UNIVERSITY OF TWENTE.

INTRODUCTION ITC
CAPACITY BUILDING & PROPOSAL FOR TRAINING

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Faculty ITC

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FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

Proposed programme

- Introduction: ITC and us.
- Multi-hazard risk for decision making
- Near real time satellite data and its use in Early Warning
- The CHARIM project
- ITC's capacity building strategy.
- Proposed training course
- Discussion

ITC

UNIVERSITY OF TWENTE.

COURSES

IN THE DEGREE AND DIPLOMA PROGRAMMES

Geo-information science and earth observation for

- Applied Earth Sciences

- Geoinformatics

- Governance and Spatial Information Management

- Land Administration

- Natural Resources Management

- Urban Planning and Management

- Water Resources and Environmental Management

- Environmental Modelling and Management

- Geographical Information Management and Applications

PROGRAMME STRUCTURE

18-MONTH MSC DEGREE PROGRAMME

This will be 24 months MSc in 2017

BLOCK	MODULES (3 weeks)	
1	1-3	Geo-information science and earth observation
2	4-10	Application of geo-information science and earth observation in the field of interest
3	11-15	Research orientation
4	16-23	Individual research

A programme based on research
- Entry level: BSc

PROGRAMME STRUCTURE

9-MONTH POSTGRADUATE DIPLOMA PROGRAMME

BLOCK	MODULES (3 weeks)	
1	1-3	Geo-information science and earth observation
2	4-10	Application of geo-information science and earth observation in the field of interest
3	11-12	Final assignment

A programme based on the first part of the MSc programme
- Serves as a basis for entering the second part of the MSc programme
- Entry level: BSc

CERTIFICATE PROGRAMME

Certificate courses and individual modules

- Duration: 3 weeks to 3 months

- Entry level: BSc / Secondary School

Distance education courses

- Duration: 6 weeks

- Entry level: BSc / Secondary School

Refresher courses

- Duration: 2 weeks

- Organized for alumni in their home country

Distance education course example:
https://www.itc.nl/disaster-management

- Open source software
- Steep learning curve
- Continued learning
- Contents:
    - Hazard assessment
    - Elements at risk
    - Vulnerability
    - Risk assessment
    - Risk reduction planning

Tuition fee: 500 Euro
Next course starts in May

Short course example:
https://www.itc.nl/disaster-management

Study Research Services Departments Alumni Library Organisation

Home » Study » Courses »

Study

Courses

« Back

Certificate course in

Disaster Risk Management and Environmental Assessment for Spatial Planning

Certification Certificate	Location	Start	Duration	EC	Tuition fee	Registration deadline	NFP/MENA registration deadline	Register
Certificate	Netherlands	05 Jun 2017	6 weeks	10	EUR 1569	15 Apr 2017	Not applicable	Register

There is an urgent need to integrate hazard assessment and disaster risk management into strategic planning and sustainable development. Our exposure and vulnerability to extreme events - including both natural and human-induced hazards - continue to increase. Worldwide the impact of disasters is rapidly growing. However, many countries and development agencies so far do not consider hazard and disaster risk in development planning, and lack sufficient strategies to plan, assess, prevent or mitigate the effects of extreme events.

Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) are decision-making tools for mainstreaming hazard and disaster risk reduction strategies and measures into policies, plans and projects. They can be applied at national, regional and local level and in different sectors. Environmental assessments should provide guidance in analysing hazard and disaster risk-related consequences of proposed activities via their impact on the environment. And they should also take into account the potential threat of (natural) hazards to plans or projects.
This course provides a unique opportunity to integrate a multidisciplinary assessment of hazard and risk into spatial planning.

Scholarships

www.itc.nl/scholarships

Find a scholarship to help finance your study at ITC

RECOGNITION OF DEGREES

- The degrees awarded by the University of Twente are formally recognized by the Ministry of Education, Culture and Science, based on accreditation NVAO

- For its degree programmes the University of Twente issues an internationally recognized document attached to diploma:
the Diploma Supplement (DS)

SEEKING THE SOURCE

FELLOWSHIPS

- Netherlands Fellowship Programme

- European Union: Erasmus Mundus

- United Nations agencies

- Joint Japan World Bank Scholarship Programme

- International Fellowships Programme Ford Foundation

- The Huygens Programme

- STUNED Scholarship Programme

SUMMARY

- @ITC: accredited 120 EU ECTS points –top rated (NL 2015,16)

- 18-24-month M.Sc.program in Geo-information Sciences & Earth Observation with different specialisations

  - Modular program (3-wks units)

- Modules or module blocks are also offered as stand-alone courses

- Distance education and e-learning mode available for some

- Tailor-made training programs

- Curriculum development

- Project-based training

Proposed training course

- **Spatial Data for Disaster Risk Management**
- 3 weeks: 2 weeks halftime, 1 week fulltime + follow up .
- ITC certificate.
- Week 1:
  - Spatial data & Early Warning
- Week 2:
  - Risk Assessment
- Week 3:
  - Multi-hazard risk and decision making
- After:
  - Development of use cases on the integration of hazard and risk information into one of the activities related to planning in a certain sector.

National Multi-Hazard Analysis (Saint Vincent)

Hazard type	Return periods
Tsunami	None
Storm surge	10 years 25 years 50 years 100 years
River flooding	5 years 10 years 20 years 50 years
Volcanic	None
Landslides	None
Wild fires	None

Study area

1: Creating criteria tree

2: Standardization & weighting

3: Create multi-hazard susceptibilitymap

Result 1

Result 2

Result 3
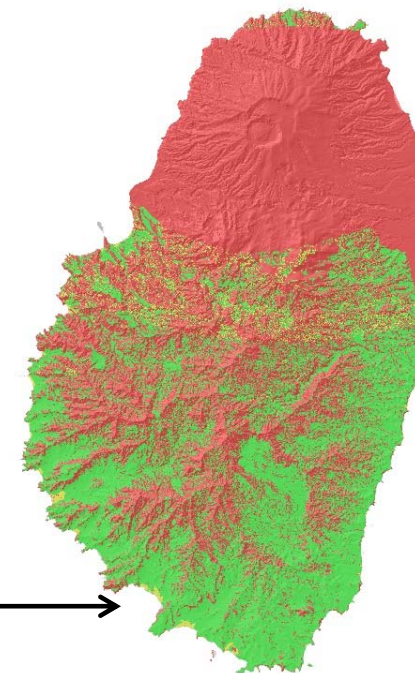
Click on a part of the flowchart to see more detail

Tsunami susceptibility

This map is made by Boruff and Cutter (2007) Smith and Shepherd (1993)

