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APPENDIX 2

United Nations Convention to Combat Desertification

TRAINING IN GEOGRAPHIC INFORMATION SYSTEMS (GIS)

OVERVIEW OF GIS

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Purpose of Training

- St. Lucia is signatory to the UN Convention to Combat Desertification and Mitigate Effects drought.

- **Desertification** *is a process of land degradation in arid, semi-arid and dry sub-humid areas, which starts with the loss of vegetation cover and ends with the destruction of the soil's fertility and its transformation into barren desert, resulting from a combination of various factors including climatic variations (mainly high temperatures and low rainfall) and human activities (e.g. burning, overgrazing, poor farming practices, settlement).*

- National Action Plan to Combat Land Degradation

GIS Component of Project

- GIS Status and Needs Assessment in Key Agencies (skills set, software, hardware related technologies, use)
- To *create awareness of the use of GIS* in Land Degradation Application(s) and to provide GIS training/exposure to the following key users
  - Community based Groups
  - Technical Officers
  - Decision Makers within Agencies within key agencies
- Use of GIS in Benchmarking and Monitoring the National Action Plan (NAP).

WHAT IS A GIS?

Some Definitions

- An organised collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update and manipulate, analyse and display all forms of geographically referenced information.

- Database Management System which integrates geographic data (mapped) and the descriptive that describes it into a single system to facilitate spatial analysis required to support decision making.

- Decision Support Tool that enables the user to answer critical geography questions - WHERE? or WHAT IS AT?

- Key components : Software, Hardware, dedicated and trained staff, current geo-referenced data at a useful scale and ‘expert knowledge' (artificial intelligence and modelling)

- A computerised information system for the management, storage and analysis of spatial or geo-referenced data.

Purpose of a GIS

- To store & organise information.
- To support general research
- To provide support to enhance decisions.

WHAT IS UNIQUE ABOUT A GIS?

1. **Geo-referencing of data :** Adding geography to data through the joining of 2 types of databases**:-**
- **Attribute :** textual, descriptive, aspatial
- **Geographic :** spatial or map data.

This enables the answering of 2 key questions:-
What is at?
Where is/are?

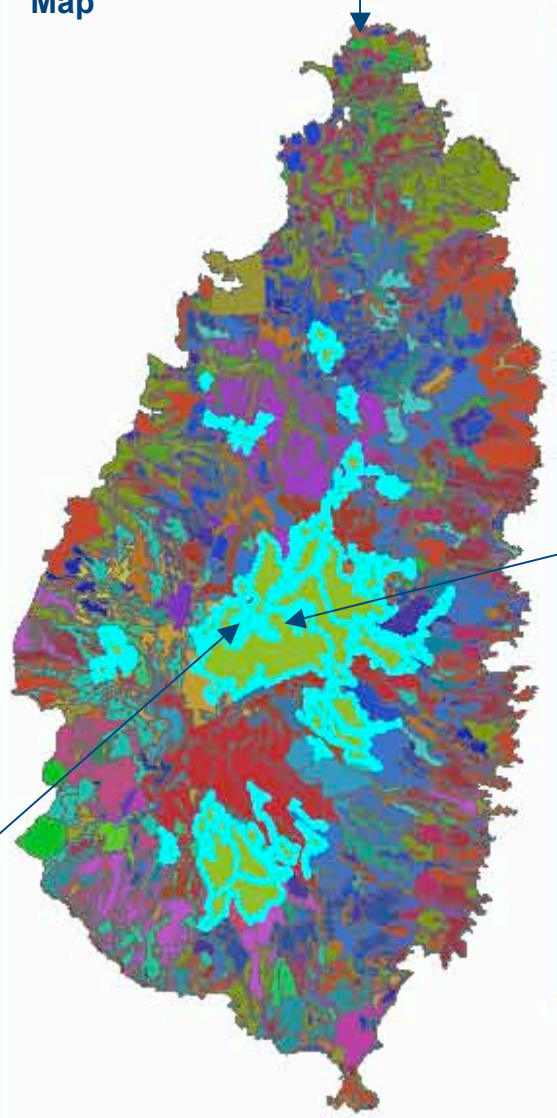
Joining a Soils Map and Soils Attribute File

