



The National Water Information System- Grenada

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Grenada

OUTLINE

- Introduction
- What is the NWIS
- Update on Grenada NWIS
- Issues to be considered
- Conclusions and recommendations

Water Resources Information Systems

- A National Water Resources Information System (WRIS) is a valuable tool for:
 - organizing water data
 - easier access to the data, and
 - assessing a country's water resources.

Caribbean NWIS vary in complexity

Simple forms and spread Sheets e.g. Trinidad, Guyana

More centralized system incorporating more than met and stream data, e.g. St Lucia

Web based system, linked to Google Earth - Grenada

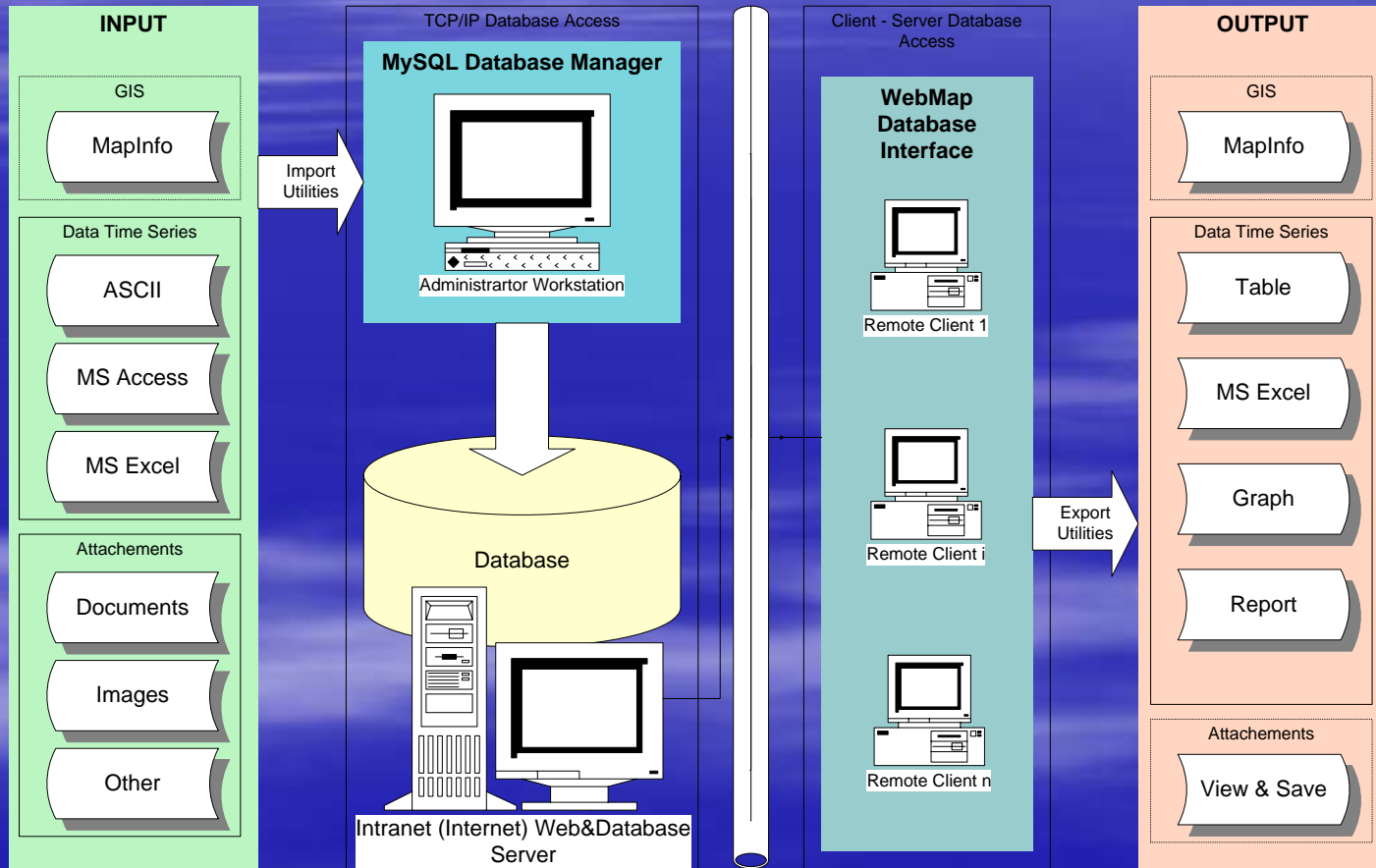
Level of Complexity



Grenada NWIS

Server Side

Client Side



KEY STAKEHOLDERS

- MINISTRY OF AGRICULTURE
- MBIA MET OFFICE
- NAWASA
- ST GEORGE'S UNIVERSITY

IP ADDRESS www.cariwin.gd

Grenada - Water Information System - Windows Internet Explorer

