Notwithstanding, the performance target of 85%, set at 10 percentage points above the perennial target of 75%, was not achieved. This was due to several factors such as insufficient time to complete field measurements due to increase workload emanating from flooding associated with weather systems, blocked roads, etc. Table (b) shows the performance of the Unit in the collection, analysis and compilation of hydrological data in the 2005/2006 financial year.

Table (b)
Unit's performance in the collection of hydrological data

Activity	Performance Standard	Area 1	Area 2	Area 3	Data Unit
Stream flows					
Monthly flow measurements	85% completion	95%	84%	63%	78%
Medium/high flow measurements		0	0	0	0
Gauge height of zero flow	3 per unstable control/year	0%	0%	0%	0%
Gauge height reviews	3 per manual gauge/year	33%	67%	100%	67%
Gauge height charts and cards	85% completion	28%	38%	42%	37%
Annual pages	85% completion	53%	47%	53%	51%
Computerization		92%	98%	83%	81%
Groundwater levels					
Monthly water level measurements	85% completion	75%	83%	67%	76%
Water level folders	85% completion	100%	100%	100%	100%
Computerization		81%	83%	67%	78%

The Rio Cobre Flood Warning System was very active during the 2005/2006 financial year. Between July and November 2005, there were 10 occasions whereby warnings of potential flooding of the Bog Walk Gorge had to be issued to the Office of Disaster Preparedness and

Emergency Management (ODPEM). Of the 10 warnings issued, the gorge was closed 8 times due to flooding. Damage to the infrastructure of the flood warning system during this time was minimal. The system was down for two days on June 12 and 13, 2005 due to suspected power failure and/or lightening strike at one of the repeater stations. Generally, the flood warning system performed satisfactorily except on occasions when rainfall reports were not transmitted from some of the rainfall gauges and sometimes larger than expected differences in gauge height readings by the observer compared to that transmitted by the flood warning system.

The equipment that are currently being used in the Rio Cobre Flood Warning System are old, outdated and is no longer supported by the company, as new and more advanced technology have been developed. The system therefore needs to be upgraded and this will be pursued in the 2006/2007 financial year given the importance of this system to the protection of life and property of users of the Bog Walk Gorge. Daily rainfall totals were forwarded to CVM TV for broadcast on 359 days.

One of the rain gauge forming part of the Rio Grande Flood Warning System was affected by downtime for the latter half of the year while the logger on the Annotto River in Boundbrook has not been monitored as the access road was destroyed by floodwaters in 2005. There were no major problems with the other Flood Warning Systems at Cave River and Pedro River in St. Ann and Annotto Bay in St. Mary.

One technician was employed to the Unit and another was granted study leave, on a part-time basis, to read for a Bachelor of Science Degree (BSc.) in Urban and Regional Planning at the University of Technology (UTECH). In the last quarter of the financial year, one technician, who was on training at the Caribbean Institute for Meteorology and Hydrology (CIMH), returned to the Unit having successfully completed the course.

Requests for data and technical assistance

The unit received and responded to more than 33 requests for data, information, and technical assistance. Details of the some of the requests are presented in Table (c).

Table (c)
Requests for data, information and technical assistance

Organization	Type of request	Description of work
Shari Logan – student UWI	Data/information	Permeability of soil type and water table in Irish Town
Geneva Hibbert/Owen Crooks – MWH/JRC	Data/Information	Hydrologic & other data at Medium and Large bridges along railway line (Clarification on data request sought)
NEPA	Data/Information	Water supply in the Great River Watershed
Gregory Bellamy – GM & Associates	Data/Information	Well location, water table, flow direction in Mona & Bushy Park
NEPA	Data/Information	Water supply in the Great River Watershed
G.M. & Associates	Data/Information	Well location, water table, flow direction - Mona & Bushy Park
NWA	Data/Information	Stream flow data on major rivers with emphasis on major events such as hurricanes
Deluxe Construction	Data/Information	Well location, water table, flow direction - Coconut Grove, Ocho Rios
NEPA	Data/Information	Stream flow data on the Rio Cobre for last 10yrs
Holy Childhood High School	Technical Assistance	Trip to Harmons with students
Historical Society	Technical assistance	Trip to Yallahs
NEPA	Data/Information	Location and production rate of wells in the Great River Watershed and the communities that these wells supply
St. Andrew High School	Data/Information	Groundwater data and flooding in Harmons, Manchester
Fluid Systems Engineering Ltd	Data/Information	Rainfall data in the Hope River Watershed over the period September to November 2005
Radio 94 FM	Data/Information	Information on flooding in Bliss Pastures and Congo Town in Wakefield Trelawny
Power 106 FM	Data/Information	Information on upwellings in Content/Porus environs
CVM TV	Data/Information	Flooding in Harmons
TVJ	Data/Information	Flooding in Harmons
Jamaica Observer	Data/Information	Information on flooding in communities across the island
Irie FM	Data/Information	Information on water affecting Ocho Rios - Confirmed NWC main
Sunday Herald	Data/Information	Information on rising water levels in the Moneague Lake

Manchester PC	Data/Information	Technical information on flooding in Harmons
MLE/JIE	Data/Information	Floodplain Maps
Jamaica Small Hydro Systems	Data/Information	Flow data and duration curve for Gauge station #07FB003 "Mayfield River @ Flower Hill" 1994-2003
Reading Citizens Association	Technical Assistance	Investigate flooding @ Reading Spring in St. James
Westwood High School	Data/Information	information on springs arising in Coral Gardens for SBA
Oberlin High School	Data/Information	Information on how streamflow measurements are carried out
Camperdown High School	Data/Information	location, source, water quality, depth, width, velocity etc. of the Rio Cobre.
Mathew Evans	Data/Information	Data on flooding in Moneague and Coral Gardens
Queens High School	Data/Information	Information on the rising of the Moneague Lake
Moneague Primary & Junior High	Data/Information	Data on the rising of the Moneague Lake
Highway 2000	Data/Information	Hydrologic data in the Rio Cobre Basin

Rehabilitation, upgrade and expansion of the national hydrometric network

The rehabilitation and expansion of the national hydrometric network did not receive funding under the Capital Budget in 2005/2006 however minor maintenance and repair works were done on fifteen (15) stream gauging stations from the recurrent budget and drought funds including the relocation of 2 stream gauging stations.

Publication of hydrological yearbooks

Progress on the 1999 hydrological yearbook in the past financial year was limited by staff availability and a focus on higher priority tasks.

Investigation of long-term trends in hydrological data

Progress on the Investigation of Long-Term Trends in Hydrological Data during the past financial year was also limited by staff availability and a focus on higher priority tasks.

Requests for technical training and educational support

Table (d) lists the requests for technical training and educational support responded to by the Unit in 2005/2006.