Map Key

Thematic (Soil Series)/Spatial Database

Map

Attribute Table or Aspatial Database

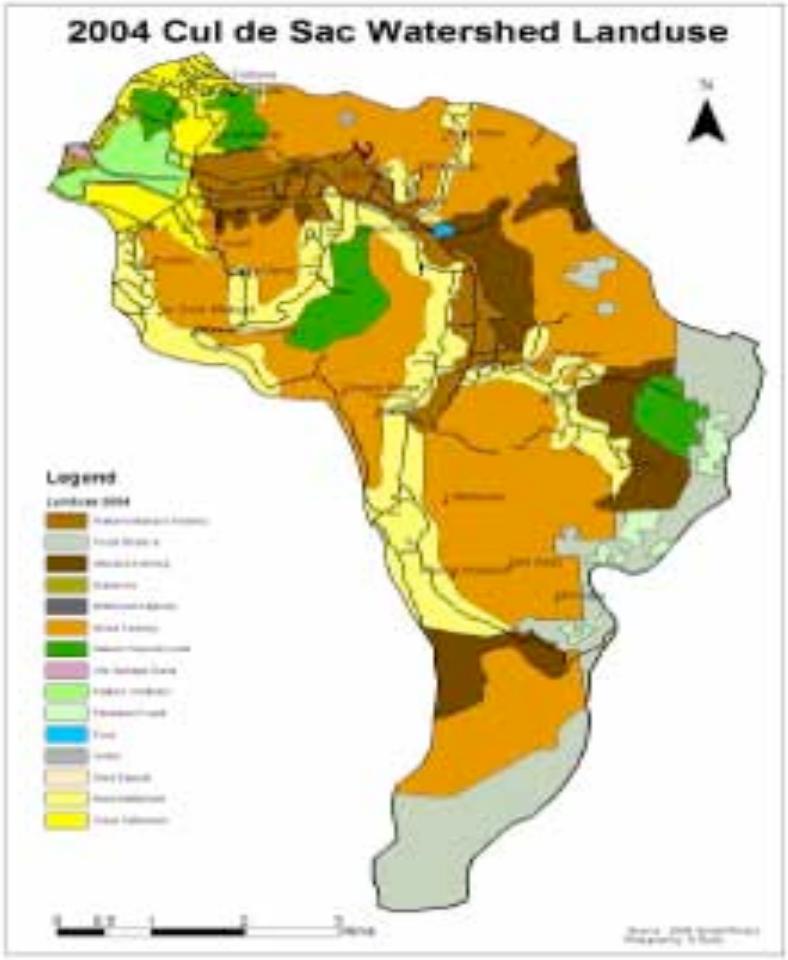


Attributes of Soils_Exercise1

DSTONE	DOMSOL	M_CLA
S	Rabot Clay	
F	Ivrogne Stony Clay	
E	Rabot Clay	
S	Casteau Gravelly Bouldery Silt Loam	
E	Ivrogne Stony Clay	
NA	Deglos Silty Clay	
F	Falaise Stony Loam	
F	Falaise Stony Loam	
0	Salina	
V	Falaise Stony Loam	
0	Excessively Steep Slopes	
0	Excessively Steep Slopes	
F	Bocage Stony Clay	
NA	Warwick Clay	
NA	Falaise Stony Loam	
S	Bocage Stony Clay	
V	Falaise Stony Loam	
S	Falaise Stony Loam	
V	Falaise Stony Loam	
0	Mangrove Swamp	
q	Falaise Stony Loam	
0	Swamp	
0	Mangrove Swamp	
0	Beach Sands	