http://www.cariwin.gd/webmap/app/db/index.php


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WEB SEARCH

Grenada - Water Information System Home Feeds (J) Read Mail Print Page Safety Tools Help

Grenada Water Information System



The Ministry Of Agriculture, Fisheries and Forestry



CARIWIN is a project on Integrated Water Resources Management (IWRM) in the Caribbean, led by the Brace Centre for Water Resources Management at McGill University and the Caribbean Institute for Meteorology and Hydrology (CIMH), Barbados.

Grenada Water Information System (WIS) uses up-to-date Web technologies to provide reliable and easy access to water related data. The core component of the Grenada WIS is the WebMap Application, facilitating data retrieval through an user-friendly interface.

Database: Grenada
Predefined View: My Last View
Raster Images: Soils
Point Objects: Show All

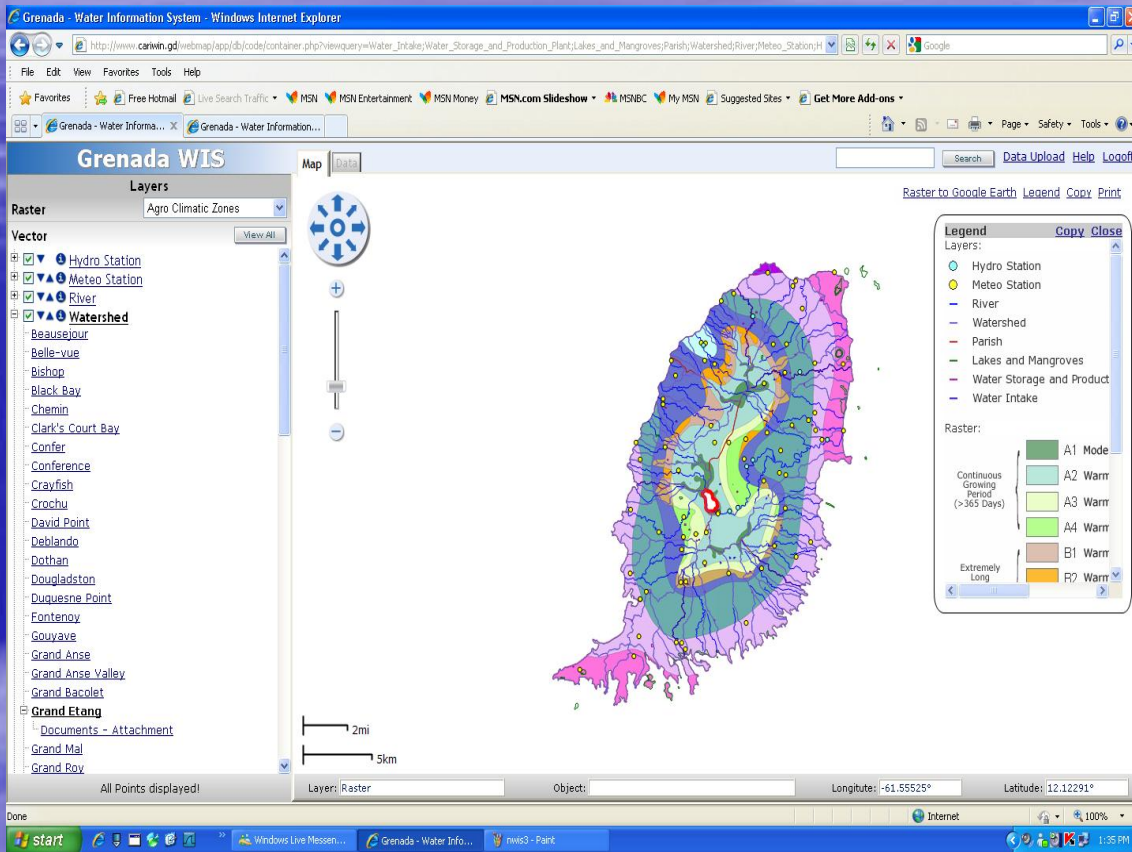
Username:
Password:

Sign In

Contact [Kenton Fletcher:Kenflet@hotmail.com](mailto:Kenflet@hotmail.com) or [Trevor Thompson:trevort_lud@yahoo.com](mailto:TrevorThompson:trevort_lud@yahoo.com) to obtain Username and Password.

start Microsoft PowerPoint ... Inbox (50) - Yahoo ... Grenada - Water Info... Internet 100% 9:02 AM

MAP LAYERS IN SYSTEM



- SOILS
- AGROCLIMATIC ZONES
- WATERSHEDS
- RIVERS
- ROADS
- METEO STATIONS
- TOPOGRAPHIC
- WATER INTAKE
- WATER BODIES
- ADMINISTRATIVE BOUNDARIES
- WATER STORAGE & PRODUCTION FACILITIES

THE SYSTEM -Other Features Object Relationship Browser

Grenada - Water Information System - Windows Internet Explorer

http://www.cariwin.gd/webmap/app/db/code/container.php?viewquery=Water_Intake;Water_Storage_and_Production_Plant;Lakes_and_Mangroves;Parish;Watershed;River;Meteo_Station;H

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Free Hotmail Live Search Traffic MSN MSN Entertainment MSN Money MSN.com Slideshow MSNBC My MSN Suggested Sites Get More Add-ons

Grenada WIS

Map | Data

Search Data Upload Help Logoff


Raster to Google Earth Legend Copy Print

Layers

Raster: Topographic Map

Vector: View All

- Hydro Station
- Meteo Station
- River
- Watershed
- Parish
- Lakes and Mangroves
- Water Storage and Production Plant
- Water Intake



2mi
5km

All Points displayed!

Layer: Raster Object: Longitude: -61.85531° Latitude: 12.09285°

start Windows Live Messen... Grenada - Water Info... nwis1 - Paint Internet 100% 1:29 PM

SYSTEM FEATURES

Excel spreadsheets, Reports, Charts, Graphs, Statistical Reports, Station Data,

Grenada WIS

Map | **Data** | Search | Data Upload | Help | Logout

Layers

Raster: Agro Climatic Zones

Vector: View All

- Hope Estate
- Knoll Black Bay
- Kubalal C & W Autostation
- Kublal Cable And Wireless
- La Sagesse
- Les Avocates Wtp
- Levera
- Lower Marii
- Mamma Cannes Wtp
- Maran Cocoa Station
- Maran Estate
- Mardigras Agric. Stat.
- Mardigras W.p.t.
- McDonald College Agromet
- Mirabeau Agr. Station**
 - Maximum Temperature - Monthly
 - Minimum Temperature - Monthly
 - Rainfall - Monthly
 - Relative Humidity - Monthly
- Mirabeau Auto Station
- Mirabeau W.p.t.
- Mt. Alexander
- Mt. Hartman
- Mt. Home Cocoa Station
- Mt. Morritz
- Mt. Plaisir
- Mt. Reuil Estate
- Niangafoix

All Points displayed!