Flood extent Max 1.87 m
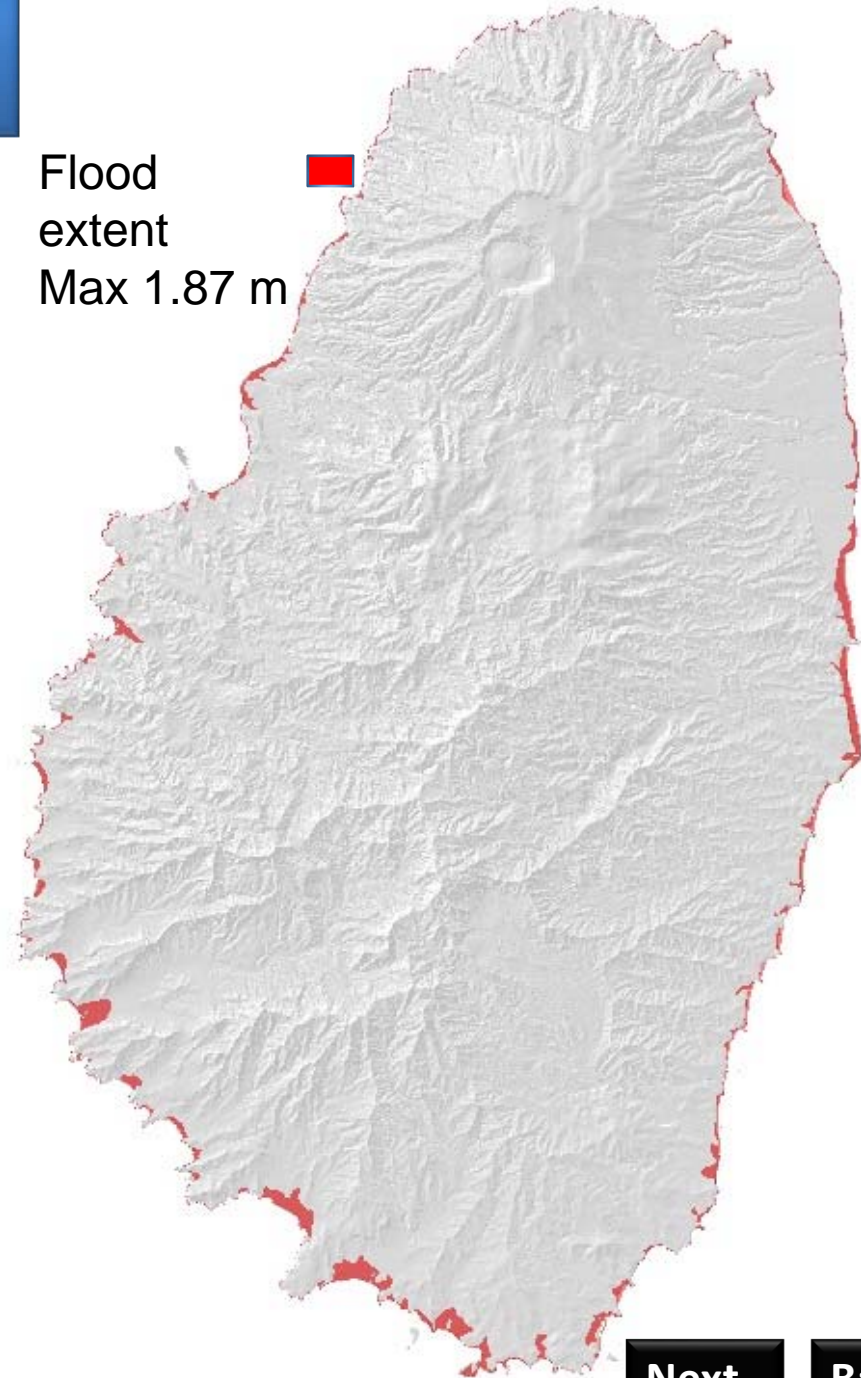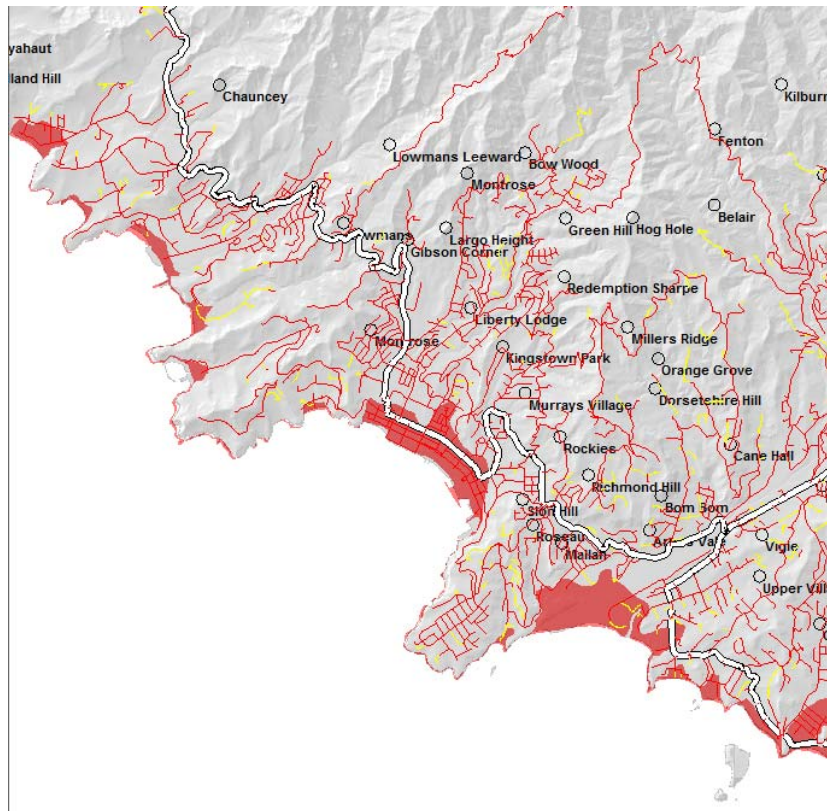
Storm surge 100 years

