INTERNATIONAL WORKSHOP ON WATER AND DISASTER
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Flood Forecasting and Hazard Mapping in Jamaica

Presenter

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Water Resources Authority Jamaica

Content

- **The cause and nature of flooding**
- **Flood warning/Hazard mapping as risk reduction instruments.**
- **Lessons Learned**
- **Way forward**

Jamaica located; 161 km (100 miles) south of Cuba
Latitude 17º42′ and 18º31′ N
Longitude 76º10′ and 78º22′ W. .

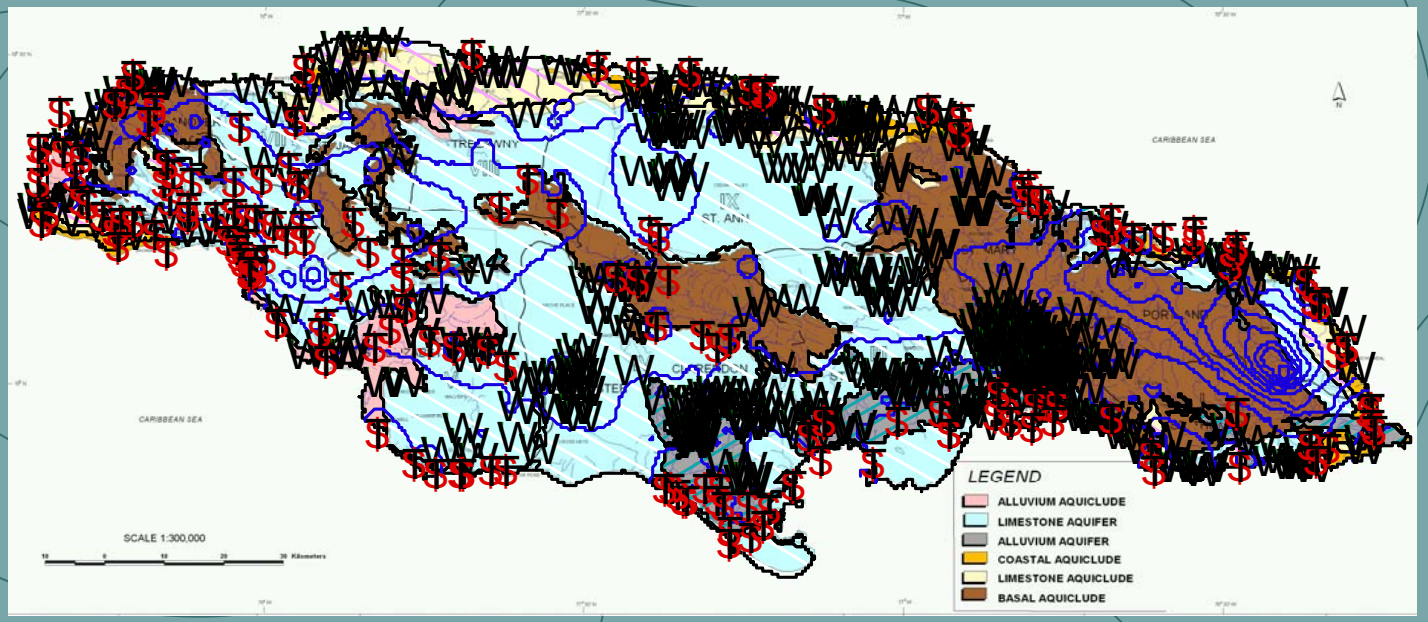
Cause of Flooding

- ✓ Jamaica prone to flooding
- ✓ Topography /geology determines the nature of flooding
- ✓ Climate also impacts
- ✓ Man's impact aggravate the flooding