Layer:	Year From/To	Display As
Meteo_Station	1961	Excel Table
Mirabeau Agr. Station	2009	<input type="checkbox"/> New Window

Object: Rainfall [inches]
Parameter: Monthly
Aggregat.: CARIWIN
Owner:

File Download

Do you want to open or save this file?

Name: Mirabeau_Agr_Station_6132.xls
Type: Microsoft Excel Worksheet, 7.20KB
From: www.cariwin.gd

Always ask before opening this type of file

While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. [What's the risk?](#)

Types of data

Table

Day	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	1.10	0.000	0.000	0.600	1.30	7.00	27.4	0.000	1.30	14.1	16.0
3	1.50	0.000	0.000	0.000	1.90	0.000	1.70	14.3	0.600	0.100	8.40	3.10
4	2.40	0.000	0.000	0.000	7.70	0.000	17.5	8.40	0.000	0.000	10.3	4.20
5	0.000	0.000	0.000	0.000	0.600	0.000	0.000	0.000	0.000	0.000	0.000	28.5
6	0.000	0.000	0.000	0.000	0.000	7.20	1.00	0.000	1.10	0.000	0.000	14.5
7	15.4	0.000	0.000	0.000	4.00	0.000	0.000	7.00	2.60	3.50	0.000	4.70
8	0.200	0.000	0.000	0.000	0.000	1.50	2.20	7.50	0.000	0.000	0.000	1.40
9	0.000	0.000	1.40	0.000	2.90	0.000	1.00	0.000	10.5	17.5	0.000	4.40
10	0.000	0.000	0.000	0.000	1.30	3.10	0.400	0.000	1.50	5.30	0.000	2.30
11	0.000	13.7	0.000	0.000	3.10	0.000	0.000	0.000	4.40	0.000	0.000	0.200
12	0.000	0.000	0.000	0.000	0.000	0.500	4.00	1.30	11.0	0.500	0.000	3.50
13	0.000	0.000	1.40	0.100	1.40	0.000	0.500	4.10	15.4	5.30	0.000	3.90
14	0.000	0.200	6.60	0.000	7.20	13.2	6.50	0.100	9.90	2.60	1.10	0.000
15	0.000	3.80	2.30	0.000	20.6	0.000	1.10	1.90	13.5	1.30	1.00	15.4
16	0.000	13.4	0.000	0.000	0.000	2.20	1.40	0.000	0.000	6.20	0.000	0.000
17	0.000	0.000	0.000	0.000	2.70	2.00	1.00	25.6	0.000	2.00	2.00	1.40
18	0.000	0.300	0.000	0.200	5.30	21.0	0.500	2.40	0.000	0.000	13.8	0.000
19	1.40	2.10	0.000	0.000	6.40	2.10	5.20	3.10	0.700	2.20	54.4	0.300
20	3.50	0.400	0.000	0.000	11.0	58.7	2.40	1.20	16.5	0.100	7.40	0.40
21	1.20	0.000	0.000	1.90	2.30	0.000	0.000	7.50	33.4	3.70	51.4	0.000
22	2.20	0.000	0.000	4.40	27.0	0.000	0.000	0.200	5.10	1.80	0.900	0.000
23	0.000	0.000	0.000	0.000	6.30	2.50	3.70	1.80	0.000	0.400	3.50	2.50
24	0.000	0.000	0.000	0.000	19.0	0.500	0.000	3.50	0.000	16.6	9.10	9.30
25	2.70	0.00	0.000	0.000	0.000	3.10	9.30	0.400	0.500	28.9	22.3	0.000
26	0.600	0.000	0.000	0.000	0.000	16.2	2.00	0.000	0.000	10.8	50.8	0.000
27	0.800	0.000	0.000	0.000	0.000	0.000	0.000	2.80	2.10	0.000	41.7	0.300
28	0.000	0.000	0.000	0.000	6.40	0.200	4.50	0.500	0.000	0.000	0.000	0.500
29	0.000	0.000	5.30	0.000	1.80	5.80	3.30	2.10	1.70	0.000	0.300	2.30
30	0.000	0.000	0.000	0.000	2.10	1.50	3.40	32.9	0.000	2.10	0.000	0.600
31	0.600	0.000	0.000	0.400	0.000	5.20	0.000	0.000	0.000	0.000	0.100	0.000
Min.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Avg.	1.99	1.26	0.540	0.770	4.73	5.03	7.48	5.37	32.7	9.78	14.18	11.0
Max.	15.4	13.7	6.60	4.40	37.0	58.7	17.5	32.9	33.6	26.9	54.4	28.5
Year Min.			0.000				3.60					50.7