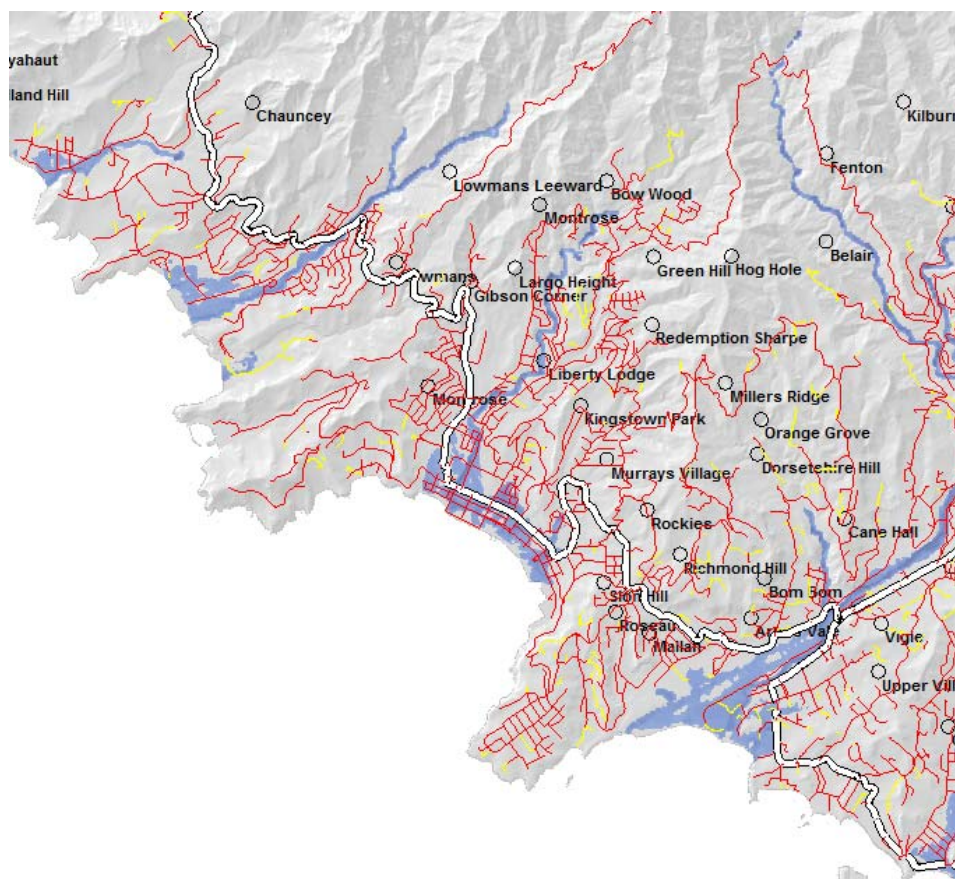This hazard map is made by CDMP (2000) and Boruff and Cutter (2007).
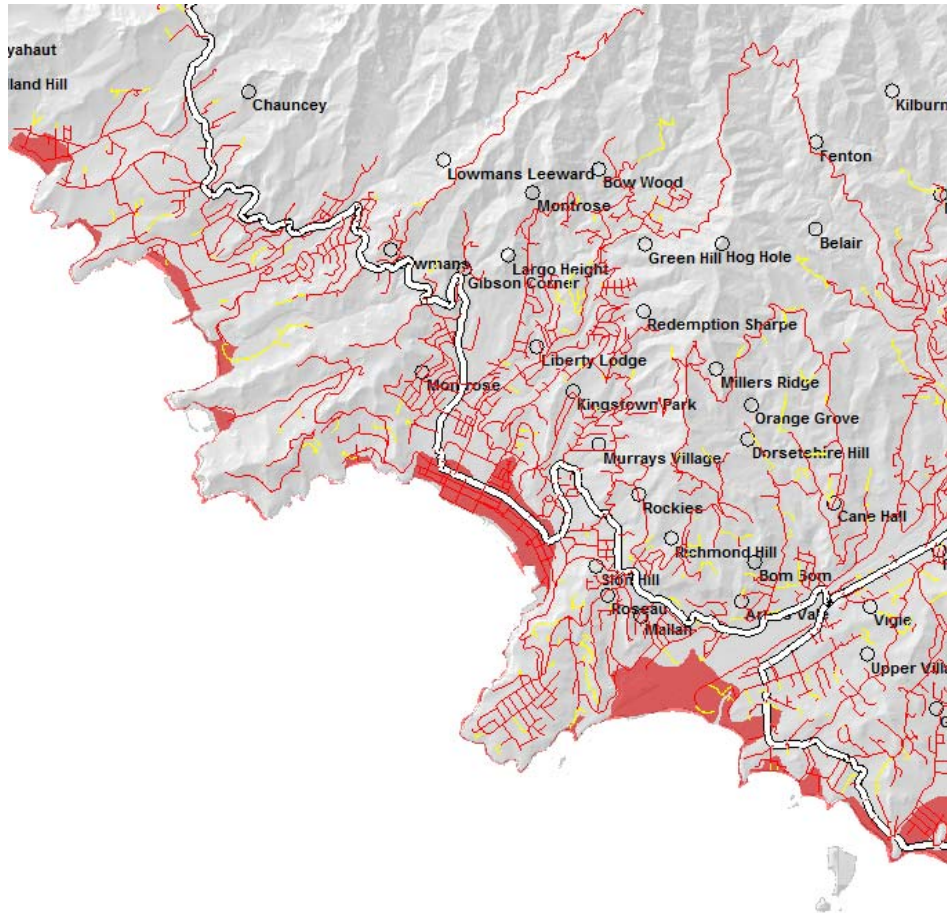
Flood extent
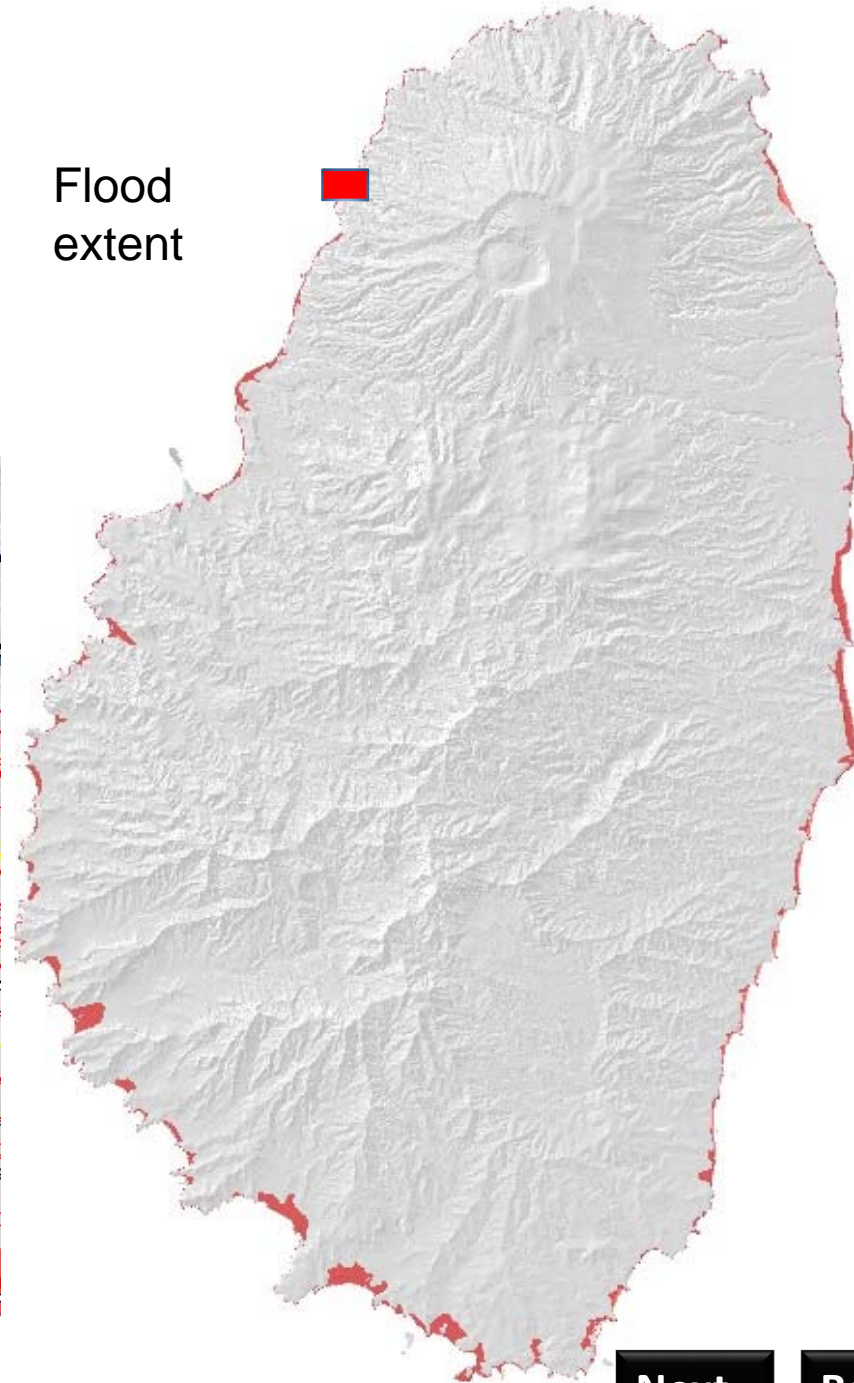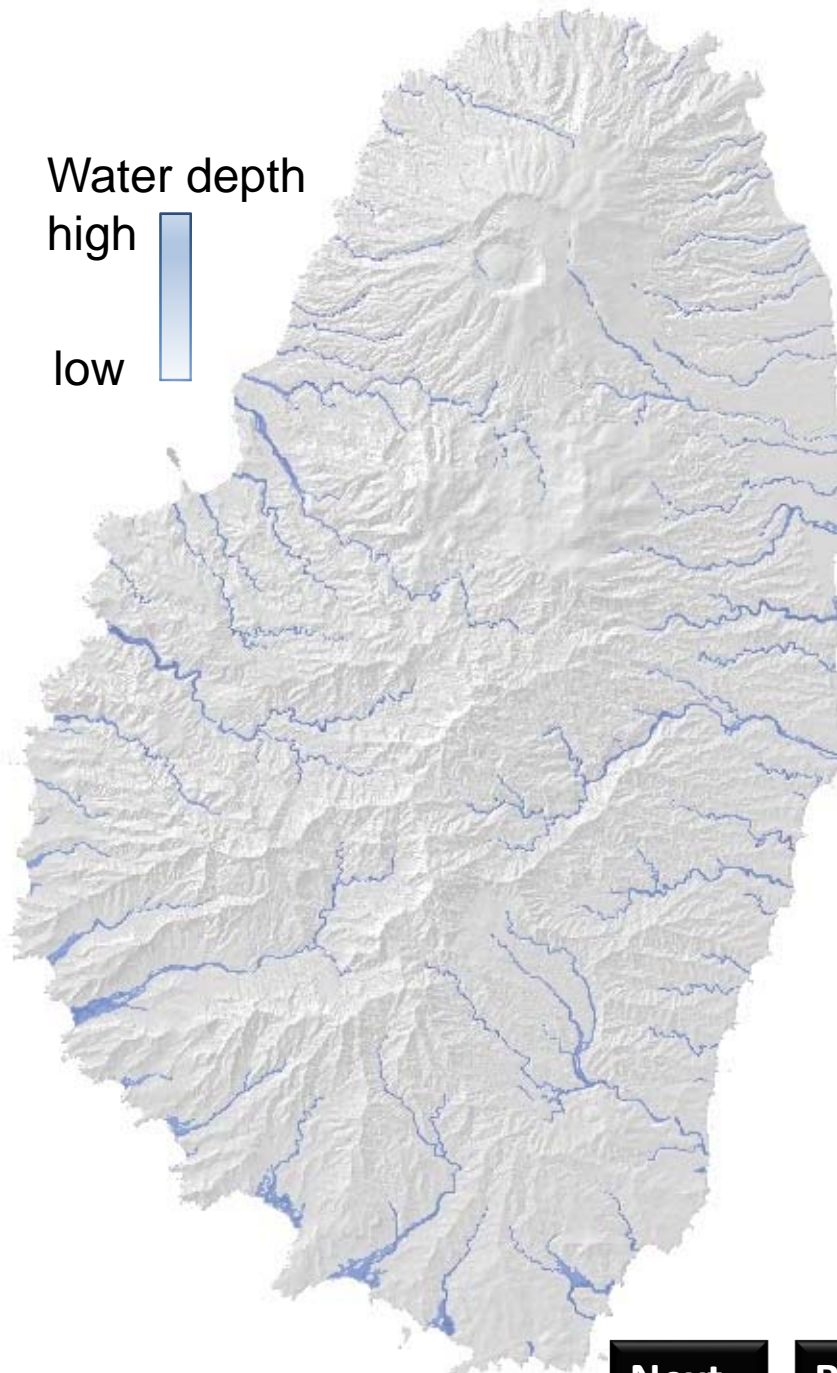
Flood depth 50 years

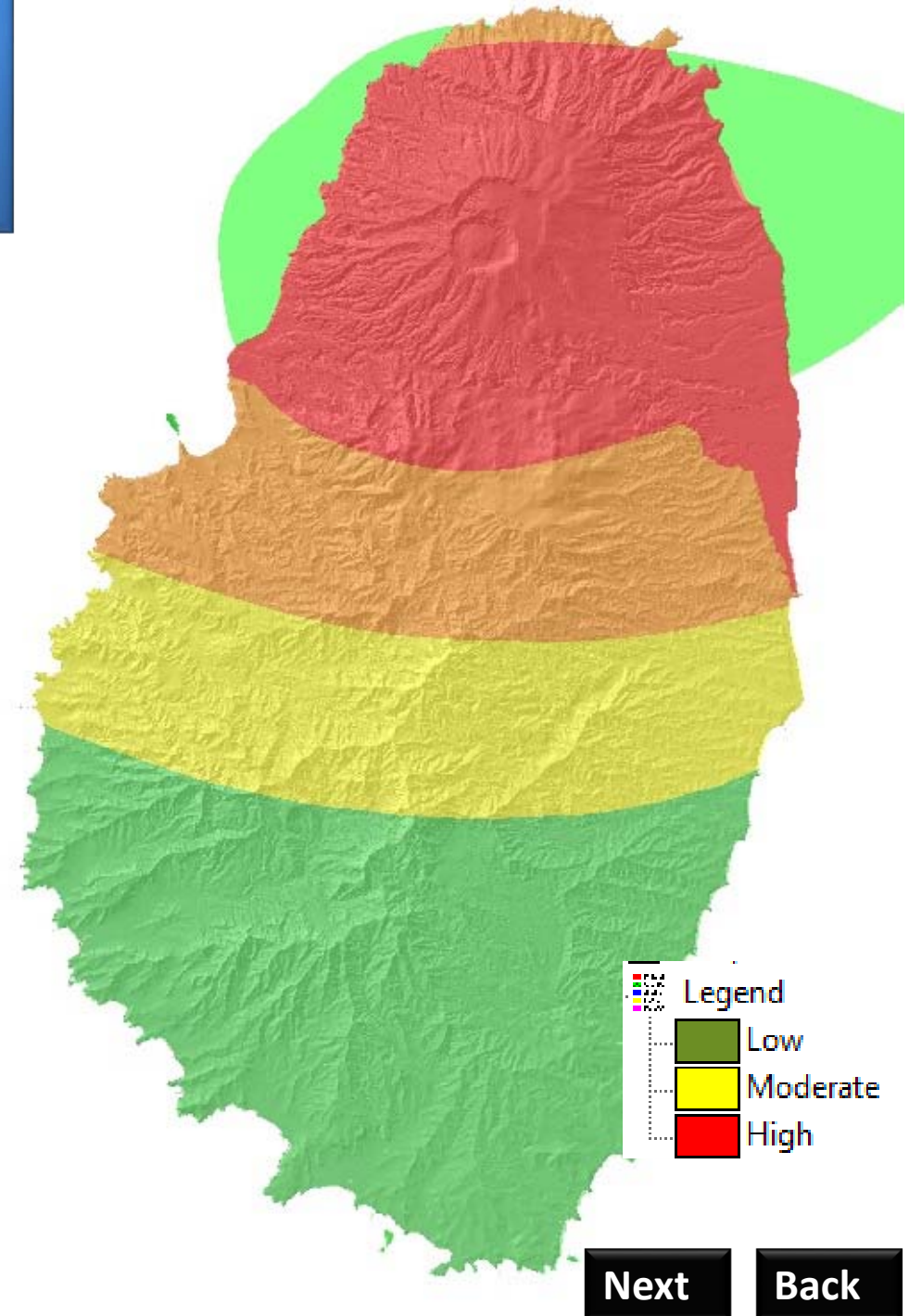This hazard map is made by Victor Jetten (ITC-University of Twente) based on flood modelling using the LISEM model.