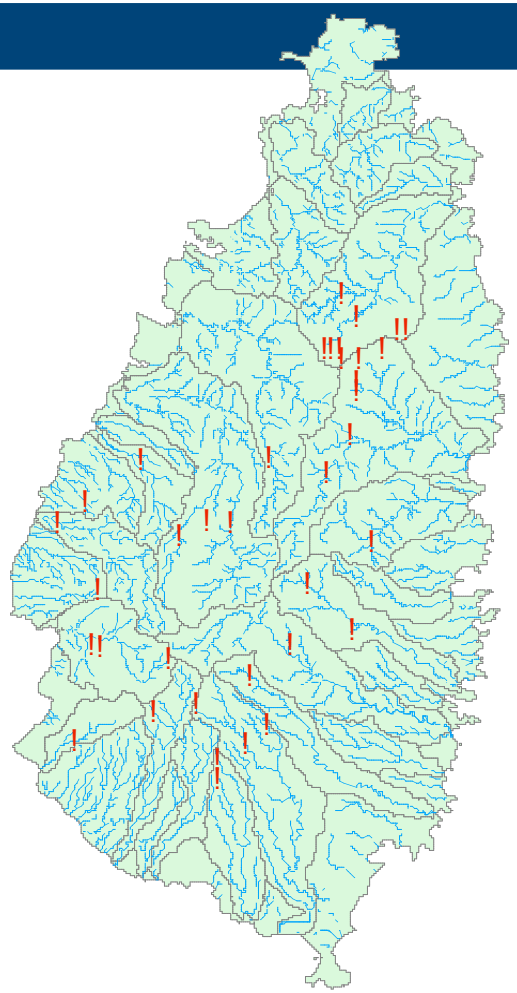
Record: 1 Show: All Selected

Visualization – Thematic mapping gives much meaning to data



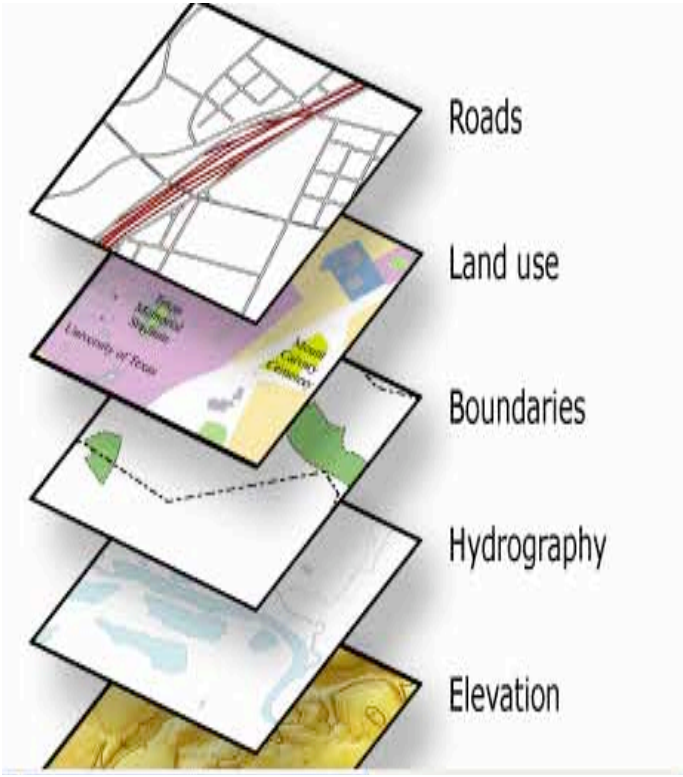
Spatial analysis

- Exploratory Analysis :observation of patterns in data



Spatial analysis

Overlaying of several datasets to enable complex multi criteria analysis using the brute force of the computer