Table (d)
Requests for technical training and educational support

Organization	Nature of request	Description of work
Bridgeport Primary school	Educational Support	Presentation on water resources to students
Holy Childhood High School	Educational Support	Guided tour of flooding in Harmons, Manchester to students
Liguanea Preparatory School	Educational Support	Guided tour of the Yallahs River Valley to students
University of the West Indies (UWI)	Educational Support	Guided tour of flooding in Moneague, St. Ann to students
Oberlin High School	Educational Support	Trip to Wagwater River; demonstration of flow measurements; Importance of river and watershed explained.
Queens High School	Educational Support	Presentation on the rising of the Moneague Lake to students

Strengthen technical capabilities through subject-specific training

One technician successfully completed the six-months "General Technician's Course in Hydrology and Meteorology" at the Caribbean Institute for Meteorology and Hydrology (CIMH) in Barbados. The technician's participation was made possible through sponsorship from the World Meteorological Organization (WMO).

Participation in local/international seminars/workshops/conferences

Officers from the unit participated in both local and international seminars as follows:

- One officer participated in the "UN/Austria/ESA (European Space Agency) Symposium on Space Systems – Protecting & Restoring Water Resources" which was held in Austria. The officer's participation was funded by the United Nations (UN).

- One participated in the Caribbean Natural Resources Institute's (CANARI) Water Sector Forum under the "Who Pays for Water Project" workshop held in Jamaica.

PLANNING AND INVESTIGATION UNIT

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;

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

Capital Projects

The Capital projects that the unit was involved in 2005- 2006 were;

- Update of the Water Resources Development Master Plan
- Aquifer Vulnerability Mapping (Island Hydrostratigraphic mapping).
- Evaluation of Saltwater Intrusion into Coastal Karstic Aquifers on Caribbean Islands.
- Characterization of Groundwater in the Vicinity of Bauxite/Alumina Plants for the Optimal Use of Water Resources

Update of the Water Resources Development Master Plan

Brace Centre for Water Resources Management was awarded the contract to update the Water Resources Master Plan. The project is slated to last for 24 months. During the period under review a stakeholder's workshop was held on December 8, 2005, which presented the second draft of the Water Resources Development Master Plan. The workshop featured presentations by the consultants and break out groups and group discussion of the document. The comments and recommendations from the workshop were submitted to the Consultants.

Aquifer Vulnerability Mapping (Island Hydrostratigraphic mapping).

The Aquifer Vulnerability mapping for the island has been put on hold and no additional work has been done during the period under review. Twelve (12) map sheets of the island hydrostratigraphy at a scale of 1:50,000 have been completed to date.

Evaluation of Saltwater Intrusion into Coastal Karstic Aquifers on Caribbean Islands.

The Evaluation of saltwater intrusion into coastal karstic aquifers is a regional project, which seeks to model the situation that exists in the limestone aquifers in Jamaica, Antigua and Barbados. Based on this modelling exercise a management plan with operational strategies to contain and reduce the problem of salt-water intrusion in these aquifers is to be developed. A critical part of the project is technology transfer and training. One participant from each country is to read for a postgraduate degree using data generated from the project as the basis for the thesis. In the case of Jamaica one member of the WRA staff will read for the MPhil degree. The member of staff assigned to the project was registered at UWI for the academic year 2005-2006 for the MPhil programme. Five (5) chapters of the Thesis have been submitted and have been reviewed. The completion of the MPhil degree has been delayed by the fact the MPHIL supervisor had resigned from UWI and to date they have not identified a suitable person with experience in hydrogeology to take over supervision of the research student.

The WRA hosted a workshop on Saltwater Intrusion Monitoring from April 14-15, 2005. This workshop was organized by CEHI (Caribbean Environmental Health Institute) and the programme included lectures on saltwater intrusion monitoring and field demonstration. Eight (8) persons from the staff at WRA attended the workshop. This training proved to be beneficial to the staff members who were trained in the theoretical and practical applications of saltwater intrusion monitoring. A country report on the occurrence of saltwater intrusion and saltwater intrusion monitoring in Jamaica was generated by CEHI. This report was submitted to the members of the Saltwater Project Team.

The WRA staff assigned to the project participated in several training courses such as:

- Technical exchange programme at SWRI, Texas from April 25- May 9th 2005 where the preliminary data interpretation report on the geophysical survey conducted in Jamaica was collated and analysed.

Saltwater Intrusion Monitoring Workshop (April 14-15, 2005)

Water Quality Monitoring at Innswood Corehole #7

Lecturers and Participants of the Workshop

The project officially ended on June 30, 2005. A country report detailing the data collected at the pilot site has been completed and was reviewed by the OAS Project evaluator.

Characterization of Groundwater in the Vicinity of Bauxite/Alumina Plants for the Optimal Use of Water Resources

"The Characterization of Groundwater in the Vicinity of Bauxite/Alumina Plants for the Optimal Use of Water Resources" is a collaborative Government of Jamaica (GOJ) and International Atomic Energy Agency (IAEA) approved project that seeks to characterize the source of contamination in the groundwater using isotope hydrology. The use of isotopes will facilitate the understanding of the hydrodynamics of the aquifer system and determination of salinity from various sources.

Water quality samples collected from the pilot sites at JAMALCO-Halse Hall, Clarendon and Essex Valley – St. Elizabeth were analysed at the IAEA's Laboratory in Austria, where they went underwent chemical and isotopic analyses. Preliminary analysis of the first sampling exercise conducted at Essex Valley- St.Elizabeth is 95% completed and that for JAMALCO is 80% completed.

The IAEA's Country Officer Mr. Chao visited the WRA on August 31, 2005 and a meeting was held with him, the members of the WRA's project team and a representative of the Planning Institute of Jamaica (PIOJ) – the Executing Agency. The WRA requested an extension of this project which was scheduled to be completed in 2005 and an extension of one (1) year was granted.

The IAEA provided technical assistance to the WRA by procuring the services of a consultant (Dr. Michael Focazio) from the United States Geological Survey (USGS) who visited Jamaica from November 13-17, 2005. During his visit meeting was held with the key participants of the project which includes WRA staff and Alumina Partners of Jamaica (ALPART). The water quality results from the two (2) pilot sites were reviewed and the WRA is awaiting the result of the further interpretation and analyses of the isotope and water quality data from the consultant.

The completion of this project has been delayed by several problems that are independent of the operations of the WRA. Some of these are 1) delay in receipt of equipment for fieldwork from UNDP, 2) the active Hurricane Season which has resulted in the delay in the execution of the first and second sampling programmes and 3) the non-receipt of the report from the USGS consultant.

Hydrological Assessments

The unit conducted several 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. Over the year a total of 39 such assessments were conducted.

Technical Assistance/ Technical Support

The Unit offered Technical assistance/ Technical Support to several government agencies and private sector agency in support of national development. Some of the investigations required a long-term support from the WRA staff.

During the passage of Hurricanes Dennis and Emily the unit also assisted in the monitoring and assessment of flooded areas.