Water depth
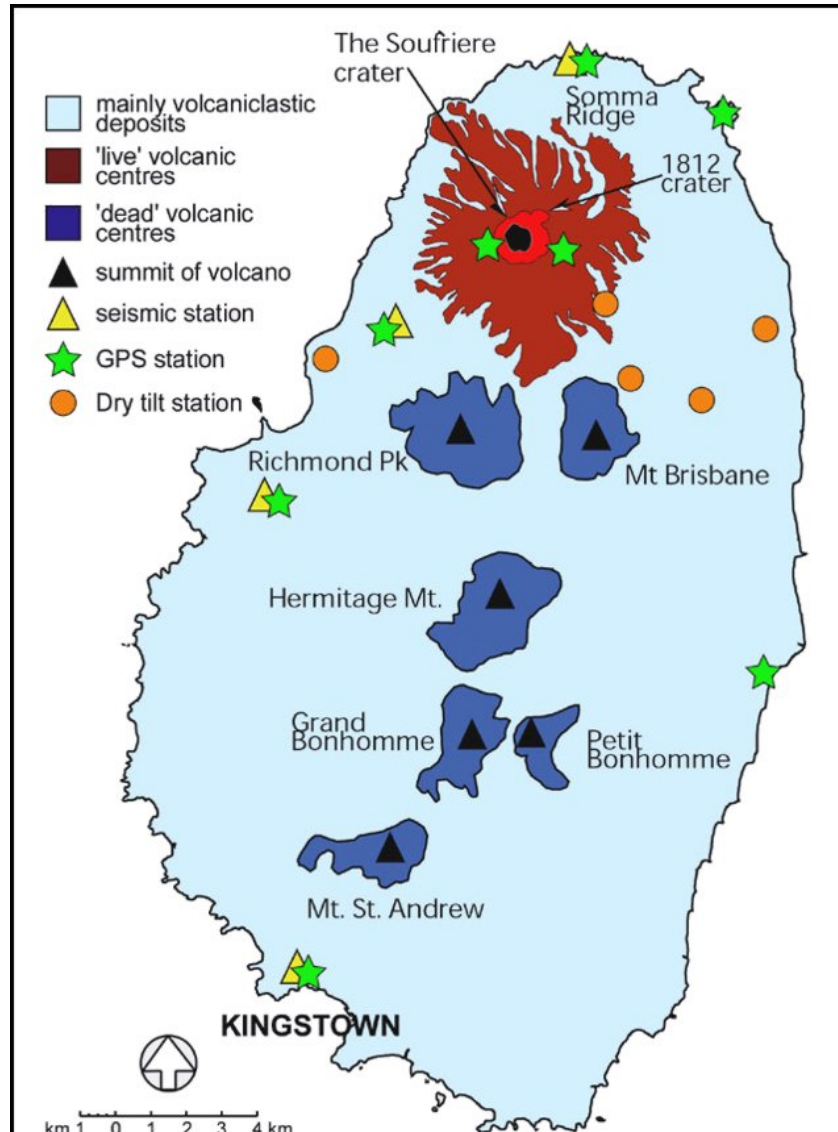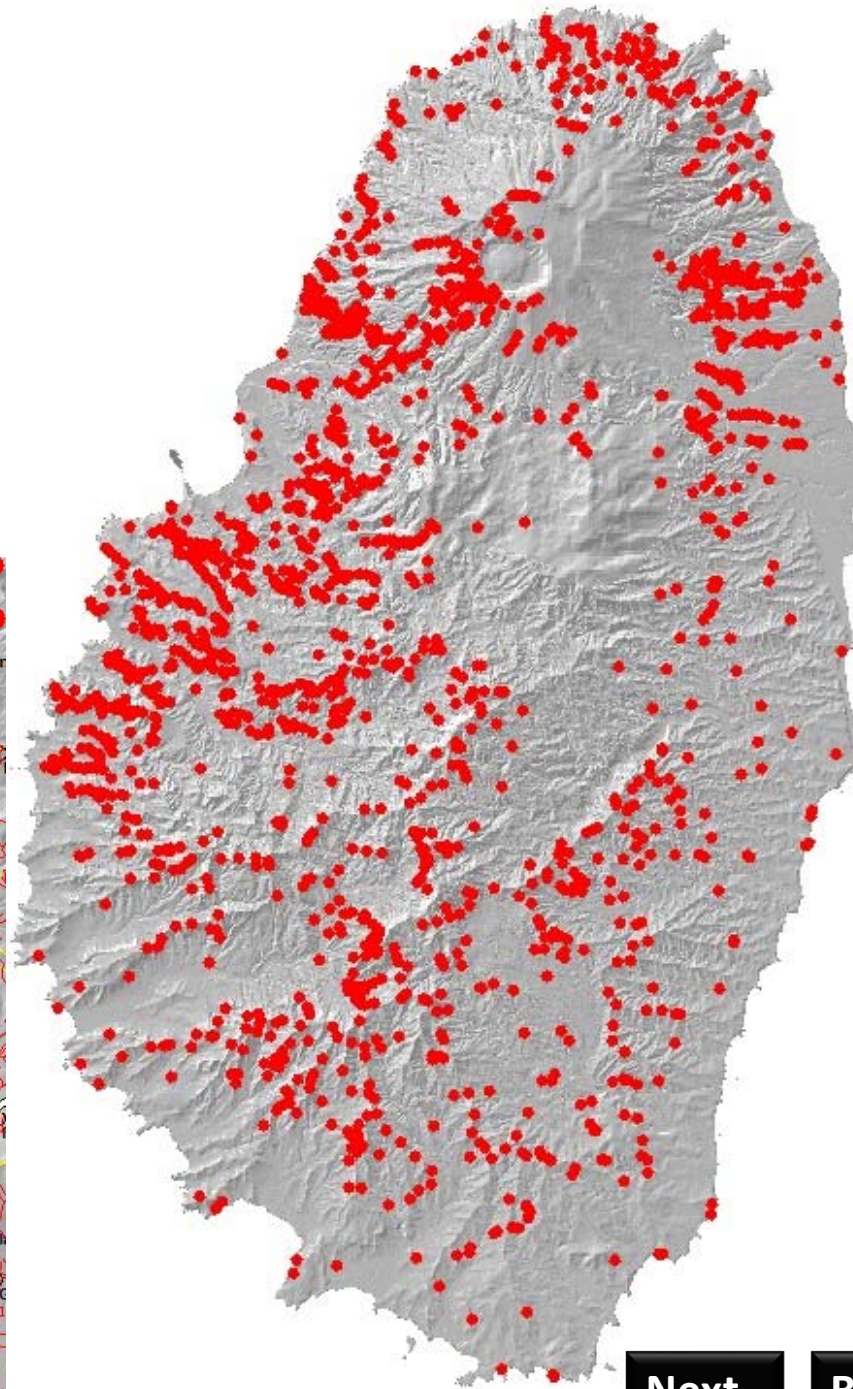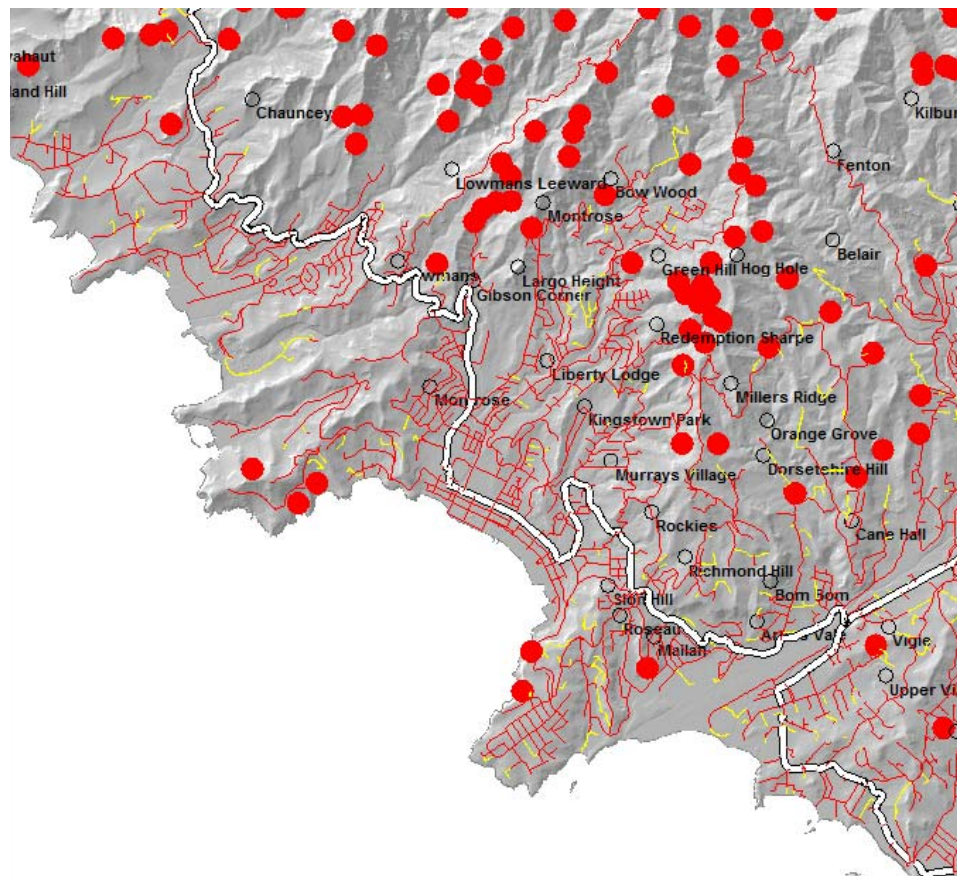high