30-yr. rain

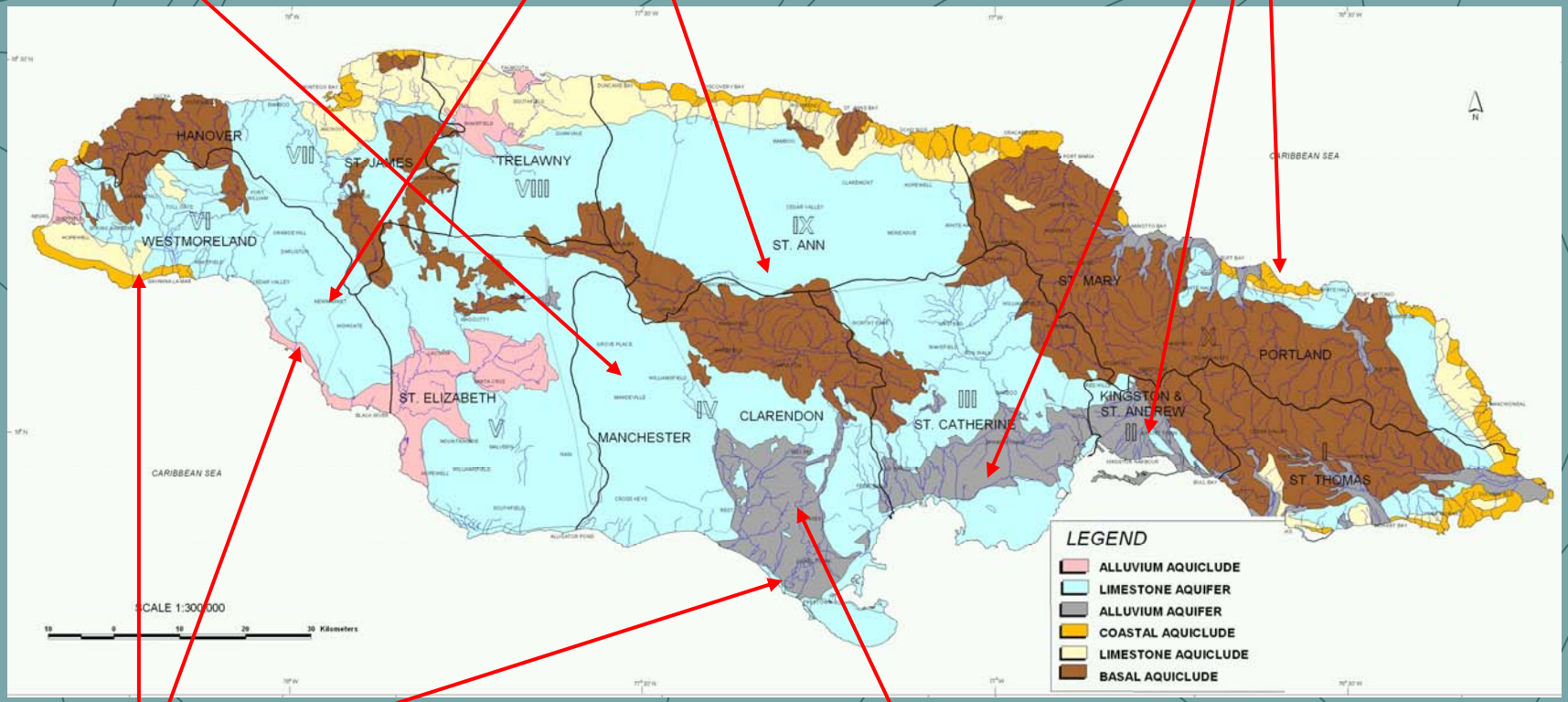
Flood prone areas

Housing areas



Nature of the flooding

- Groundwater induced
- Depression
- Riverine