Technical Assistance 2005/2006

Organization	Nature of Task/Request	Description of Task/Request
CECL	Technical Assistance	Hydrological evaluation of water sources at Lucky Valley- St. Catherine
NWC	Technical Assistance	Completion report on the well at Granville- St. James
Ministry of Health	Technical Assistance	Investigate upwelling of water at Spaulding - Manchester
St. Ann Parish Council	Technical Assistance	Assessment of a spring at Free Hill- Bamboo, St. Ann
NWC	Technical Assistance	Well Site Investigation Agualta Vale- St. Mary
NWC	Technical Assistance	Provide data on the Low Ground Wells - Clarendon
NWC	Technical Assistance	Proposal for water resources assessment at Mines- St. Ann and Sherwood Content- Trelawny.
NWC	Technical Assistance	Supervision of well drilling and pumping test at Granville, St. James
Ministry of Water and Housing	Technical Assistance	Evaluation of Water Availability and Water Quality for Mile Gully, Manchester
Ministry of Water and Housing	Technical Assistance	Hydrogeological Assessment of groundwater resources at Fort Stewart- St. Mary
Ministry of Water and Housing	Technical Assistance	Assessment of the Vernamfield B1 well, Cooks Gate- Clarendon
Ministry of Water and Housing	Technical Assistance	Hydrogeological evaluation of water resources in Manchester
Ministry of Transport and Works	Technical Assistance	Assessment of potential domestic water supply sources for Sterling Castle- St. Catherine
Ministry of Land and Environment	Technical Assistance	Hydrological Assessment of Investigation of a proposed cemetery site at Burnt Ground- Hanover
U.D.C.	Technical Assistance	Hydrogeological Assessment of water resources at Auchindown- Westmoreland
Ministry of Labour and Social Security	Technical Assistance	Hydrogeological Assessment of water resources in Northern Clarendon
The Nature Conservancy	Technical Assistance	Revision of the Hydrological assessment of the Cockpit Country
St.Ann Jamaica Bauxite Company	Technical Assistance	Hydrogeological Assessment of the Berrydale wells-St.Ann
JAMALCO	Small Investigation	Hydrogeological evaluation of water resources in Mile Gully - Manchester
National Housing Trust	Technical Assistance	Hydrogeological evaluation of water resources to a proposed housing development at Perth- Manchester

Organization	Nature of Task/Request	Description of Task/Request
Private	Technical Assistance	Hydrogeological evaluation of water resources at Mount Pleasant- St. Ann
Private	Technical Assistance	Conducted streamflow measurement at Constant Spring, Kingston.
Private	Technical Assistance	Conducted assessment of water resources at Belvedere, St. Thomas
Private	Technical Assistance	Conducted streamflow measurements at Mavis Bank- St. Andrew
Private	Technical Assistance	Conducted assessment of water resources at Reading, St. James
Private	Technical Assistance	Conducted investigation into the feasibility of rehabilitating the Longville Park #1 Well in Clarendon
Private	Technical Assistance	Hydrogeological evaluation of water resources at Galina- St. Mary
Private	Technical Assistance	Investigate upwelling of water at Ironshore Coral Gardens, St. James
Private	Technical Assistance	Investigate upwelling of water at Reading , St. James
Private	Technical Assistance	Conducted investigation into the feasibility of drilling a well at Twelve Miles- St. Thomas
Private	Technical Assistance	Assessment of the Coolshade spring in St. Ann
Private	Technical Assistance	Hydrological evaluation of surface water resources at Mt. Zion- S. Ann
Private	Technical Assistance	Conducted streamflow measurements and water quality sampling at Llandovery – St. Ann
Private	Technical Assistance	Site investigation of a spring at Lethe, Hanover
Private	Technical Assistance	Conducted assessment of water resources at Culloden, Westmoreland
Private	Technical Assistance	Evaluation of a well at Ewarton, St. Catherine as a potential source for irrigation purposes
Private	Technical Assistance	Conducted investigation into the feasibility of drilling a well at Twelve Miles- St. Thomas
Private	Technical Assistance	Conducted investigation into the feasibility of drilling a well at Auchindown- Westmoreland
Private	Technical Assistance	Conducted flow measurements at Barton Isle- St. Elizabeth

Data Provision

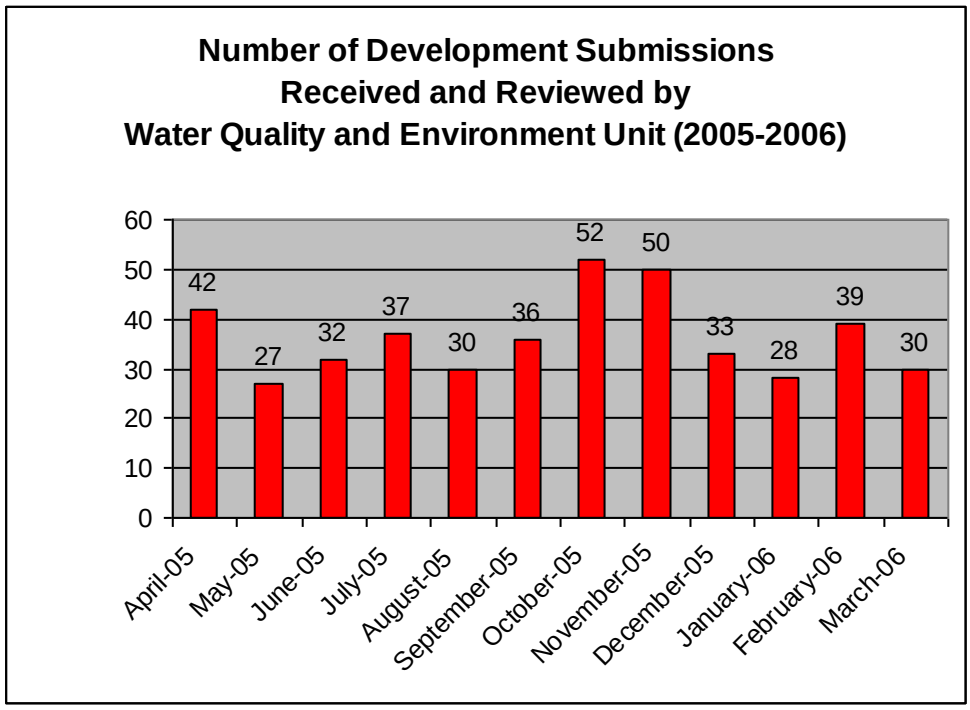
The unit provided hydrologic data to a number of agencies and students. The table below summarises the data made available:

Organisation	Request
Ministry of Agriculture	Provided information on wells at Spring Ground- Manchester
National Water Commission	Assessment of water supply for Southwest and Southeast St. Elizabeth.
National Water Commission	Provided information on wells in Pondside, St. Elizabeth
Coconut Industry Board	Provided information on wells in Barton Isle, St. Elizabeth
CECL	Assessment of water sources to Giblatore, St. Catherine
Highway 2000	Computed and compiled data on water demand for the parishes of St. Catherine and Clarendon
Private	Compile hydrogeological and geological data on New Forest, St. Elizabeth
Private	Compile hydrogeological and geological data on Rosehall - St. James
Private	Provided information of wells located in the vicinity of East Rhine - St. Thomas
Private	Provided information of wells located in the vicinity of Time and Patience- St. Catherine.
UTECH	Provision of data on the Management of Watershed Management in Jamaica.
UWI/ Earthquake Unit	Compilation of data on wells in the Liguanea Aquifer , Kingston
UWI	Compiled hydrogeological data for the Duckensfield, Chiswick areas of St. Thomas
UWI	Compiled hydrogeological data for Coral Spring – Trelawny

WATER QUALITY AND ENVIRONMENT UNIT

Development Applications

The Unit received and reviewed a total of four hundred and thirty six (436) development submissions from Parish Councils and The Kingston and St Andrew Corporation (KSAC), private developers and the National Environment and Planning Agency (NEPA). The breakout is shown in the table below.



These reviews include:-

- the determination of the need for flood impact assessments associated with small to very large housing developments
- the determination of the level of sewage treatment required for the protection of water quality
- the evaluation of ecotourism projects in respect of the risks of water contamination
- recommendations related to the siting of private and public cemeteries
- recommendations related to the siting and design of petroleum storage tanks; and
- the treatment and management of industrial wastewater discharges

The number of staff within the Unit consisted of three persons, resulting in the extension of the two (2) week processing period to approximately four (4) weeks.

Not only does this lengthen the overall development application process, but it reduces the time that the professional staff within the Unit can dedicate to critical water quality studies and water quality management initiatives. This situation has become untenable in terms of the performance standards and overall goals set by the Unit.

In response to this situation, the Unit is now pursuing the development of an alternative processing mechanism: a decision matrix, which should result in pre-designation of the appropriate level of sewage treatment, required for areas across the island. It is anticipated that a number of parish maps and supporting information would be generated and made available to each Parish Council, other government regulatory agencies and private developers. It is expected that this would achieve the following:-

- reduce significantly the number of submissions requiring review by the Unit
- provide Parish Councils, other government regulating agencies and private developers information on the level of sewage treatment recommended by the Water Resources Authority
- enhance the timeliness of the overall development application process
- allow professionals within the Unit to perform some of the other critical functions of the Unit

It is anticipated that the decision matrix system devised will be reviewed periodically to ensure relevance and adequacy of the process and the maps will be adjusted accordingly.

However, until this alternative processing mechanism is developed and implemented, the timeliness of the development approval process will continue to be affected.

Special Investigations

Water Quality of Moneague Lake, St Ann

Elevated water levels in the Moneague Depression associated with the extreme rainfall events of 2005 (Dennis, Emily and Wilma) led to the emergence of what is considered a spectacular and scenic lake water body, enhancing its appeal as a recreational site. The Lake has become increasingly attractive for both primary and secondary recreational activities including swimming, boat rides, fishing and jet skiing. Lakeside picnic outings have also become a common feature of the area.

Elevated Water Levels in the Moneague Lake, St Ann after Heavy Rains of 2005

The elevated water levels have also resulted in the inundation of a number of houses and on-site sewage systems; pit latrines and absorption pits.

In support of the increased human activity at the Lake, informal toilet facilities have been erected on the banks of the lake.
These factors, together with the increased use of the Moneague Lake by the public for recreational purposes and the possible threat to water quality in the Lake from a number of sources, have pointed to the need to evaluate the quality of the Lake water to determine its suitability for recreational use.

The Water Quality and Environment Unit of the Water Resources Authority conducted a snap shot assessment over the period January to February 2006 of the water quality in the Moneague Lake.

The recreational water quality standards applied were a) the US EPA Bathing Water Standard, b) the EEC Guideline and the more recent c) Blue Flag Recreational Standard.
In the application of the three Recreational Water Standards, all three (3) sample points on the Moneague Lake met each of the three standards.

In light of the proximity of the lake to housing units now occupied and the impact of land based sources of pollution from surface runoff into the lake, the recommendation of the Unit, on use of the Lake for recreation was limited to secondary recreational activities, e.g. boating and fishing from boats could be considered safe. (No direct skin contact activities such as swimming or wading).

Essex Valley, St Elizabeth Water Quality Report

The Water Quality and Environment Unit was asked to provide an interpretation of water quality data collected for a number of sample points within the Essex Valley region, St Elizabeth. This evaluation will form part of the output of the project entitled 'Characterization of Groundwater in the Vicinity of Bauxite/Alumina Plants for the Optimal Use of Water Resources', being coordinated by the Planning and Investigation Unit of the Water Resources Authority.

The general objective of the assessment was to determine the quality status of ground and surface water in the Essex Valley region, St Elizabeth.

The specific objectives were: -

1. To identify water considered pristine / high in quality by comparison with the National Ambient Water Quality Standard.

2. To make an assessment of the suitability of the water for specific beneficial uses; domestic supply and irrigation.

3. To determine the water type (based on major anions and cations) and source rock associated with the ground and surface waters sampled.

4. To identify the types and levels of water contamination (if present) with the use of selected pollution indicators.

With respect to water chemistry (anions and cations), five (5) of the thirty two (32) sample points are designated as high quality, as all fourteen (14) parameters fell within the National Ambient Water Quality Standard. They are as follows:-

Santa Cruz (NWC)
Goshen Diary (Well #34)
Mount De Las Uvas
Well #17; and
Well #18

Twenty five (25) of the 32 sample points were determined suitable for drinking (with requisite treatment) and irrigation.

Table 1 indicates the suitability of the sample locations for drinking and irrigation.