low

Volcanic hazards susceptibility map

Historical landslides

This inventory is made by Cees van Westen (ITC-University of Twente) based on image interpretation of multi-temporal satellite images using Google-Earth Pro, and incorporating earlier inventories by De Graff
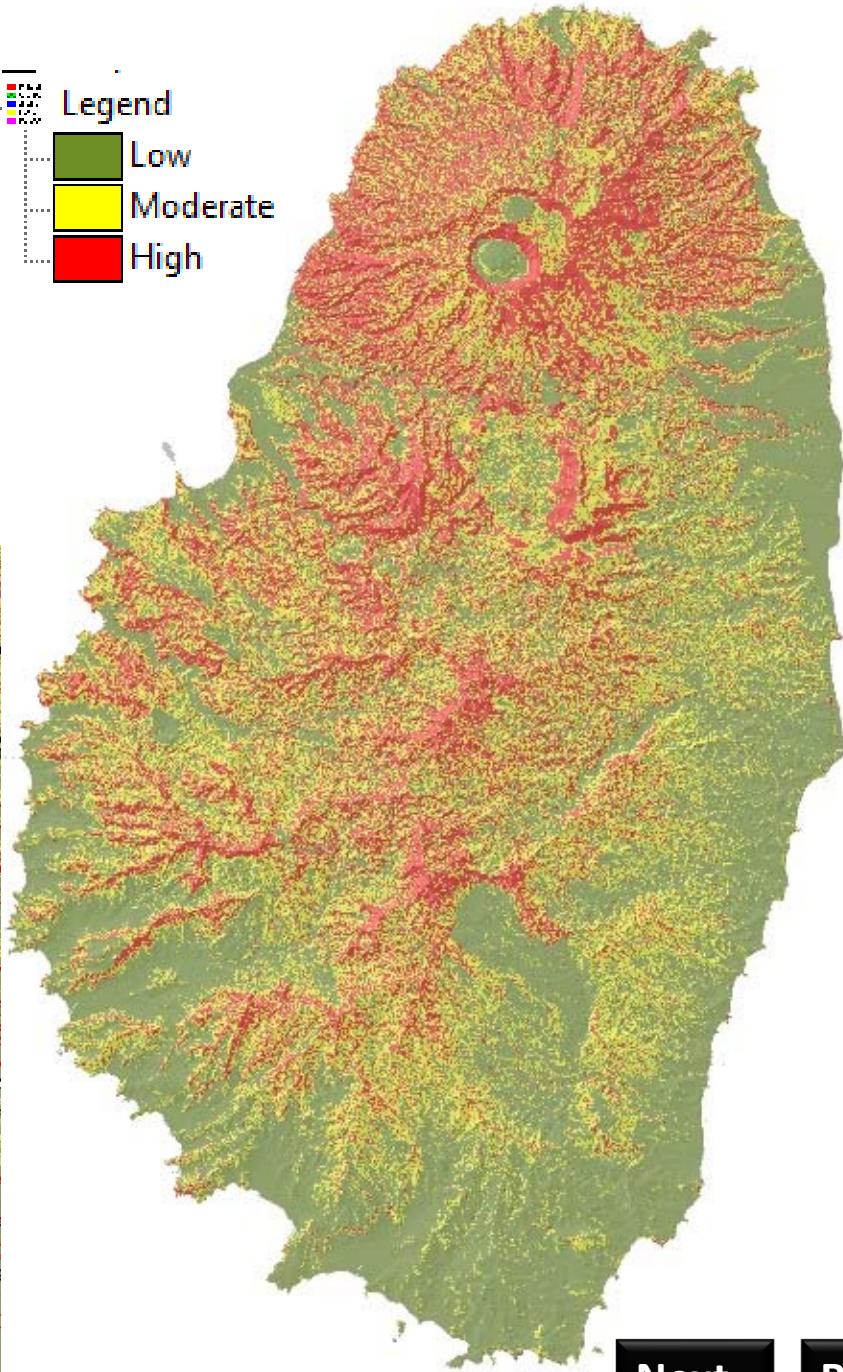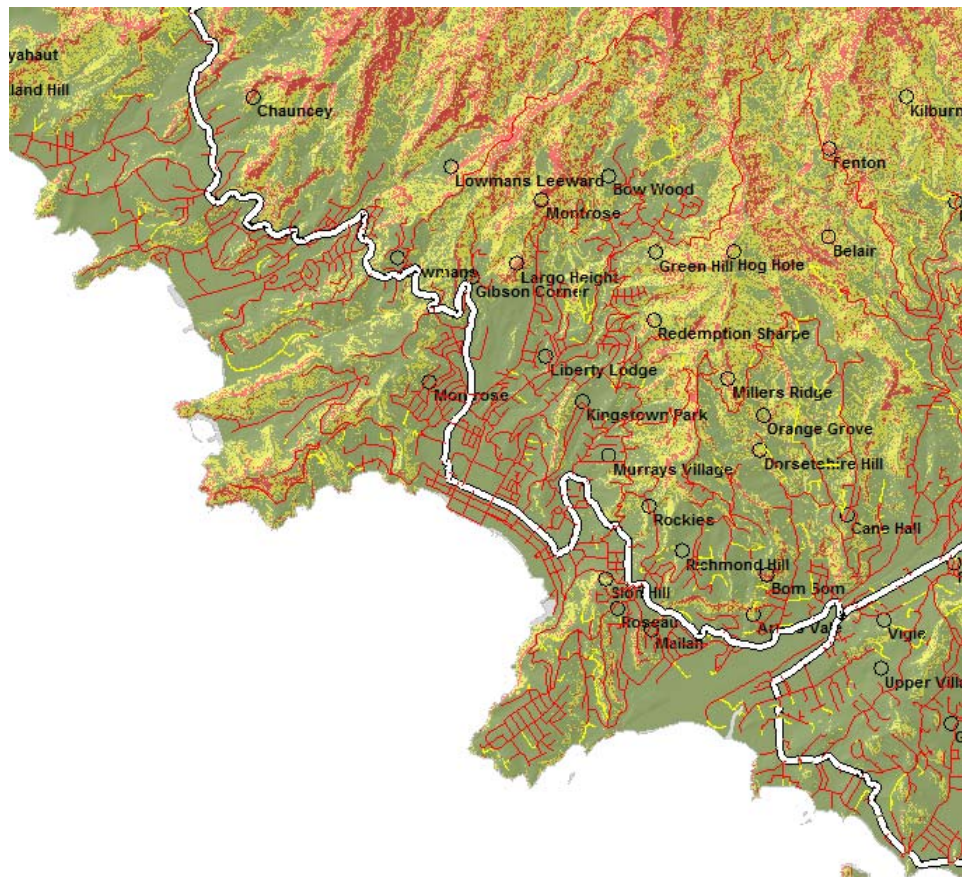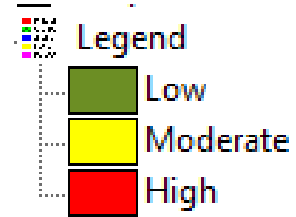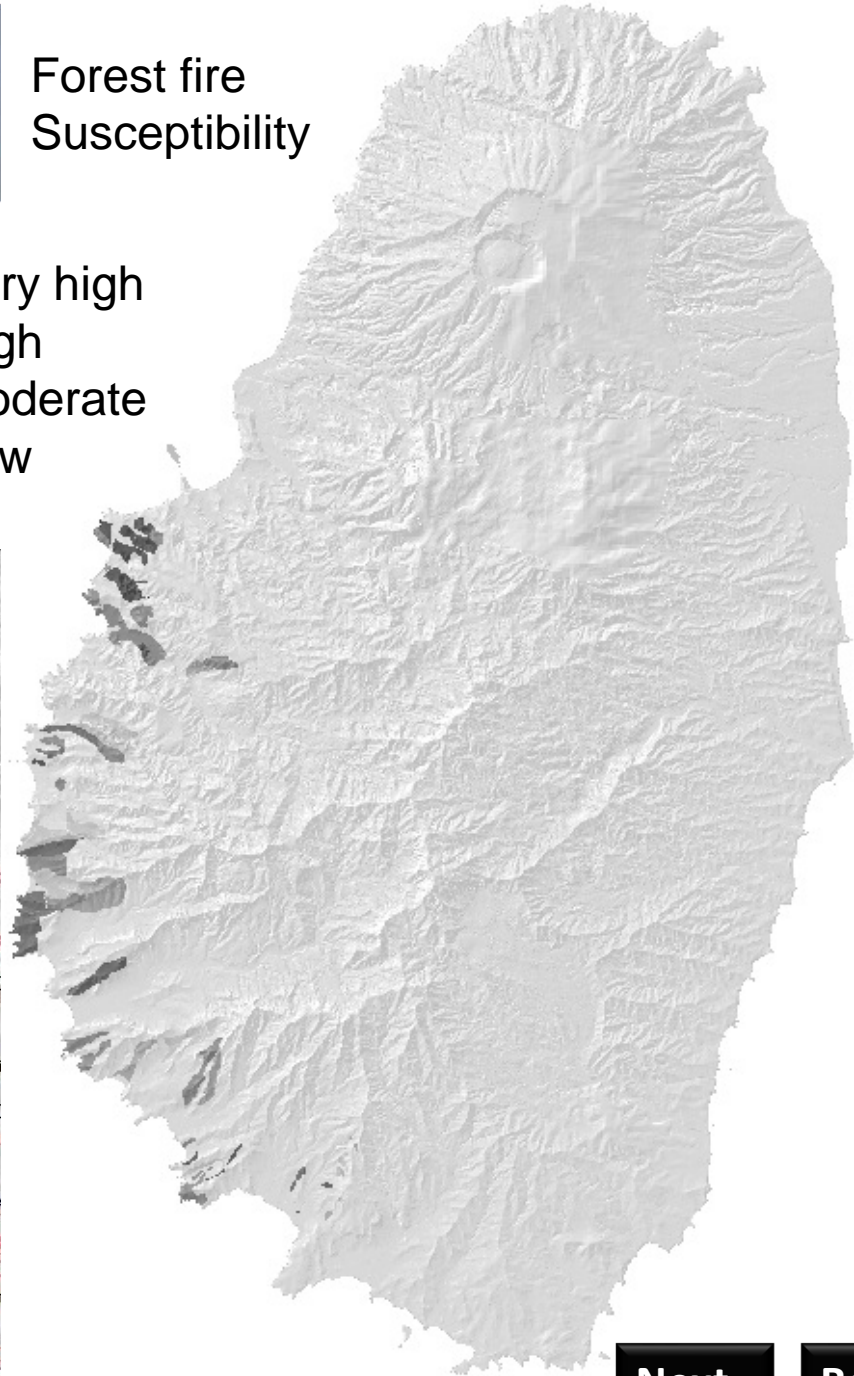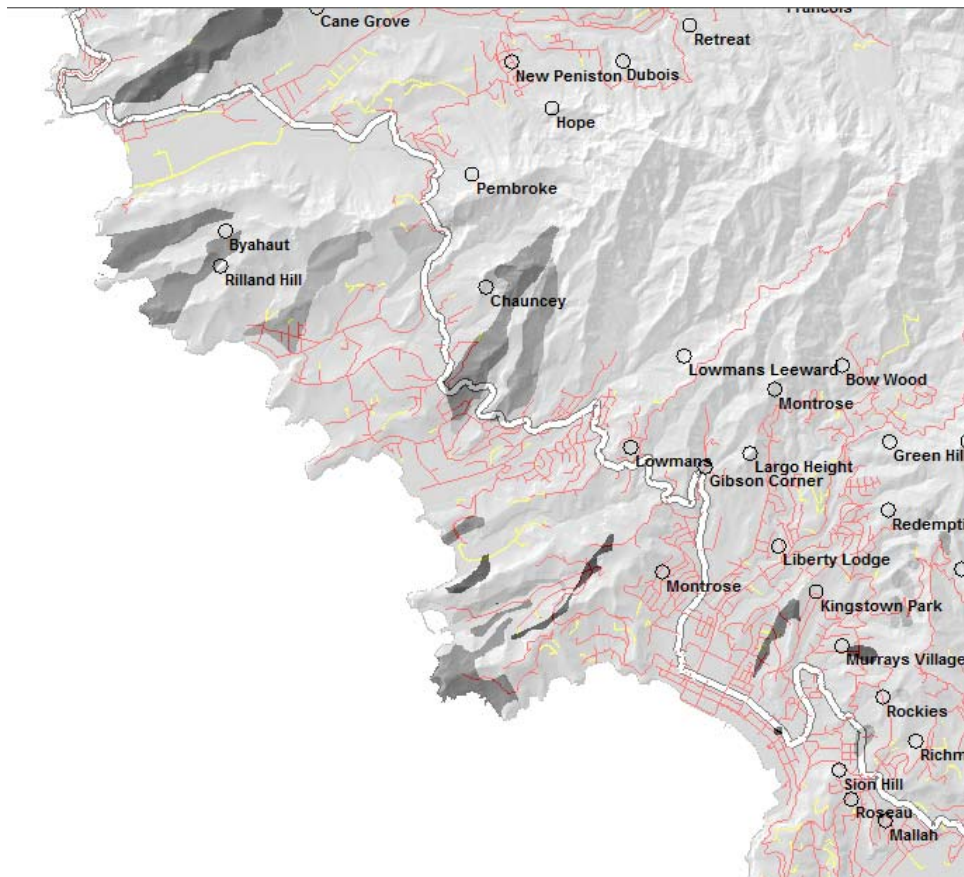
Landslide susceptibility