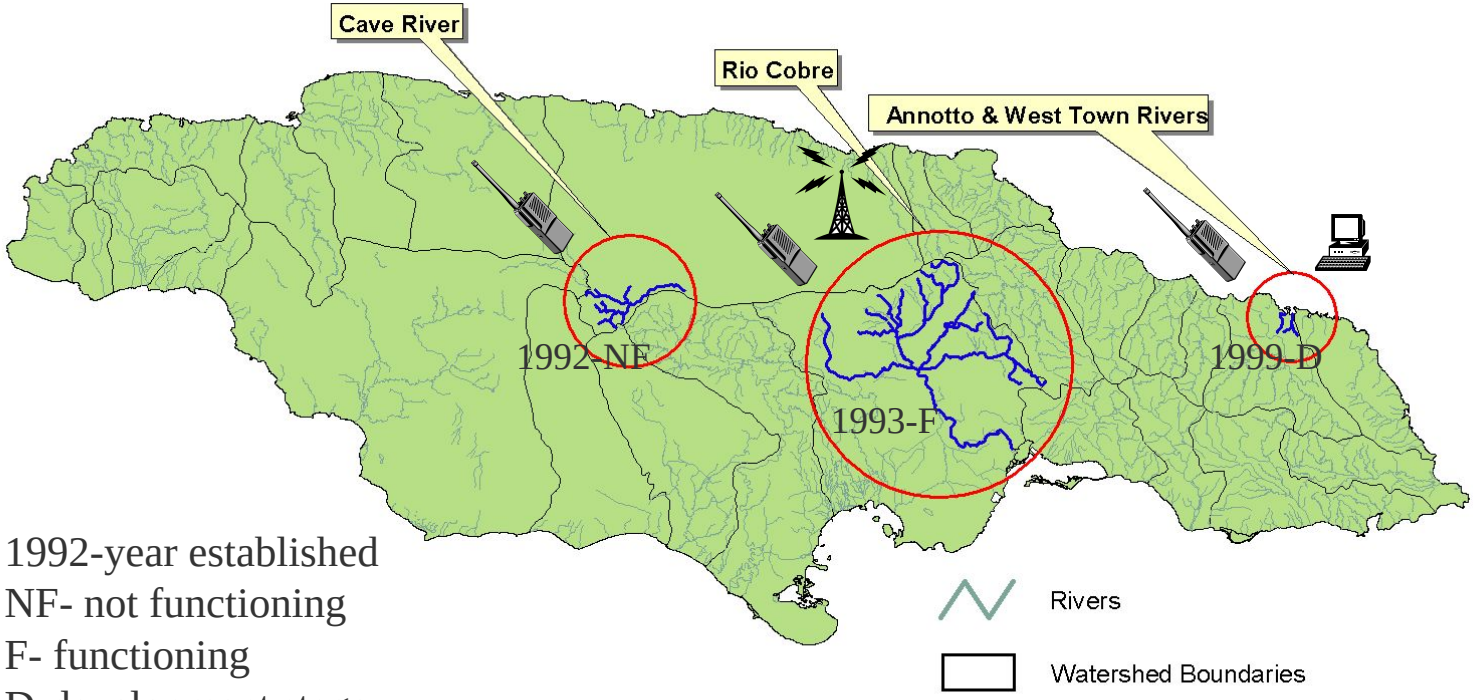


- Storm Surge
- Urban Runoff

Minimising the Flood Risk

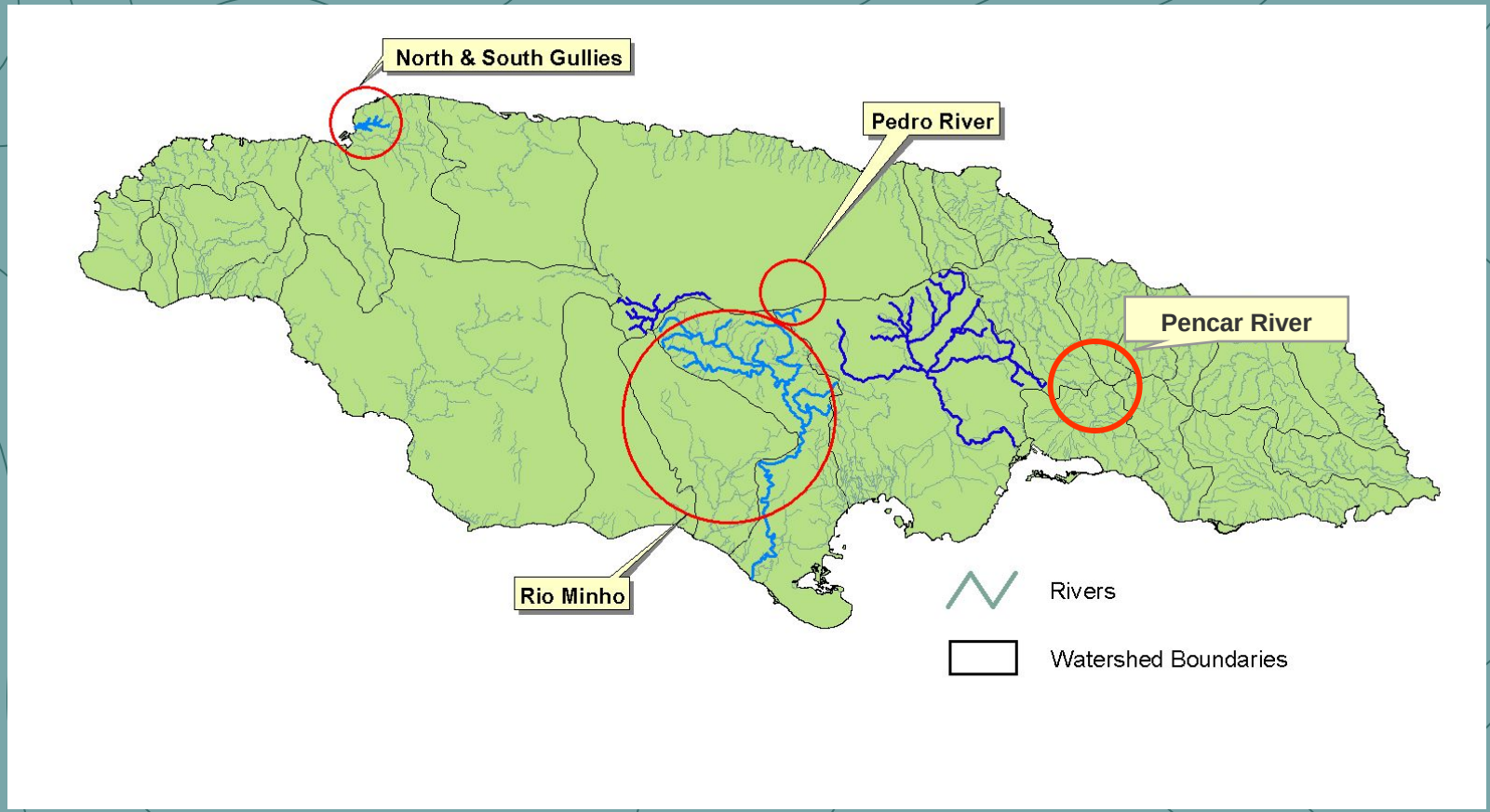
What is the Jamaican Experience ?