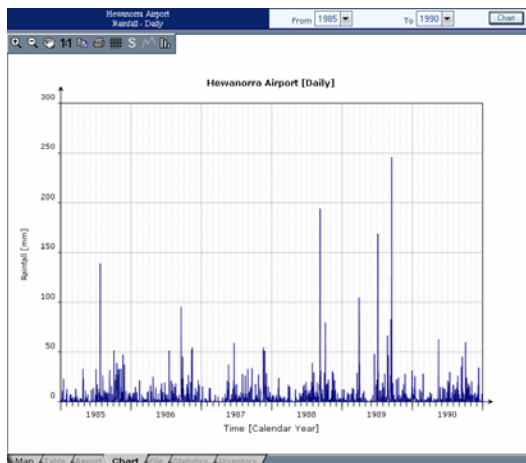
Report

Yearly Report

Object: ClimaticStation: Hewanorra Airport
 Variable: Rainfall [mm]
 Aggreg.: Daily
 Year: 1986

Day	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	5.4	3	0	0.1	0	0	6.5	1.8	0	1.6	0.1	13.9
2	15	0	0	0	3.2	0	5.8	1.7	3.2	0	0	5.1
3	0.4	0	0.8	0.4	0	0	0	4	3.8	0	0.2	1.7
4	2.3	1.6	2.3	0.1	0	0.8	3.6	11.2	0	0	2.4	5.4
5	3.2	0	4.9	0	0.1	12.7	0	0.8	0	0	3.6	4.3
6	0	0	2.6	0	0.7	0.5	0	17.7	0	1	19.4	3.2
7	2.5	0.6	0	0	0	4.1	0	0.4	3.8	6	15.1	2.8
8	1.1	0	0.4	0	7.7	0	0	0.2	6.4	5.3	13.1	0
9	0.7	0.1	1.9	0	14.3	18	7.1	2.7	0	5.5	0.6	10.1
10	8	0.4	0	0.4	10.9	0	0	8.4	0	0	4.3	2.1
11	1.1	0.1	0	0	0	0.3	0	1.3	0	0	14.6	0.2
12	0.3	2.1	2.9	1.6	0	0.7	2.4	3	0.3	0	52.3	1
13	1.7	1.9	0	0	0.8	2.5	0	0.9	0	0	1.5	0
14	1.1	21.3	0.2	0	0	0.7	0.5	0	0.5	0.2	28.3	2.2
15	7	0	0	0	0.1	9.3	1.9	14.9	0	7.5	54.4	9.0