This landslide susceptibility map is made by Cees van Westen (ITC-University of Twente) based on bivariate statistical analysis and weights of evidence modelling.

Legend
- Low
- Moderate
- High

Forest Fire susceptibility map
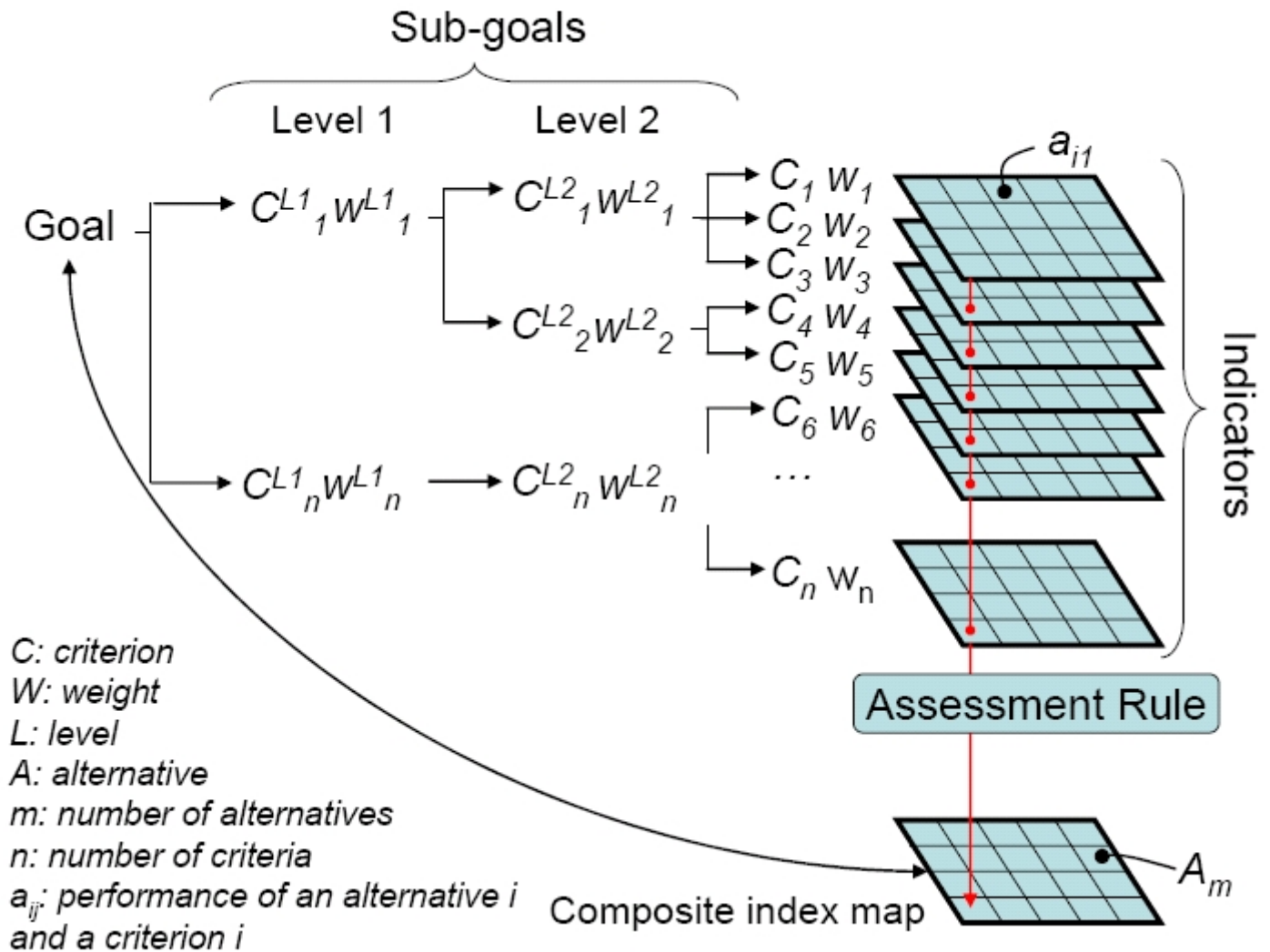
Forest fire Susceptibility

- ■ Very high
- ■ High
- ■ Moderate
- □ Low

The analysis starts with defining a goal / objective which is the generation of a multi-hazard susceptibility map at national scale, followed by sub-goals (individual hazard types) and spatial indicators (maps). The maps are standardized between 0 and 1 (rescaled) and weighted, and then combined into a composite index map.