Existing early warning systems in Jamaica



1992-year established
NF- not functioning
F- functioning
D-development stage

Future Early Warning Systems



Cave River

Flood Forecast table

CAVE RIVER COMMUNITY FLOOD WARNING SYSTEM

PREDICTION TABLE SHOWING THE TIME TO FLOODING IN AENON TOWN FROM THE BEGINNING OF THE STORM (HRS.)

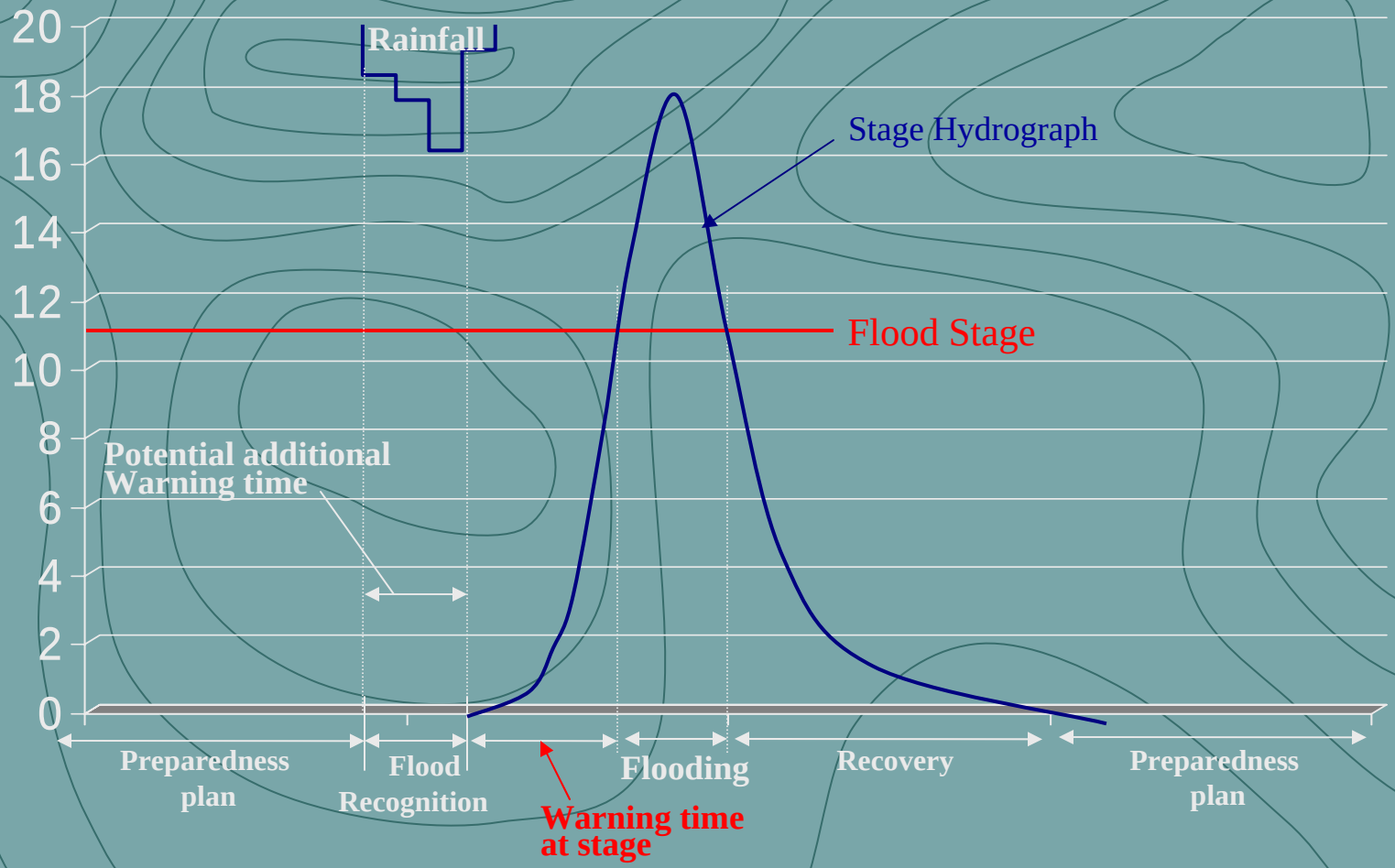
TOTAL RAINFALL DEPTH (IN)	RAINFALL DURATION FROM THE BEGINNING OF THE STORM (HRS.)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1.0	10																							
1.5	8	13																						
2.0	7	10	14																					
2.5	7	8	11																					
3.0	7	8	10	13																				
3.5	7	7	9	11	14																			
4.0	6	7	8	10	12	14																		
4.5	6	7	8	9	11	13	14																	
5.0	5	7	7	8	10	11	13																	
5.5	5	7	7	8	9	11	12	14																
6.0	5	7	7	7	8	10	11	13	14															
6.5	4	7	7	7	8	9	11	12	13	14														
7.0	4	7	7	7	8	9	10	11	13	14	14													
7.5	x	7	7	7	8	8	9	10	12	13	14													
8.0	x	6	7	7	7	8	9	10	11	12	13	14												
8.5	x	6	7	7	7	8	8	9	10	11	13	14	14											
9.0	x	6	7	7	7	8	8	9	10	11	12	13	14	15										
9.5	x	6	7	7	7	8	8	9	F	F	F	F	F	F	F									
10.0	x	5	7	7	7	7	8	F	F	F	F	F	F	F	F	F								
10.5	x	5	7	7	7	7	8	F	F	F	F	F	F	F	F	F								
11.0	x	5	6	7	7	7	8	F	F	F	F	F	F	F	F	F	F							
11.5	x	5	6	6	7	7	F	F	F	F	F	F	F	F	F	F	F	F						
12.0	x	5	6	6	7	7	F	F	F	F	F	F	F	F	F	F	F	F	F					
12.5	x	5	6	6	7	7	F	F	F	F	F	F	F	F	F	F	F	F	F					
13.0	x	5	6	6	7	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F				
13.5	x	5	6	6	7	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F			
14.0	x	4	6	6	7	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
14.5	x	x	6	6	7	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
15.0	x	x	5	6	6	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
15.5	x	x	5	6	6	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
16.0	x	x	5	6	6	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
16.5	x	x	5	6	6	7	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F