Data Integration

-Linking maps with aerial photographs

-Satellite images

-GPS

-CAD system files

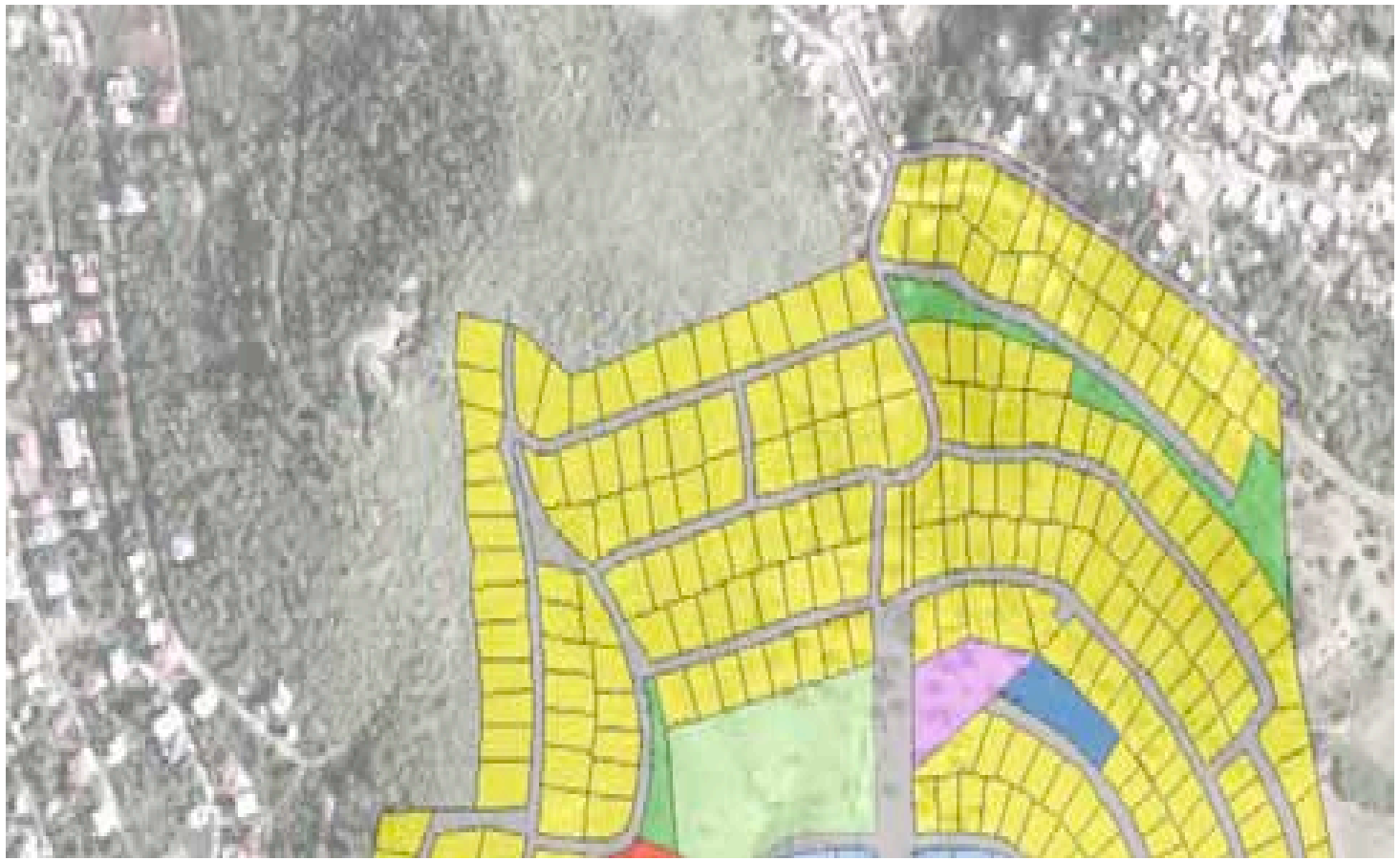
-Pictures

-External attribute data e.g. EXCEL spreadsheets, ACCESS databases

-Google Images

Picture Integration

La Tourney – Aerial Photo & Sub-division



Integration with Google Images

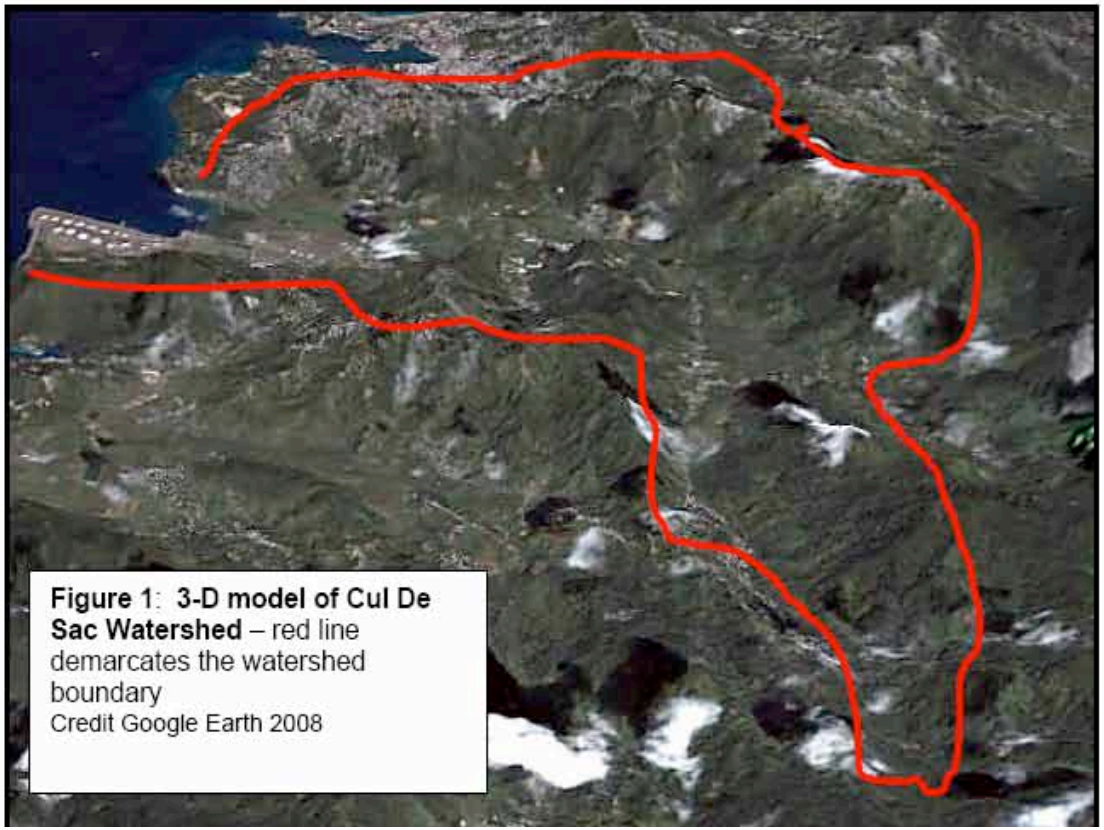


Figure 1: 3-D model of Cul De Sac Watershed – red line demarcates the watershed boundary
Credit Google Earth 2008

Some Key Functions

- Capture, storage, retrieval and update of geo-referenced data
- Production of maps at any scale and colour
- The update of maps and their databases
- Normal attribute database functions (queries, calculate fields,\summary, boolean functions
- Database joining

- Data Manipulation (Buffering, Sorting, Aggregation, Overlay etc.)
- Queries – Spatial & Aspatial
- Slope analysis and contouring
- statistics etc.)
- Network Analysis
- Visibility Analysis
- Programming and customizing

- Profiling
- Time Series Assessments (comparisons overtime – M&E)
- Constraints mapping (slope and hazard mapping)
- Conversion and integration of data external sources (GPS, Satellite Imagery & remote sensing, linking to cad systems and picture files

Benefits of a GIS

- Automation of manual operations -mapping
- Easy storage, updating & reproduction to a number of scales and colours.
- Increases speed & efficiency of data query & manipulation
- Effective means of organising and retrieving data
- The brute force of computer technology allows for complex multi criteria analysis (& others) not possible through manual methods.

- Allows for more scientific analysis
- Internal & external models e.g. Predictive models of a particular phenomenon can be of immense value to an organization.
- Effectiveness of decisions – more scientific & information rich.
- Visualization.

GIS COMPONENTS

SOFTWARE

- Digitizing package
- Mapping
- Computerised database
- Statistical analysis
- Modeling capability (internal or external)

Software type:-***(300 plus proprietary packages on the market)***

- ARC INFO\ARC GIS
- SPANS
- ATLAS
- MAPINFO
- ARCVIEW
- IDRISI
- ARCAD

HARDWARE

- Computers
- Plotter
- Digitizer
- Scanner
- Large Printer
- Digital Camera etc

HUMANWARE

- Dedicated GIS Technical Staff or Technicians and apprentices
- Personnel with expert knowledge with GIS exposure