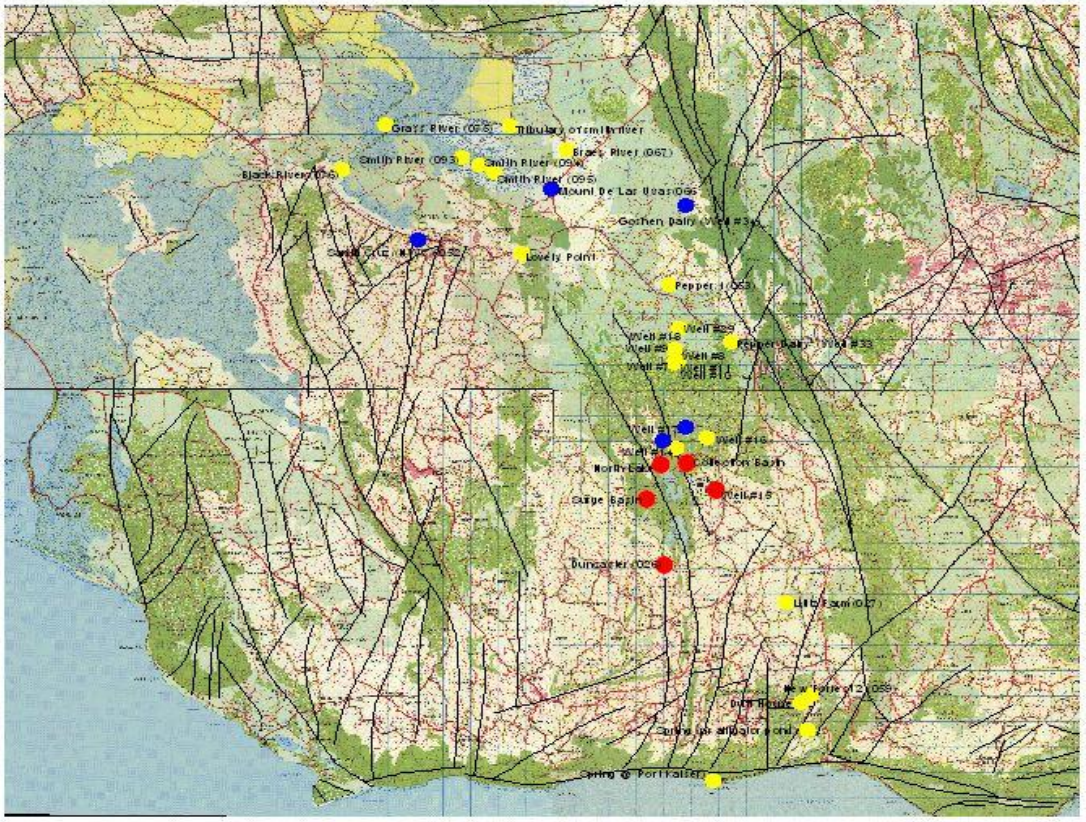
Aluminium, Arsenic, Bromine and Fluoride were found to be elevated at some sample locations. The sample points with elevated heavy metals were located down gradient of the alumina waste disposal facility and include wells and springs. This indicates that the red mud disposal facility is impacting on water resources in this area.

Figure 1 represents a colour-coded summary of the status of water quality within the Essex Valley area.

Table 1 Water Suitability Assessment and Water Quality Classification
Essex Valley, St Elizabeth, 2004

Sample Location	Ambient 	Drinking (with requisite treatment) 	Irrigation 	Water Quality Class
Spring (nr alligator pond)	x	x	✓	
New Forrest 2 (059)	x	✓	✓	
Pepper 1(053)	x	✓	✓	
Duncaster (026)	x	x	✓	
Lititz Farm (027)	x	✓	✓	
North Lake	x	x	✓	
Duff House (well #41)	x	x	✓	
Surge Basin	x	x	✓	
Collection Basin	x	x	✓	
Well #15	x	x	✓	
Well #16	x	✓	✓	
Well #14	x	✓	✓	
Well #17	✓	✓	✓	
Well #18	✓	✓	✓	
Well #11	x	✓	✓	
Well #10	x	✓	✓	
Well #7	x	✓	✓	
Well #9	x	✓	✓	
Well #29	x	✓	✓	

Water Quality Status
Essex Valley, St Elizabeth



Source: Water Resources Authority 2004

WATER RESOURCES AUTHORITY
FINANCIAL STATEMENTS
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WATER RESOURCES AUTHORITY

FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2006

CONTENTS

Auditor General's Department

Report on the Financial Statements

Of Water Resources Authority

I have audited the accompanying financial statements of the Water Resources Authority which comprise the balance sheet as at March 31, 2006, the statements of income and cash flow for the year then ended and a summary of significant accounting policies and other explanatory notes.

Management is responsible for the preparation and fair presentation of these financial statements in accordance with generally accepted accounting standards. This responsibility includes: designing, implementing and maintaining internal controls relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

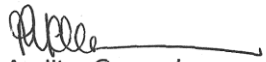
My responsibility is to express an opinion on these financial statements based on my audit. I conducted my audit in accordance with the auditing standards issued by the International Organization of Supreme Audit Institutions (INTOSAI). Those standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The Procedures selected depend on the auditor's 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 auditor considers 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.

An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

In my opinion proper accounting records have been kept and the financial statements, which are in agreement therewith, give a true and fair view of the financial position of the Water Resources Authority as at March 31, 2006, and of its financial performance and cash flows for the year ended in accordance with generally accepted accounting standards.



Auditor General
2009/01/06

STATEMENT I

WATER RESOURCES AUTHORITY

Balance Sheet

AS AT MARCH 31, 2006

	Note	2006	2005
Assets			
Non-current assets			
Property, plant and equipment	[4]	9,564,351	9,079,654
		9,564,351	**9,079,654**
Current assets			
Rceivables	[5i]	1,828,412	1,123,609
Prepayments	[5ii]	464,448	405,533
Short-term investment	[6]	2,325,396	2,112,312
Cash and cash equivalents	[7]	16,334,101	10,234,783
		20,952,357	**13,876,237**
Total assets		**30,516,708**	**22,955,891**
Reserves			
Reserves and accumulated funds			
Capital projects subvention	[8]	2,117,149	2,041,833
Capital project grant	[9]	4,769,511	5,269,242
Other projects fund	[10]	1,056,958	1,228,848
Accumulated fund	[11]	19,808,500	8,053,044
Total reserves		**27,752,118**	**16,592,967**
Liabilities			
Current Liabliities			
Payables and accruals	[12]	2,764,590	6,362,924
Total liabilities		**2,764,590**	**6,362,924**
Total reserves and liabilities		**30,516,708**	**22,955,891**

The attached notes on Statement IV form an integral part of these financial statements.

APPROVED BY THE BOARD:

.....)
) DIRECTORS
.....)

STATEMENT II

WATER RESOURCES AUTHORITY

Income Statement

YEAR ENDED MARCH 31, 2006

	Note	2006	2005
		$	$
Subventions	[2f]	**84,631,047**	**68,297,861**
Other operating income	[13]	4,551,345	3,745,087
Gross profit		89,182,392	72,042,948
Administrative and other expenses		-77,426,936	-72,993,095
Operating surplus/(deficit) for the year		**11,755,456**	**-950,147**

The attached notes on Statement IV form an integral part of these financial statements.