NO FLOODING EXPECTED WITHIN 24 HOURS FROM THE BEGINNING OF THE STORM

KEY:

F	Flooding is expected at this time	6	Hours to flooding from the beginning of the storm
x	Unlikely rainfall condition		

Flood Forecasting



Community Based Early Warning Systems in Jamaica

FLOOD GAUGES

Blue = Watch mode

Orange = Alert mode

Red = Critical

Value FEWS to Community

Communities		Reliability	Loss Reduction	Is System still being used
Rio Cobre	Rivoli	97% yes	97% yes	100%
	Thompson Pen	93% yes	100% yes	98%
Cave River (Aenon Town)		44% yes 16% no	28% yes 39% no	60% yes 6% no

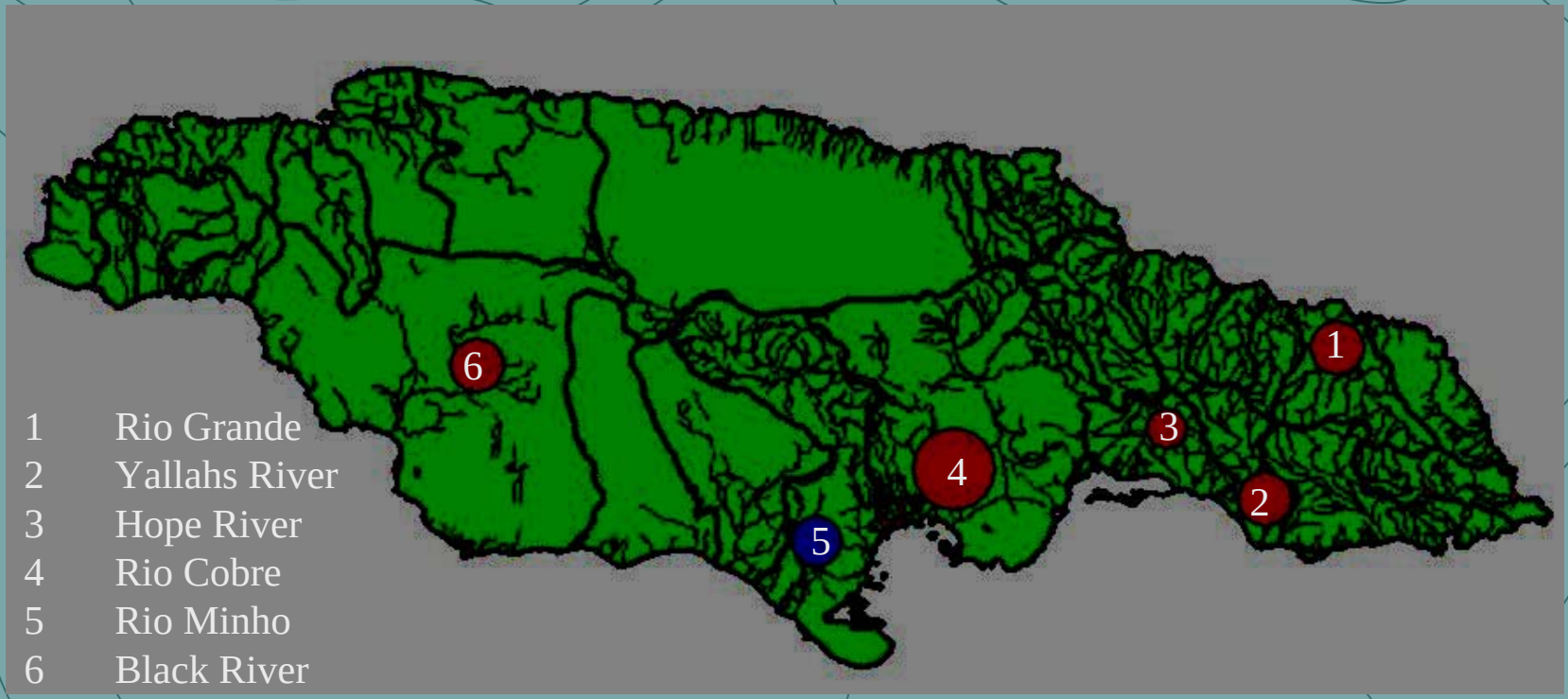