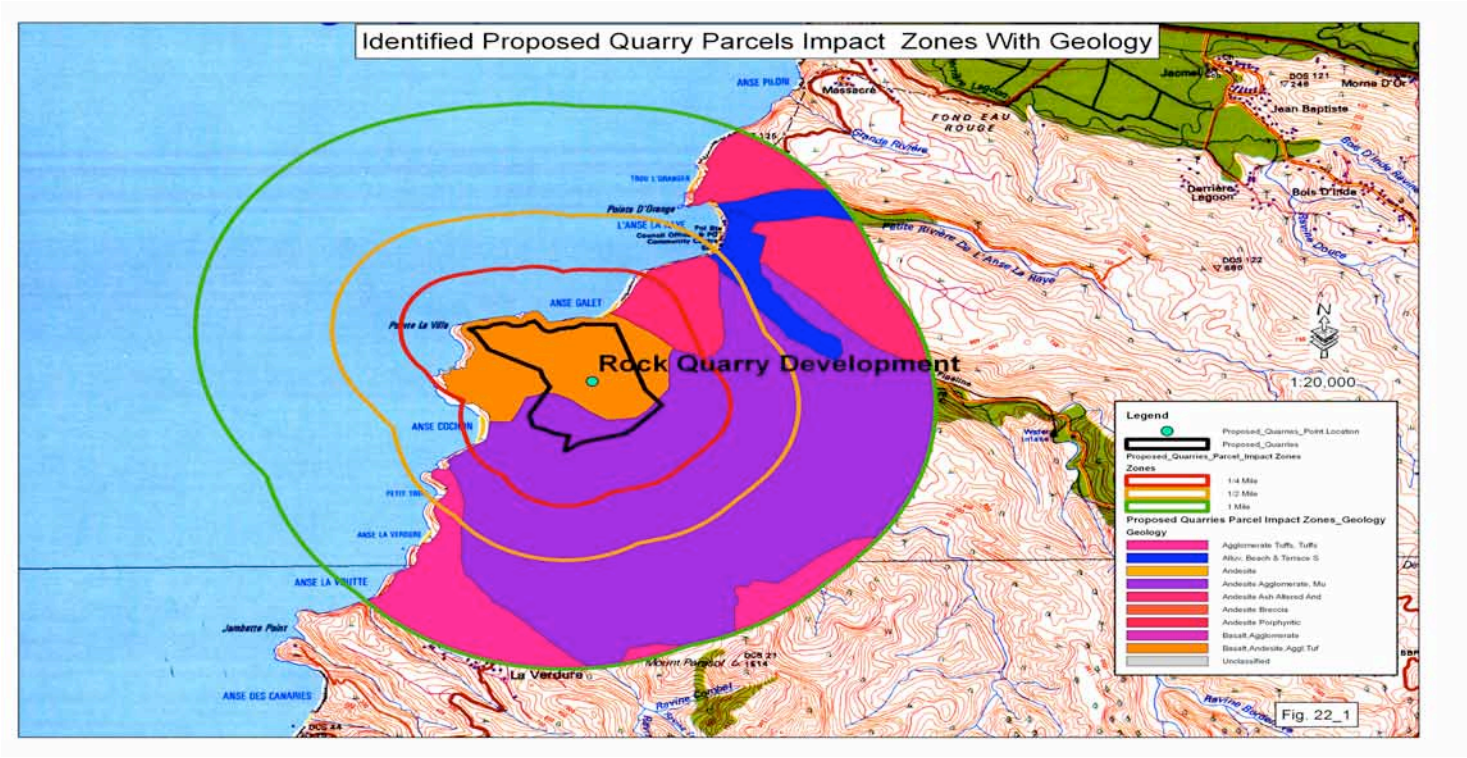
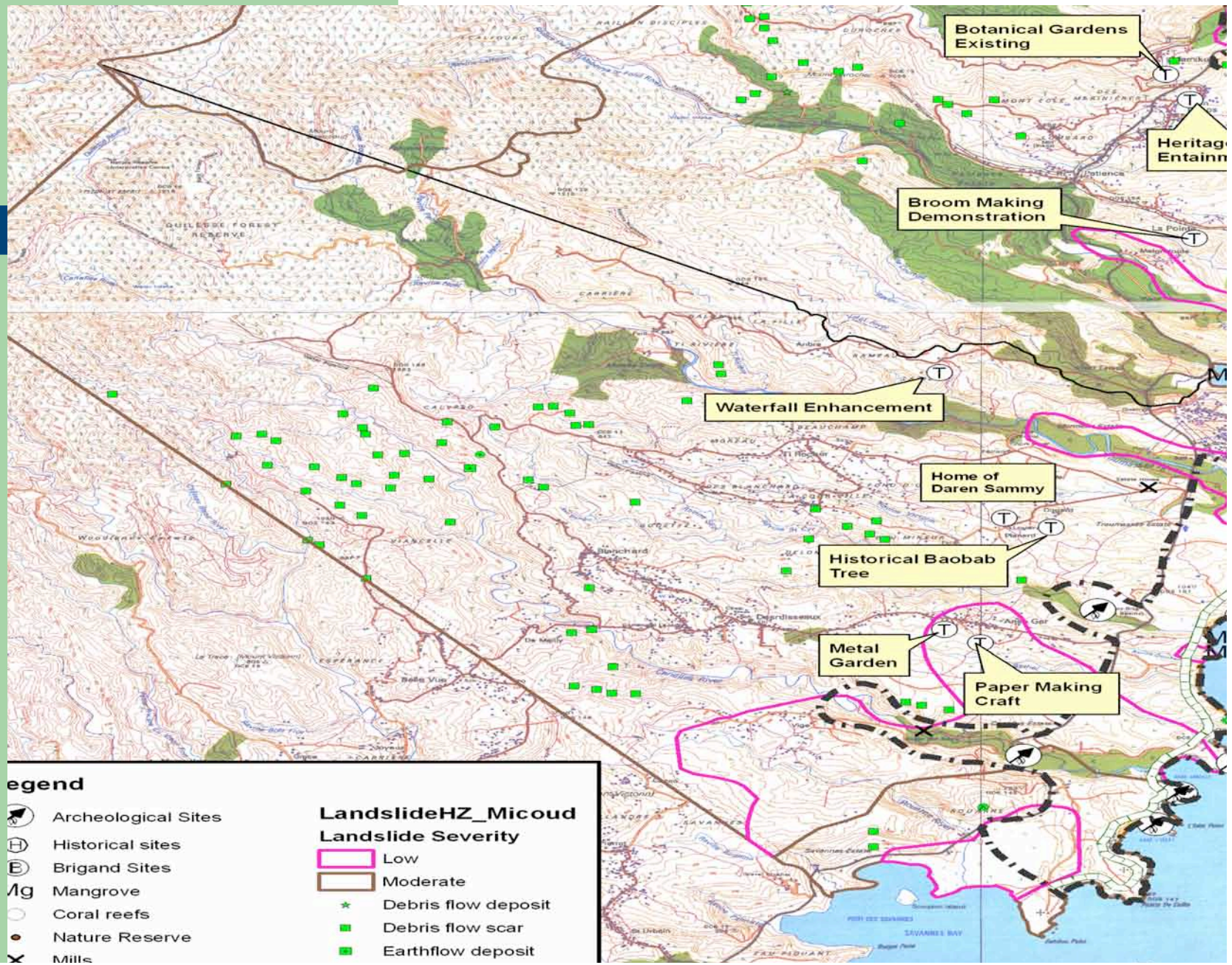
DATA

- Maps
- Tables
- Computerised Records
- Remote Sensed Data
- Aerial Photographs
- Scanned Images
- Global Positioning Systems

GIS APPLICATIONS

- Map Archiving, updating and mapping
- Site Suitability Analysis – cropping, facilities location
- Mineral Prospecting
- Hazard Mapping and Planning
- Network Analysis and Planning
- Landuse Planning
- Workload Balancing
- Routing – e.g. Solid Waste Collection
- Geo-demographic Analysis – service provision, deprivation studies, assessment of public sector spending in relation to need
- Watershed management

Buffering of Impact Zones – Proposed Quarries



Tropical Storm Debbie Landslide Occurances - Micoud