STATEMENT III

WATER RESOURCES AUTHORITY

Statement of Cash Flows

YEAR ENDED MARCH 31, 2006

	2006 $	2005 $
Cash flows from operating activities:		
Operating surplus / (deficit) for the year	11,755,456	-950,147
Prior year adjustment	-	168,017
	11,755,456	**-782,130**
Adjustments to reconcile operating surplus/(deficit) for year to net cash provided by operating activities:		
Depreciation	2,247,114	1,667,842
Depreciation transferred from capital grant	-499,731	-499,731
Gain on disposal of euipment	-215,924	-
	13,286,915	**385,981**
(Increase)/decrease in current assets		
Receivables	-704,803	-213,195
Prepayments	-58,915	58,016
Short-term investment	-213,084	-237,016
(Decrease)/increase in current liabilities		
Payables and accruals	-3,598,334	5,277,367
Net cash provided by operations	**8,711,779**	**5,271,153**
Cash flows from investing actibities:		
Purchase of equipment	-2,762,437	-3,411,570
Proceeds from the disposal of equipment	246,550	-
Net cash used in investing activities	**-2,515,887**	**-3,411,570**
Cash flows from financing activities:		
Increase in capital projects subventons	75,316	1,320,355
Decrease in other projects fund	-171,890	-66,971
Net cash (used in)/provided by financing activities	**-96,574**	**1,253,384**
Net increase in cash and cash equivalents	**6,099,318**	**3,112,967**
Cash and cash equivalents at beginning of year	**10,234,783**	**7,121,816**

Cash and cash equivalents at end of year (Note 7)	**16,334,101**	**10,234,783**

The attached notes on Statement IV form an integral part of these financial statements.

STATEMENT IV

WATER RESOURCES AUTHORITY

Notes to Financial Statements

YEAR ENDED MARCH 31, 2006

1. IDENTIFICATION AND FUNDING

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

Water Resources Authority assumed the operations of the Underground Water Authority. The Underground Water Authority was established in April 1962 pursuant to the Underground Water Control Act (1959). Its main objectives were to promote the conservation and proper use of underground water resources and to control the exploitation of such water resources.

Until April 1, 1985, the work of the Authority was carried out by the Water Resources Division of the Ministry of Public Utilities and Transport, which was then integrated into the Authority. These financial statements do not reflect some fixed assets of the Water Resources Division, which are now being used by the Authority. No official transfer of these assets was executed at balance sheet date.

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. The Water Resources Authority is currently being funded by subventions from the Ministry of Water and Housing.

Except where otherwise stated, these financial statements are expressed in Jamaican Dollars.

2. SUMMARY OF ACCOUNTING POLICIES

(a) Basis of Preparation

These financial statements have been prepared under the accrual basis of accounting and in accordance with general accepted accounting principles.

(b) Accounting Convention

These financial statements have been prepared under the historical cost convention.

(c) Depreciation

Depreciation is provided on the straight line basis at such rates as will write off the various assets over the period of their expected useful lives. The useful lives approximate to ten (10) years for furniture and fixtures, five (5) years for motor

vehicles, forty (40) years for buildings and four (4) years for computer equipment and software. A full year's depreciation is charged in the year of purchase and none in the year of disposal.

(d) Use of Estimates and Judgements

The preparation of financial statements in accordance with generally accepted accounting principles requires management to make estimates and assumptions that affect the amount reported in the financial statements and accompanying notes. These estimates are based on historical experience and management's best knowledge of current event and actions. Actual results may differ fom these estimates.

The main source of estimation relates to estimation of the useful lives of property, plant and equipment. There are no significant judgements that management has made in the process of applying the accounting policies that have a significant effect on the amounts recognised in the financial statements. In addition, there are no significant sources of estimation or uncertainty at balance sheet date, that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year.

(e) Foreign Currency:

(i) Foreign currency balances at balance sheet date have been translated at rates of exchange ruling at that date.

(ii) Transactions in foreign currencies are converted at the rates of exchange ruling at the dates of those transactions.

(iii) Gains/losses arising from fluctuations in exchange rates are included in the Income Statement.

(f) Subventions

The authority is funded by subvention from the Ministry of Water and Housing. These funds are recognized on the accrual basis.

(g) Cash and Cash Equivalents

This represents cash in hand and demand deposits.

(h) Fair Value of Financial Instruments

A financial instrument is a contract that gives rise to both a financial asset of one enterprise and a financial liability or equity instrument of another enterprise. Financial instruments are recognized in the Authority's balance sheet when it has become a party to the contractual provisions of the

instruments.

The financial instruments carried in the balance sheet are receivables, short-term investment cash and cash equivalents and payables and accruals. The particular recognition methods are disclosed in the respective accounting policies associated with each item.

Fair value represents an estimate of the arm's-length consideration that would currently be agreed between knowledgeable, willing parties who are under no obligation to act and is best evidenced by a quoted market price, if one exists.

The carrying value of each class of financial instruments is considered to be fair value.

3. TAXATION

The Authority is not subject to Income Tax.

STATEMENT IV (Continued)

WATER RESOURCES AUTHORITY

NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2006

4. PROPERTY, PLANT AND EQUIPMENT:

	Building	Furniture & Fixtures	Computer Software	Computer Hardware	Technical & Scientific Equipment	Motor Vehicles	Total
	$	$	$	$	$	$	$
Gross carrying amount	5,383,635	5,178,009	2,489,135	7,264,618	1,943,630	3,188,540	25,447,567
Accumulated depreciation	-924,212	-3,646,870	-2,489,134	-6,902,763	-1,066,864	-3,174,098	-18,203,941
Carrying amount at April 1, 2004	**4,459,923**	**1,531,139**	**1**	**361,855**	**876,766**	**14,442**	**7,243,626**
Gross carrying amount	5,383,635	5,656,589	2,499,675	7,331,698	2,035,930	6,043,910	28,951,437
Accumulated depreciation	-1,058,803	-4,212,529	-2,491,769	-7,078,618	-1,270,457	-3,759,607	-19,871,783
Carrying amount at March 31, 2005	**4,324,832**	**1,444,060**	**7,906**	**253,080**	**765,473**	**2,284,303**	**9,079,654**
Gross carrying amount	5,383,635	6,130,586	2,676,335	9,231,579	2,098,507	5,984,482	31,505,124
Accumulated depreciation	-1,193,394	-4,812,263	-2,538,569	-7,729,443	-1,480,308	-4,186,796	-21,940,773
Carrying amount at March 31, 2006	**4,190,241**	**1,318,323**	**137,766**	**1,502,136**	**618,199**	**1,797,686**	**9,564,351**

STATEMENT IV (Continued)

WATER RESOURCES AUTHORITY

NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2006

The carrying amount for property, plant and equipment for the years included in these financial statements as at March 31, 2006 are reconciled as follows:

	Building	Furniture & Fixtures	Computer Software	Computer Hardware	Technical & Scientific Equipment	Motor Vehicles	Total
	$	$	$	$	$	$	$
Carrying amount at April 1, 2004	**4,459,423**	**1,531,139**	**1**	**361,855**	**876,766**	**14,442**	**7,243,626**
Additions	-	478,580	10,540	67,080	92,300	2,855,370	3,503,870
Depreciation	-134591	-565,659	-2,635	-175,855	-203,593	-585,509	-1,667,842
Carrying amount at March 31, 2005	**4,324,832**	**1,444,060**	**7,906**	**253,080**	**765,473**	**2,284,303**	**9,079,654**
Additions	-	517,747	176,660	1,899,881	62,577	105,572	2,762,437
Disposal	-	-43,750	-	-	-	-165,000	-208,750
Depreciation	-134,591	-612,859	-46,800	-650,825	-209,851	-592,188	-2,247,114
Eliminated on disposal	-	13,125	-	-	-	164,999	178,124
Carrying amount at March 31, 2006	**4,190,241**	**1,318,323**	**137,766**	**1,502,136**	**618,199**	**1,797,686**	**9,564,351**