Chart



File

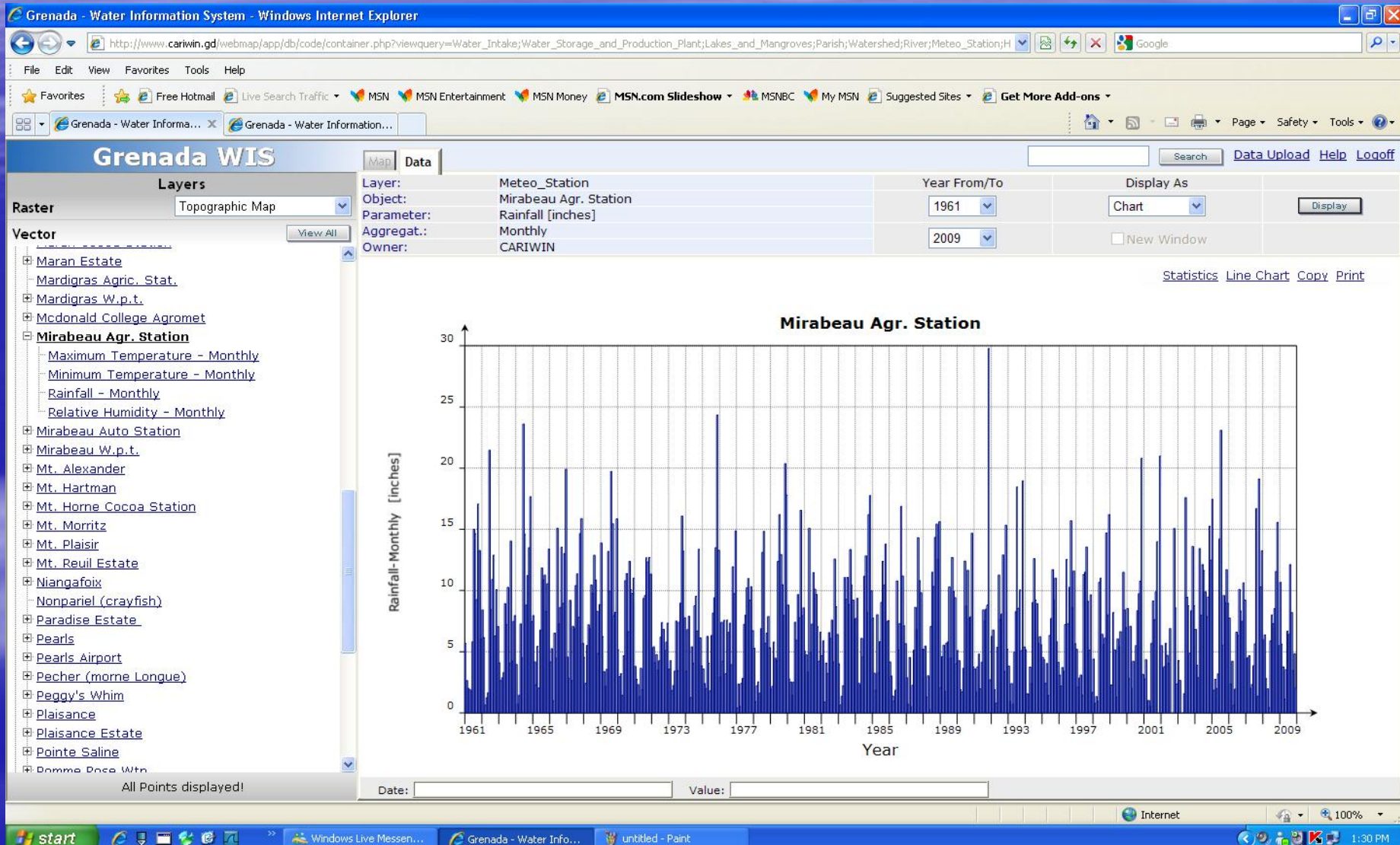
A1 Object: Hewanorra Airport

	A	B	C	D	E	F
1	Object: Hewanorra Airport	Variable: Rainfall [mm]	Aggregation: Daily	Period: 1985/1994		
2	Date	Value				
3	1.1.1985	0.6				
4	2.1.1985	0.8				
5	3.1.1985	2				
6	4.1.1985	0				
7	5.1.1985	1.4				
8	6.1.1985	2.5				
9	7.1.1985	0				
10	8.1.1985	0				
11	9.1.1985	10.8				