Sub-goals

Level 1   Level 2

Goal $\rightarrow$ $C^{L1}_1 W^{L1}_1$ $\rightarrow$ $C^{L2}_1 W^{L2}_1$ $\rightarrow$ $C_1\ W_1$
$C_2\ W_2$
$C_3\ W_3$
$\rightarrow$ $C^{L2}_2 W^{L2}_2$ $\rightarrow$ $C_4\ W_4$
$C_5\ W_5$
$\rightarrow$ $C_6\ W_6$

$\rightarrow$ $C^{L1}_n W^{L1}_n$ $\rightarrow$ $C^{L2}_n W^{L2}_n$ ...

$\rightarrow$ $C_n\ W_n$

a_{i1}

Indicators

C: criterion
W: weight
L: level
A: alternative
m: number of alternatives
n: number of criteria
a_{ij}: performance of an alternative i and a criterion i

Assessment Rule

Composite index map

A_m

Next   Back

Criteria tree final

Criteria Tree

- Multi_Hazard _map_Saint_Vincent
- **Constraint** → Not on historical landslides -- Std:Max=0.5 **Standardization**
- Not on steep slopes -- Std:Max=30
- Not on frequently flooded area -- Std:Max=1
- Not in high volcanic hazard class -- Std:Attr='Constraints'
- 1.00 Natural hazards -- ExpVal
  - **Hazard types receive equal weights** → 0.24 Landslide hazard
    - 1.00 Landslide susceptibility classes -- Std:Attr='Weight' **Input maps**
  - 0.24 Flood hazard -- ExpVal
    - **Frequent events get higher weights** → 0.52 Flood depth once in 5 years -- Std:Goal(0.000,1.500)
    - 0.27 Flood depth once in 10 years -- Std:Goal(0.000,1.500)
    - 0.15 Flood depth once in 20 years -- Std:Goal(0.000,1.500)
    - 0.06 Flood depth once in 50 years -- Std:Goal(0.000,1.500)
  - 0.24 Coastal hazards -- Pairwise
    - 0.25 Tsunami hazard
      - 1.00 tsunami hazard -- Std:Maximum
    - 0.75 Storm surge -- ExpVal
      - 0.52 Storm surge zone once in 10 years -- Std:Maximum
      - 0.27 Storm surge zone once in 25 years -- Std:Maximum
      - **Hazard types groups** → 0.15 Storm surge zone once in 50 years -- Std:Maximum
      - 0.06 Storm surge zone once in 100 years -- Std:Maximum
  - 0.24 Volcano hazard
    - 1.00 Volcanic_hazards -- Std:Attr='Weight'
  - 0.04 Forest fires
    - 1.00 Forest_fire_hazard -- Std:Goal(0.000,1.000)

Final Map

- Mutli_hazard_map
- historical_landslides
- Slope_SVG
- Flood_depth_10y
- Volcanic_hazards
- Natural_hazard_suitability
- Landslide_susceptibility
- Flood_depth_05y
- Flood_depth_10y
- Flood_depth_20y
- Flood_depth_50y
- Tsunami_hazard
- Storm_surge10
- Storm_surge25
- Storm_surge50
- Storm_surge100
- Volcanic_hazards
- Fire_hazard_map

Next   Back

Result 1

Legend

- **Red** — Unsuitable with respect to natural hazards
- **Yellow** — Restrictions: some hazards exist that should be analyzed in more detail
- **Green** — Suitable with respect to natural hazards

Applying mask
Using the criteria tree
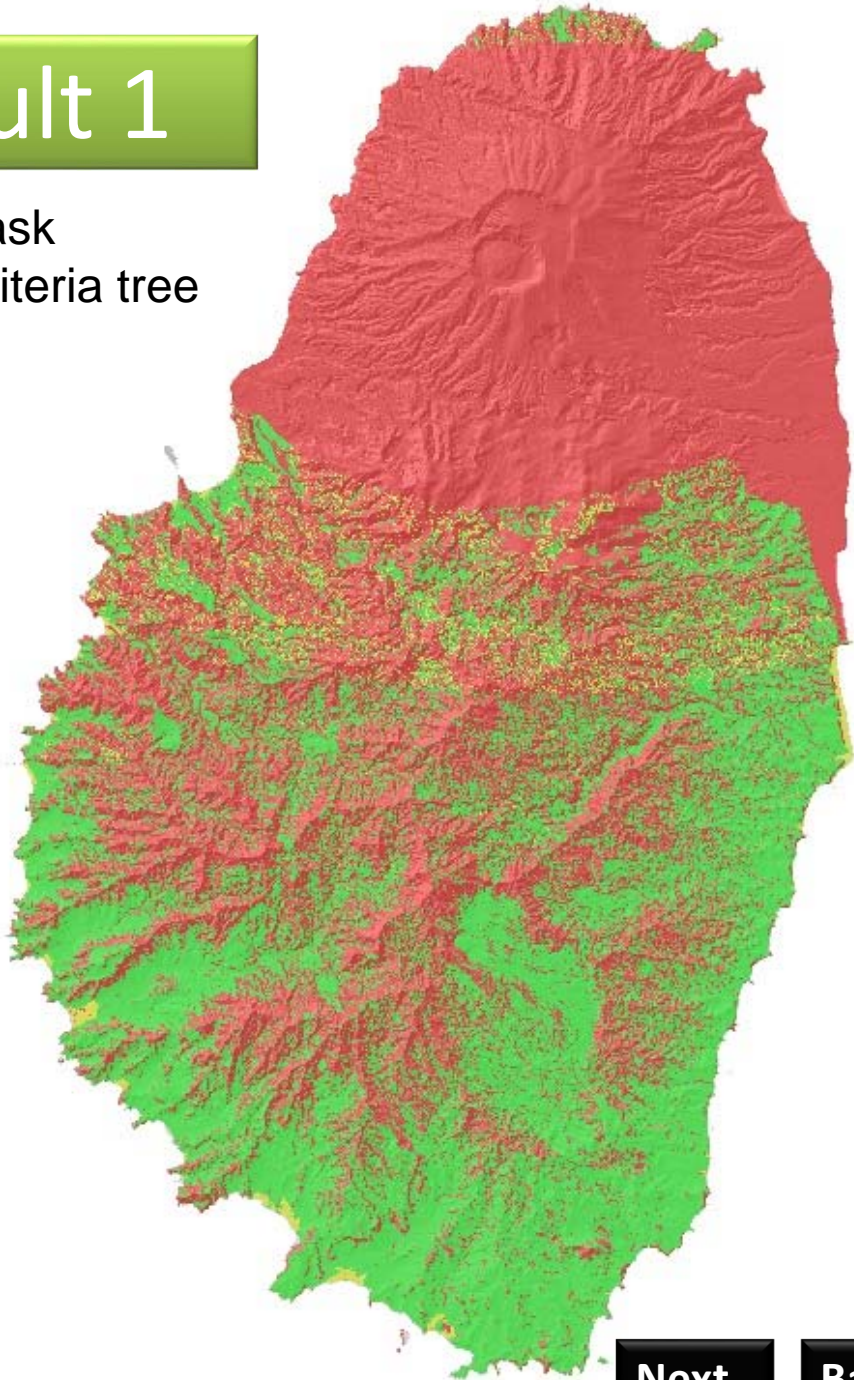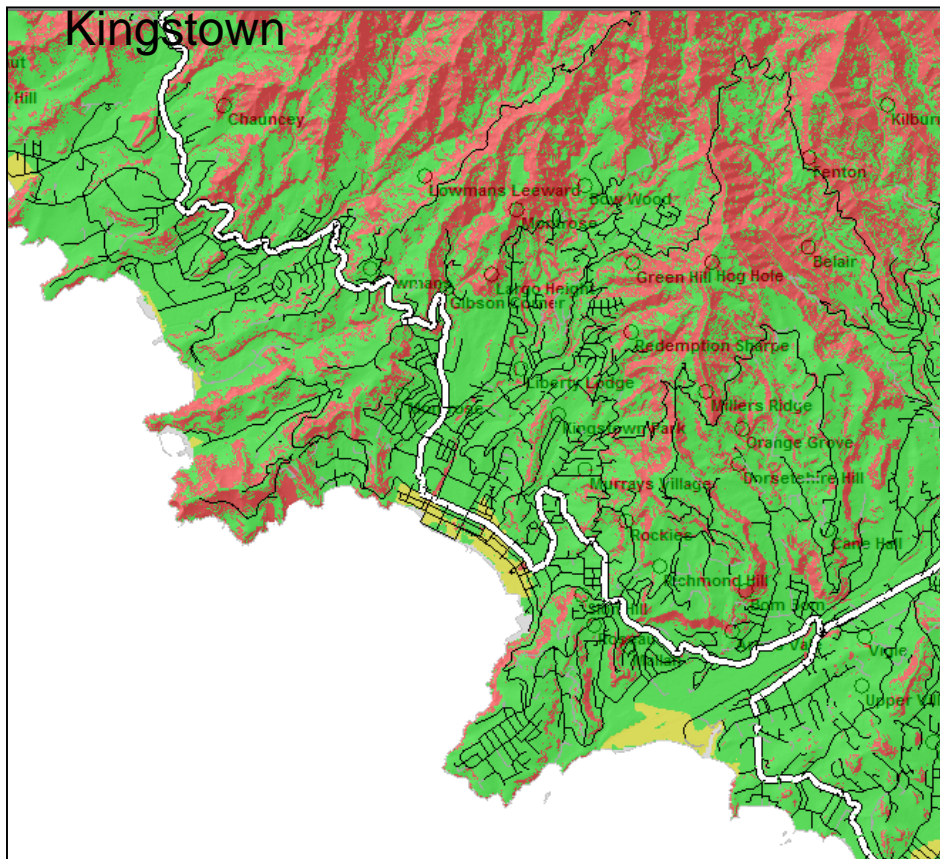
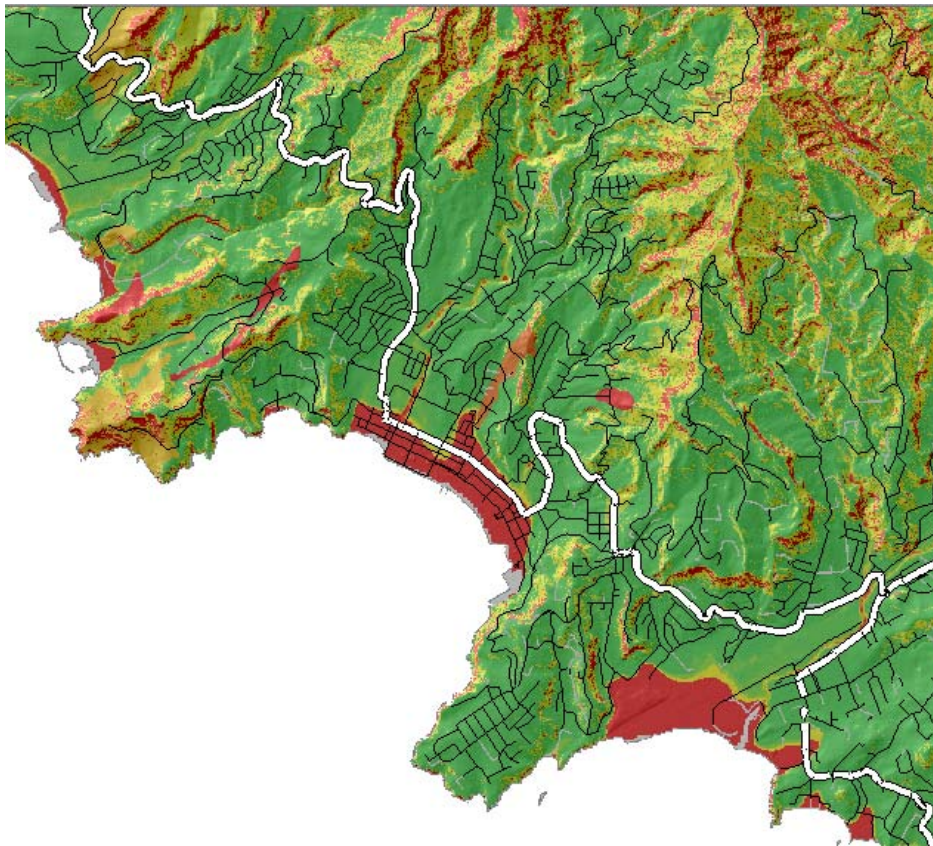Detail of the areas around Kingstown