STATEMENT IV (Continued)

WATER RESOURCES AUTHORITY

NOTES TO FINANCIAL STATEMENTS

YEAR ENDED MARCH 31, 2006

5. RECEIVABLES AND PREPAYMENTS COMPRISE:

(1) **Receivables**

		2006	2005
		$	$
(a)	Motor Vehicles Repairs Loans	450,981	236,900
(b)	Computer loans	154,170	140,152
(c)	Staff loan	336,073	-
	Withholding tax recoverable	182,592	96,137
	Interest receivables	352,942	303,878
	GCT refundable	102,503	185,272
	Other receivables	249,151	89,549
	Salary Advance	-	71,721
	Total	**1,828,412**	**1,123,609**

(ii) **Prepayments**

Insurance	340,441	325,467
Other	124,007	80,066
Total	**464,448**	**405,533**

(a) Motor Vehicle Repair loans Comprise:

Horace Roper	41,015	-
Errol Douglas	-	35,000
Clyde Blake	4,280	2,303
Clive Lobban	13,559	3,984
Francis Murphy	30,000	45,000
Bernard Williams	55,000	55,000
Angella Graham	31,788	-
Donald Hardware	-	-
Natalie Ferguson	14,751	-
Michelle Watts	-	43,750
Gilmore Fraser	31,248	8,708
Anika Sutherland	21,663	33,156
Michael Wilson	10,000	9,999
Wilfred Cameron	19,584	-
Delroy Solomon	22,500	-
Rosalyn Reid	11,494	-
Kevin Chambers	38,000	-

Novelette Brown-Thomas	29,659	-
Lawrence Barrett	56,644	-
Shonel Dwyer	19,796	-
Total	**450,981**	**236,900**

STATEMENT IV (Continued)

WATER RESOURCES AUTHORITY
NOTES TO FINANCIAL STATEMENTS
YEAR ENDED MARCH 31, 2005

5. RECEIVABLES AND PREPAYMENTS COMPRISE (CONT'D.):

(b) Computer Loans Comprise:

	2006	2005
	$	$
Clyde Blake	5,222	25,099
Felix Miller	17,560	42,210
Basil Fernandez	-	28,332
Michelle Watts	48,071	8,308
Errol Douglas	38,237	-
Delroy Solomon	21,092	29,547
Michael Samuels	23,988	6,656
Total	**154,170**	**140,152**

(c) Staff Loans Comprise:

	2006	2005
	$	$
Francis Murphy	33,774	-
Bernard Williams	54,523	-
Gilmore Fraser	57,020	-
Uton Henry	18,155	-
Rosalyn Reid	27,334	-
Pauline Sinclair	27,924	-
Chrisendeen Douglas	32,248	-
Carmela Spence	22,723	-
Shonel Dwyer	50,000	-
Gloria Abbot	12,372	-
Total	**336,073**	**-**

6. SHORT-TERM INVESTMENT

This represents amounts invested in Government of Jamaica variable rate Locally Registered Stock at an interest rate of 12.65% per annum.

7. CASH AND CASH EQUIVALENTS COMPRISE:

	2006 $	2005 $
Bank of Nova Scotia - Current Account	7,293,433	3,428,921
Bank of Nova Scotia - Savings Account:		
Motor Vehicle Repairs Loan Account	1,011,103	1,100,994
Capital Projects Account	6,579,765	3,589,911
Petty Cash	10,000	5,000
Foreign Currency Savings Account	680,973	1,398,532
Computer Loan-Savings Account	745,275	707,273
TCC Savings Account	13,552	13,152
Total	**16,334,101**	**10,243,783**

8. CAPITAL PROJECTS SUBVENTION

	2006	2005
	$	$
(a) Balance of Subvention Funds at March 31, 2005	2,041,833	721,425
Add: Fund received	3,684,350	2,000,000
	5,726,183	**2,721,425**
Less: Projects Expenditures for year		
OAS Regional Projects	-84,994	125,384
WRA/IDB Master Plan	1,887,527	259,742
International Atomic Energy	104,712	294,466
Hydrometric network Upgrade	1,698,669	-
Water Resources Assessment	3,120	-
	3,609,034	679,592
Balance for Capital Fund - Projects	**2,117,149**	**2,041,833**

(b) Cash balance on Capital Projects

	2006	2005
	$	$
Subvention Fund	5,726,183	2,721,425
Less: Research Projects listed above	- 3,609,034	-679,592
Cash available	**2,117,149**	**2,041,833**

9. CAPITAL PROJECT GRANT

	2006	2005
	$	$
Balance at beginning of year - as previouslty reported	5,269,242	5,676,674
Add: Assets transferred	-	92,299
Less: Transfers to other income:		
Other assets	-365,140	-365,140
Herbert Chin Building	-134,591	-134,591
Transfer to other income	-499,731	-499,731
Total	**4,769,511**	**5,269,242**

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.

STATEMENT IV (Continued)

WATER RESOURCES AUTHORITY
NOTES TO FINANCIAL STATEMENTS
YEAR ENDED MARCH 31, 2005

10. OTHER PROJECTS FUND COMPRISE:

	2006	2005
	$	$
Rowlands field water	49,974	49,974
JSIF-Bog water supply	31,549	31,549
Nature Conservancy project	13,589	13,589
JPS Co.	81,960	81,960
NHT	52,400	52,400
UNDP/GOJ Project	86,706	512,993
Dunns River Watershed Project	174,668	174,668
Sedimentary Basin Resource Assessment	91,876	91,876
Black River Watershed Project	58,450	112,079
ACCC	101,246	101,246
Carib Engineering Co.	9,850	9,850
UNDP Radar	-3,336	-3,336
Granville Well Project	308,026	-
Total	**1,056,958**	**1,228,848**

11. ACCUMULATED FUND

	2006	2005
	$	$
Balance at beginning of year - as previously reported	8,053,044	8,835,174
Less: Prior year adjustment	-	168,017
As restated	**8,053,044**	**9,003,191**
Operating surplus/(deficit) for the year	11,755,456	-950,147
Balance at end of year	**19,808,500**	**8,053,044**

STATEMENT IV (Continued)