ODPEM Field Survey February 2004

RECOMMENDATIONS

- Get local govt involved and designate a Lead Agency
- Revive communication process within communities
- Improve equipment and monitoring
- Institute annual drills
- Upgrade /Maintenance of systems
- Dedicated Budget
- Strengthen institutional capacity

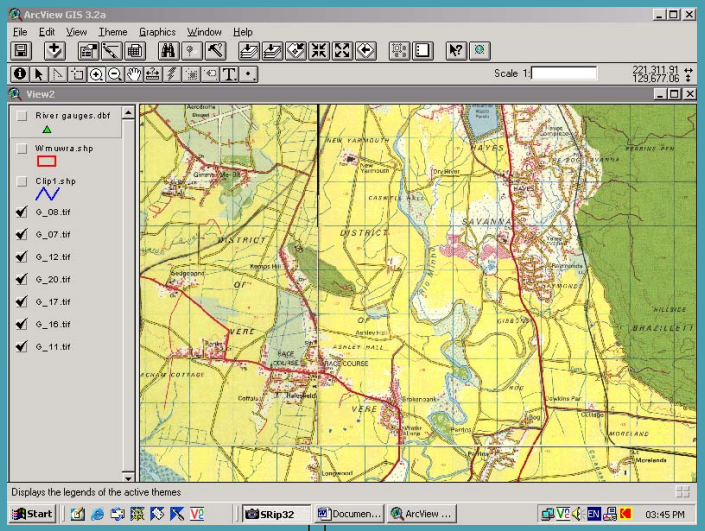
Flood Plain Mapping

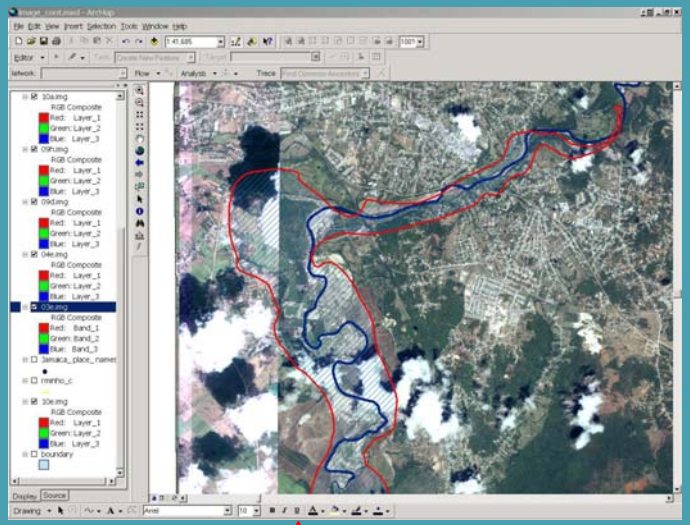
- Flood plain mapping Project, WMO 1980s
- Hydrologic Support Unit Project UNDP 1990s
- Community Disaster based management Projects UNDP, USAID, DIPECHO, 2000s - to date