Next   Back

Legend

 Unsuitable with respect to natural hazards

 Restrictions: some hazards exist that should be analyzed in more detail

 Suitable with respect to natural hazards

Detail of the areas around

Result 2

No mask
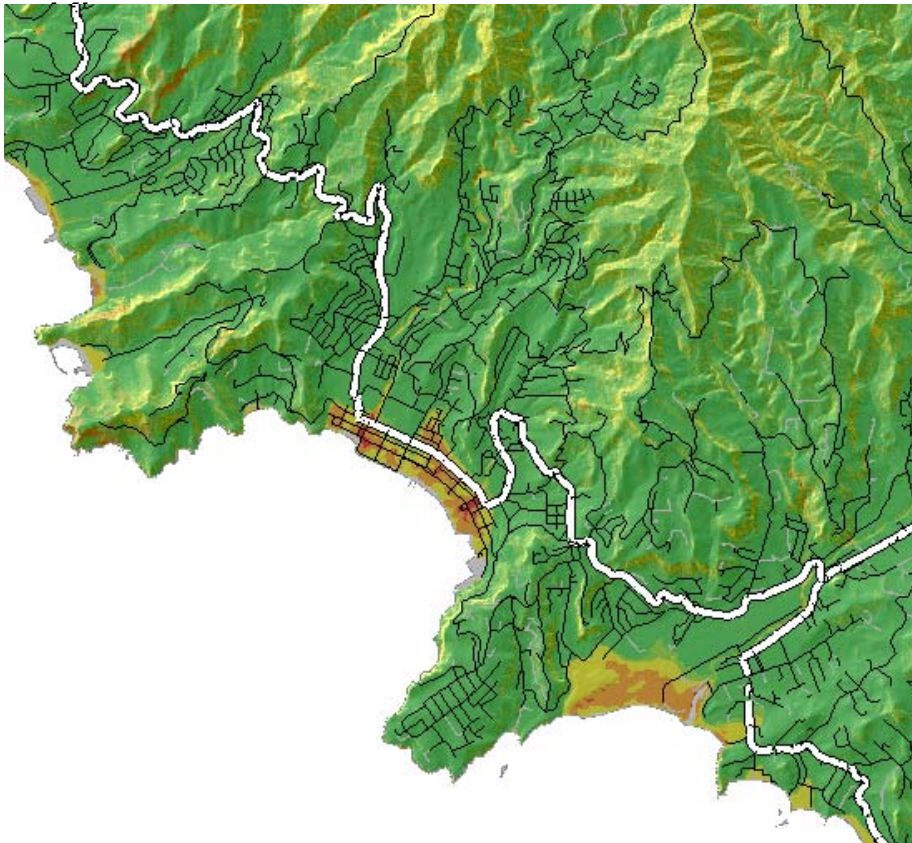Taking the highest hazard for each location

Legend

 Unsuitable with respect to natural hazards

 Restrictions: some hazards exist that should be analyzed in more detail

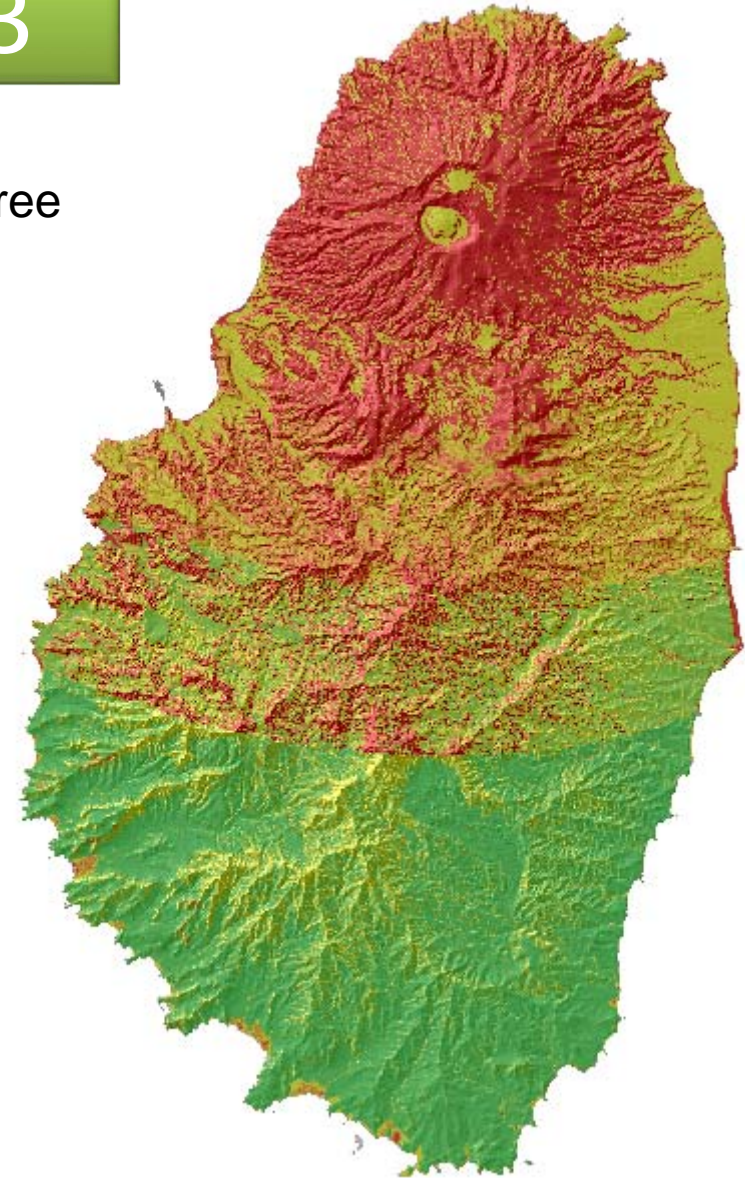 Suitable with respect to natural hazards

Detail of the areas around

Result 3

No mask
Using the criteria tree