Types of data which are generated from the NWIS

- Tabular data includes Monthly, Yearly, Minima and Maxima and Averages
- Report data are in tabular, print-ready, Microsoft Word Format
- Chart data are in the form of a Line or Bar chart. The chart may be zoomed, copied and printed. Values may be accessed by moving the mouse over the point of interest on the chart.
- File data are in the form of ASCII, Excel or comma delimited data for a selected period
- Maps

CHART PREPARED FROM RAINFALL DATA



DOCUMENT ATTACHMENT IN SYSTEM

Grenada - Water Information System - Windows Internet Explorer

http://www.cariwin.gd/webmap/app/db/code/container.php?viewquery=Water_Intake;Water_Storage_and_Production_Plant;Lakes_and_Mangroves;Parish;Watershed;River;Meteo_Station;H

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☆ Favorites ☆ Free Hotmail ☆ Live Search Traffic ☆ MSN ☆ MSN Entertainment ☆ MSN Money ☆ MSN.com Slideshow ☆ MSNBC ☆ My MSN ☆ Suggested Sites ☆ Get More Add-ons

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Grenada WIS

Map Data

Search Data Upload Help Logoff

Layer:	Type	Description
Watershed		
Object: Grand Etang		
Parameter: Documents		
Aggregat.: None	Survey on Grand Etang	Survey on Grand Etang
Owner: Ministry of Agriculture		

Display

Zoom In 100%

Download PDF Creation Tools


Properties...

Bookmarks

New Edit

Investigation of Eutrophication of the Grand Etang Lake

Grenada



8.50 x 11.00 in

Options

1 of 18

Done

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COST OF SYSTEM

CAD\$ 30,000

- COVERS ALL EQUIPMENT
- ALL SOFTWARE
- COLLECTION & INPUT OF DATA
- CONSULTANCY FEES
- TRAINING OF STAKEHOLDERS STAFF

Advantages of the NWIS

- Software is open source
 - Free download from the Internet
 - No renewal of licenses
 - No payment of user fees
 - User friendly so no copious manuals
- One system for all agencies
 - Internet access
 - Real-time data and information access

Advantages continued

- Data entry in any format
- Data can be extracted in various formats
- Selected variables could be extracted from the existing database of the contributing institution and sent electronically to the Water Resources Agency or by uploading
- Reduced chance of transcribing errors
- **LOW OPERATIONAL COST.** (Internet Connection, 1 SA staff)

Update on Grenada NWIS

- Links with Google Earth
- Links with Other Agencies
- Cooperation with Regional Agencies (Barbados, UWI)
- Increased use of NWIS by Agencies, Depts, Ministries, Schools,
- Upload data from Automatic Stations
- Data availability to public still in discussion
- Creation of separate access points for Agencies/Users



Grenada Update Challenges

1. Data Collection (getting organizations to provide data, reports in a timely manner) .
2. Capacity Building. Requires time to learn the Software components in order to make improvements to the site (Html, javascript, ajax, PHP, SQL statements.)
3. Lack of feedback from users.
4. Data Analysis

Issues to be considered

- Expansion of the NWIS – forecasting, early warning, water quality?
- Instrumentation for data collection – type, placement, maintenance
- Data collection – staff, incentives
- Data entry – error in transcribing each time data is transferred
- Data analysis, interpretation and dissemination
- Who are the users of the data? For what?

Recommendations

- Guidelines to ensure data accuracy
- Institutional arrangements to be streamlined
- Computerizing data entry in the field to reduce changes and errors
- Development of simple tools linked with IWRM
- Additional applications e.g. crop production, IWRM planning
- The review of the NWIS of other countries has shown that the system works when the persons using it see its value and when there is government commitment to support it.

Remember...

- Keep it simple!!

Thank you