Overview of the Mapping Process

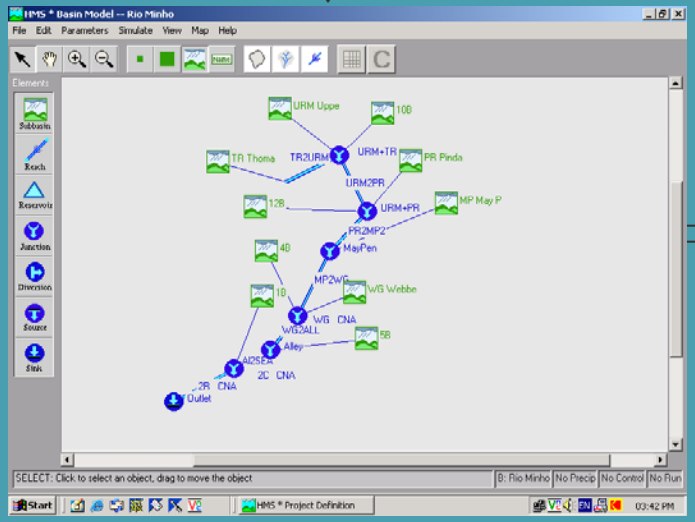
ArcView
Input Data
DEM

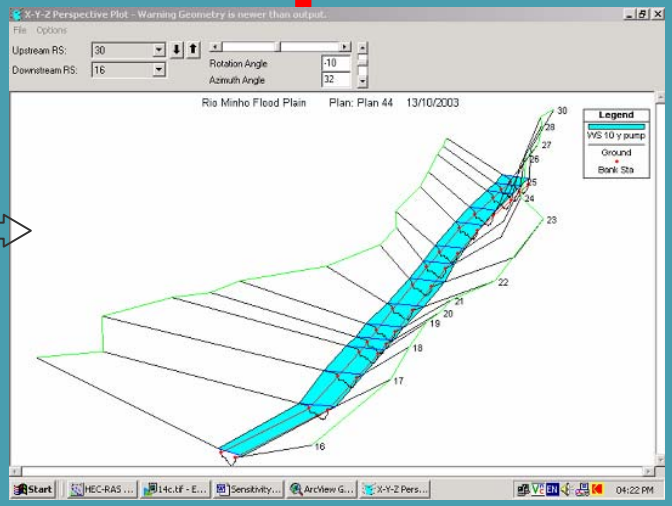




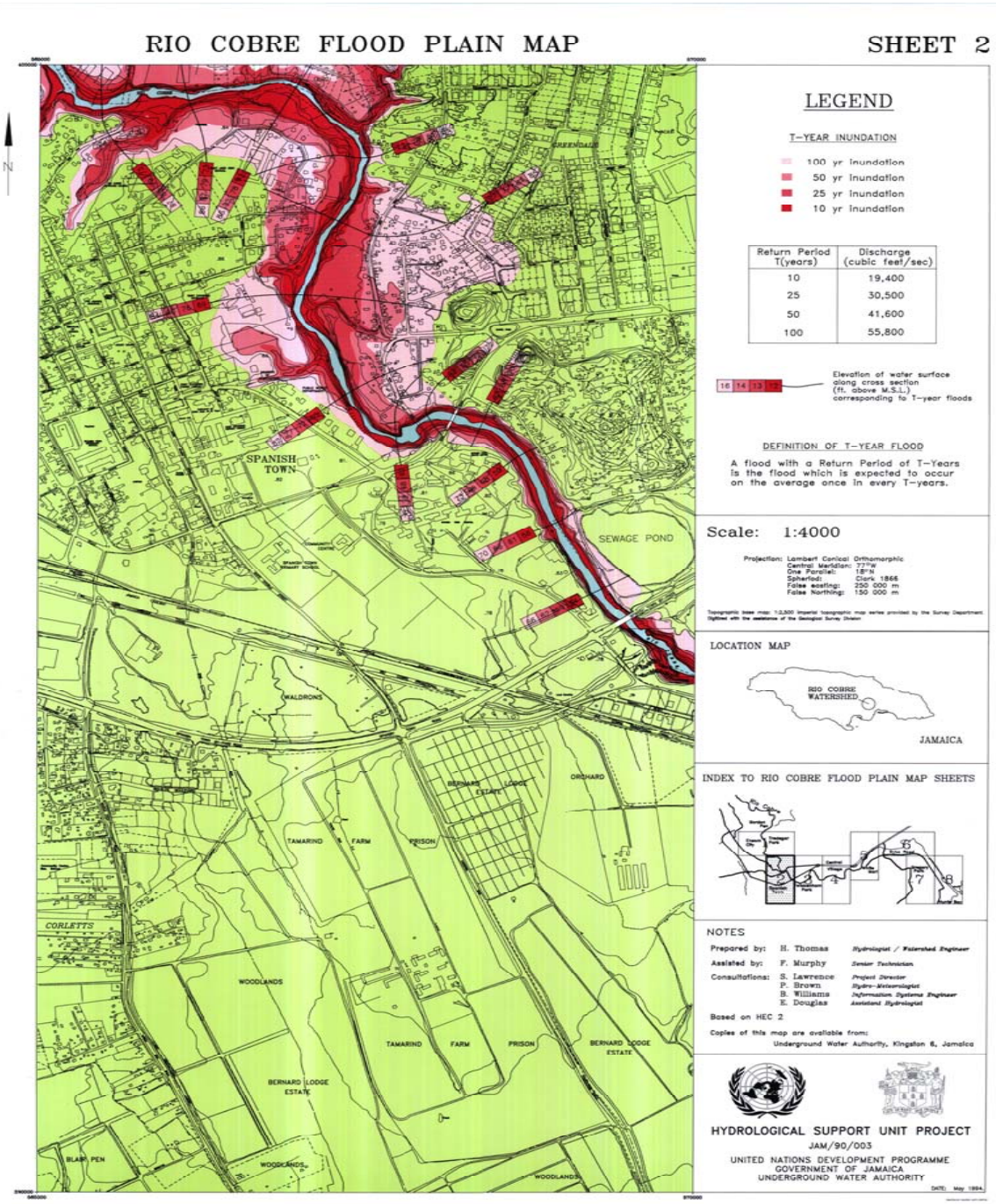
ArcView
Flood
plain maps

HEC-HMS
Flood
discharge





HEC-RAS
Water
surface
profiles


RIO COBRE FLOOD PLAIN MAP
SHEET 2
LEGEND
T-YEAR INUNDATION
100 yr Inundation
50 yr Inundation
25 yr Inundation
10 yr Inundation
Return Period T(years) | Discharge (cubic feet/sec)
10 | 19,400
25 | 30,500
50 | 41,600
100 | 55,800
Elevation of water surface along cross section (ft. above M.S.L.) corresponding to T-year floods
DEFINITION OF T-YEAR FLOOD
A flood with a Return Period of T-Years is the flood which is expected to occur on the average once in every T-years.
Scale: 1:4000
Projection: Lambert Conical Orthomorphic
Central Meridian: 77°W
One Parallel: 18°N
Spheriod: Clark 1866
False easting: 250 000 m
False Northing: 150 000 m
LOCATION MAP
RIO COBRE WATERSHED
JAMAICA
INDEX TO RIO COBRE FLOOD PLAIN MAP SHEETS
NOTES
Prepared by: H. Thomas Hydrologist / Watershed Engineer
Assisted by: F. Murphy Senior Technician
Consultations: S. Lawrence Project Director
P. Brown Hydro-Meteorologist
B. Williams Information Systems Engineer