WATER RESOURCES AUTHORITY
NOTES TO FINANCIAL STATEMENTS
YEAR ENDED MARCH 31, 2005

12. PAYABLES AND ACCRUALS COMPRISE:

		2006	2005
		$	$
(a)	Payroll deductions payable		
	P.A.Y.E.	1,314,384	2,734,614
	Education tax	119,070	247,573
	Insurances	47,963	18,530
	Credit Union	1,000	1,000
	Total	**1,482,417**	**3,001,717**
(b)	Accruals		
	Consultants' and professional fees	404,248	313,544
	Subsistence, overtime and salaries	86,017	374,896
	Accounting fees	85,000	73,000
	Public services and insurance	48,661	17,102
	Others	602,587	2,527,005
		1,226,513	**3,305,547**
(c)	Other payables	**55,660**	**55,660**
	Total	**2,764,590**	**6,362,924**

13. OTHER OPERATING INCOME COMPRISE:

	2006	2005
	$	$
Transferred from capital project (Note 9)	499,731	499,731
Investment income	287,878	309,600
Other income	150,044	58,589
Well application fees	1,565,000	860,000
Reimbursements	1,136,122	1,363,885
Interest income	616,313	546,483
Gain on disposal of equipment	215,924	-
Gain on foreign exchange	80,333	106,799
Total	**4,551,345**	**3,745,087**

14. Gain on foreign exchange

This represents losses on foreign currency transactions and conversions resulting from variation in foreign currency exchange rates.

15. Financial risk management policies

The Authority is exposed to a variety of financial risks in respect of its financial instruments: interest rate risk, credit risk, liquidity risk and cash flow interest rate risk. The Authority seeks to manage these risks by close monitoring of each class of its financial instruments as follows:

(a) Interest rate risk

Interest rate risk is the risk that the value of a financial instrument will fluctuate due to changes in market interest rates. The Authority's cash and cash equivalents are subject to risk. However, the Authority attempts to manage this risk by monitoring its interest-earning assets closely and procuring the most advantageous rates under contracts with interest rates that are fixed for the life of the contacts, where possible. The Authority minimises the risk by maintaining net interest earning assets.

(b) Credit risk

Credit risk is the risk that one party to a financial instrument will fail to discharge an obligation and cause the other party to incur financial loss. The authority maintains its cash and cash equivalents with licensed and secure financial institutions. Its receivables are due mainly from staff.

(c) Financial asset

The Authority has investments in Government of Jamaica Variable Rate Locally Registered Stock at interest rate of 12.5% per annum. Included in cash and cash equivalents are savings accounts at an average interest rate of 7.09% per annum.

(d) Financial liabilities

Financial liabilities are non-interest rate sensitive.

(e) Liquidity Risk

Liquidity risk is the risk the company will encounter difficulty in raising funds to meet its commitments associated with financial instruments. The company manages its liquidity risk by maintaining an appropriate level of resources in liquid form. At balance sheet date, liquid and near liquid assets exceeded current liabilities by $17,723,319 (2005 - $7,107,780).

(f) Foreign Currency risk

The Authority is exposed to foreign currency risk due to fluctuations in exchange rate on transactions and balances that are denominated in currencies other than Jamaican Dollar. A foreign currency bank account is maintained at a level, which will meet foreign currency obligations, which may occur from time to time. At balance sheet date the Authority held foreign currency asset of US$10,434 (2005 US$22,850) (Note 7 & 10).

16. Staff costs

	2006	2005
	$	$
Salaries and related costs	47,874,710	47,883,498
Staff benefits	3,186,443	2,871,323
Pension - employer's Contributions	5,812,077	5,975,602
Total	**56,873,230**	**56,730,423**

At March 31, 2006 the Authority had sixty-one (61) employees, while there were fifty-two (52) employees at March 31, 2005.

17. Pension scheme

The Water Resources Authority participates in a defined contribution pension scheme. All permanent employees who have completed three (3) months of service are eligible to join Employee Contribute at a mandatory rate of five percent (5%). The Authority contributes at (10%) of pensionable salaries.

WATER RESOURCES AUTHORITY
ADDITIONAL INFORMATION
YEAR ENDED MARCH 31, 2006

SUPPORTING SCHEDULE OF EXPENSES

WATER RESOURCES AUTHORITY

Supporting Schedule of Expenses

YEAR ENDED MARCH 31, 2006

	2006 $	2005 $
Administrative and other expenses		
Salaries and related costs	47,874,710	47,883,498
Staff benefits	3,186,443	2,871,323
Pension - employer's contributions	5,812,077	5,975,602
Machine rental and miscellaneous	608,790	302,700
Telephone	1,889,062	1,545,840
Utility expenses	635,219	612,807
Motor vehicle operations	2,197,404	1,699,409
Repairs, materials and related expenses	1,200,374	670,112
Construction materials	72,482	19,210
Security	840,040	774,047
postage, stationery and printing	1,111,731	666,527
Donations and subscriptions	407,974	45,122
Consultants fees	437,299	469,803
Accounting fees	90,000	102,000
Foreign travel	379,576	94,286
Travel and subsistence	7,508,698	6,857,989
Bank charges	11,002	12,867
Miscellaneous purchases	247,941	189,992
Depreciation	2,247,114	1,667,842
Insurance - property	588,422	496,132
Advertising	80,578	35,987
Total	**77,426,936**	**72,993,095**

DIRECTORS COMPENSATION 2005/2006

Position of Director	Fees ($)	Motor Vehicle Upkeep/Travelling or Value of Assignment of Motor Vehicle ($)	Honoraria ($)	All Other Compensation including Non-Cash Benefits as applicable ($)	Total ($)
Dr. A. Ventura-Chairman		**-**	**54,000**	**-**	**54.000***
Dr. C. Archer-Member		**-**	**21,000**	**-**	**21,000**
Mr. E. Gentles-Member		**-**	**17,500**	**-**	**17,500**
Mrs. S. Rickards-Member		**-**	**28,000**	**-**	**28,000**
Mr. Parris Lyew-Ayee-Member		**-**	**24,500**	**-**	**24,500**
Dr. Conrad Douglas-Member		**-**	**10,500**	**-**	**10,500**
Miss Tasha Manley-Member		**-**	**10,500**	**-**	**10,500**
Mr. Donovan Stanberry-Member		**-**	**24,500**	**-**	**24,500**

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.**

***All Totals are before tax.**

SENIOR EXECUTIVE COMPENSATION 2005/2006

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	3,284,546	NIL	170,610	Nil	-	-	3,455,156
Deputy Managing Director	2,224,707	Nil	341,220	-	-	-	2,565,927
Director Finance & Accounts	2,138,774	Nil	341,220	-	-	-	2,479,994

Notes

1. Where contractual obligations and allowances are stated in a foreign currency, the sum in that stated currency must be clearly provided and not the Jamaican equivalent.
2. Other Allowances (including laundry, entertainment, housing, utility, etc.)
3. Where a non-cash benefit is received (e.g. government housing), the value of that benefit shall be quantified and stated in the appropriate column above.