E. Douglas Assistant Hydrologist
Based on HEC 2
Copies of this map are available from:
Underground Water Authority, Kingston 6, Jamaica
HYDROLOGICAL SUPPORT UNIT PROJECT
JAM/90/003
UNITED NATIONS DEVELOPMENT PROGRAMME
GOVERNMENT OF JAMAICA
UNDERGROUND WATER AUTHORITY
SPANISH TOWN
SEWAGE POND
WALDRONS
ORCHARD
TAMARIND FARM PRISON
BERNARD LODGE ESTATE
CORLETTS
WOODLANDS
BLAIR PEN

Problems with usage

- 1. No guidelines for their interpretation and use.
- 2. No national standard for regulatory flood
- 3. No national guideline prohibiting/permitting flood plain uses.
- 4. No national standard for the level of protection – depth/or flow velocity
- 5. Very limited number of flood plain maps available.
- 6. No flood zoning done - hence need for rigorous analysis to assess cumulative impacts

Legislative Amendments

- Amendment of the Water Resources Act 1995
- Repeal of the Floodwater Control Act 1958

The Water Resources (Amendment) Act, 2003 has been drafted.

- Floodwater Control Areas
- Floodwater Control Plans for those areas.

Flood Control Policy to be implemented

(regulatory flood, usage regulation, zoning, etc)

THE END

THANK YOU

FOR YOUR ATTENTION