

Virgin Islands Seismology and Planning in Disaster Management



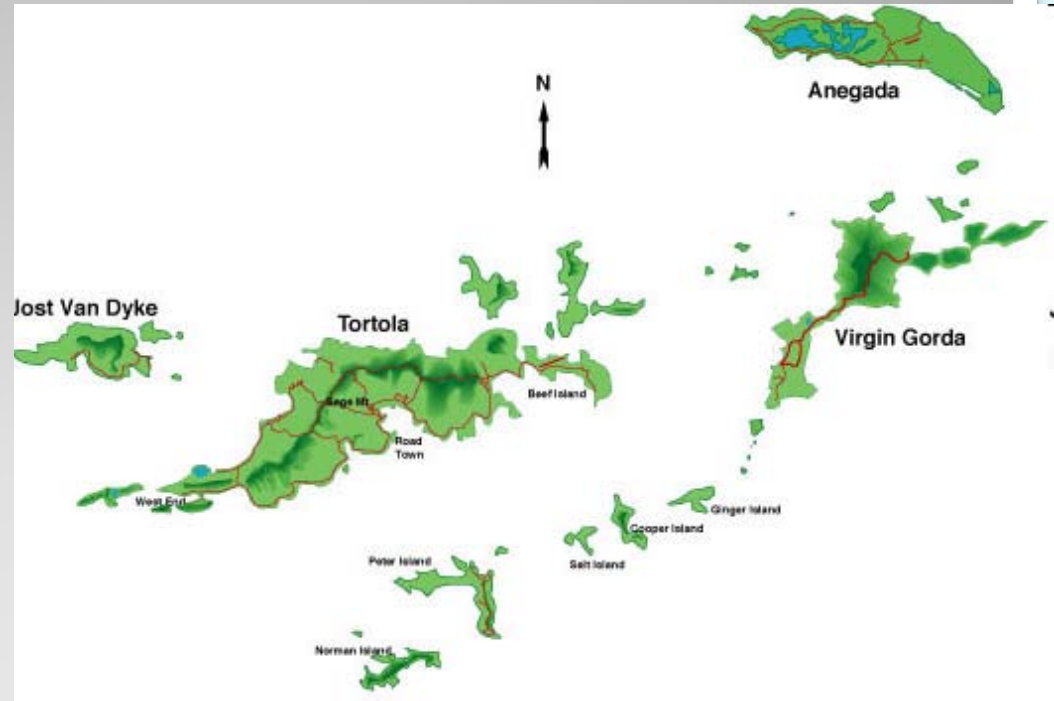
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Outline

- VI Overview
- All seismic networks in your country; who runs them
- How seismological information is used in warnings/planning related to earthquake hazards
- Seismological research in the VI
- How seismologists are trained
- Concerns and goals for the future
- Priorities for regional collaboration

Overview of the VI

- The Virgin Islands is a group of over 50 Islands located 60 miles east of Puerto Rico.
- Population approximately 25,000
- All Islands of volcanic origin except for Anegada which is limestone.

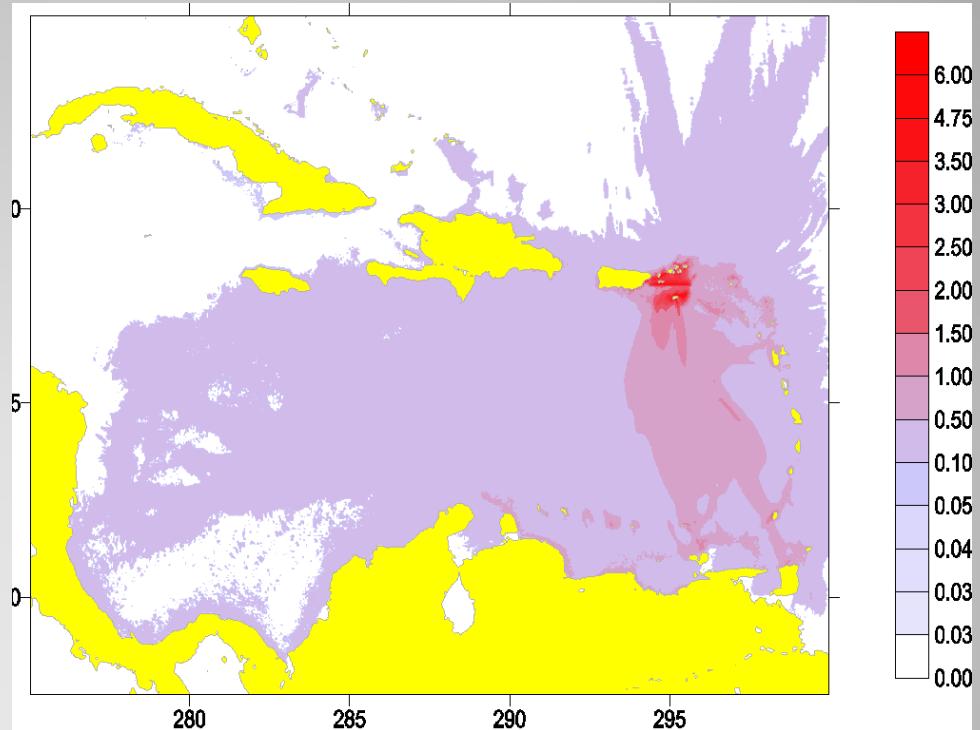


Map of the Virgin Islands (British)



Tsunami and Coastal Hazard Threats for the VI

- For the BVI, the tsunami associated with the 18 November 1867 earthquake which occurred on the southern segment of the Anegada fault zone, is the most significant since historical times.
- The sea receded, then rose 1.2 to 1.5 m above its usual level. It submerged the lowest part of the Road Town and swept away most of the small houses.



Model of the 1867 tsunami taken from Natural Hazards and Earth System Sciences (2003) 3: 367–376



Seismic Networks in the VI

- PRSN – Puerto Rico Seismic Network
- PRSMP – Puerto Rico Strong Motion Program



PRSN and the DDM



Section of the Aneгада Seismic Station: GPS and Sensor containment unit

- DDM signed an MOU with PRSN in 1999.
- Maintains a Seismic Station in Aneгада which communicate back to PRSN via a Very Small Aperture Terminal (VSAT) Satellite Communications.
- All coordination and information dissemination is done through the DDM and passed on to the public.
- PRSN and West Coast and Alaska Tsunami Warning Center are responsible for issuing tsunami warnings for the Virgin Islands.
- Virgin Islands received Tsunami Protocols in 2006 for use in the event of Tsunamis.

PRSMMP and the DDM

- The Puerto Rico Strong Motion Program (PRSMMP) is a program dedicated to obtain the most reliable and precise strong motion data.
- It is necessary to mitigate the number of lives and economical losses that will arrive from unavoidable future destructive earthquakes.
- Five Strong Motion Sensors have been installed on all the main Islands in the VI.
- Data is useful to describe the behavior of different soil deposits and to determine the characteristics of the vibrations in order to properly design the structure.



Installation of Strong
Motion Sensor at the DDM



HAZARD MITIGATION AND PLANNING

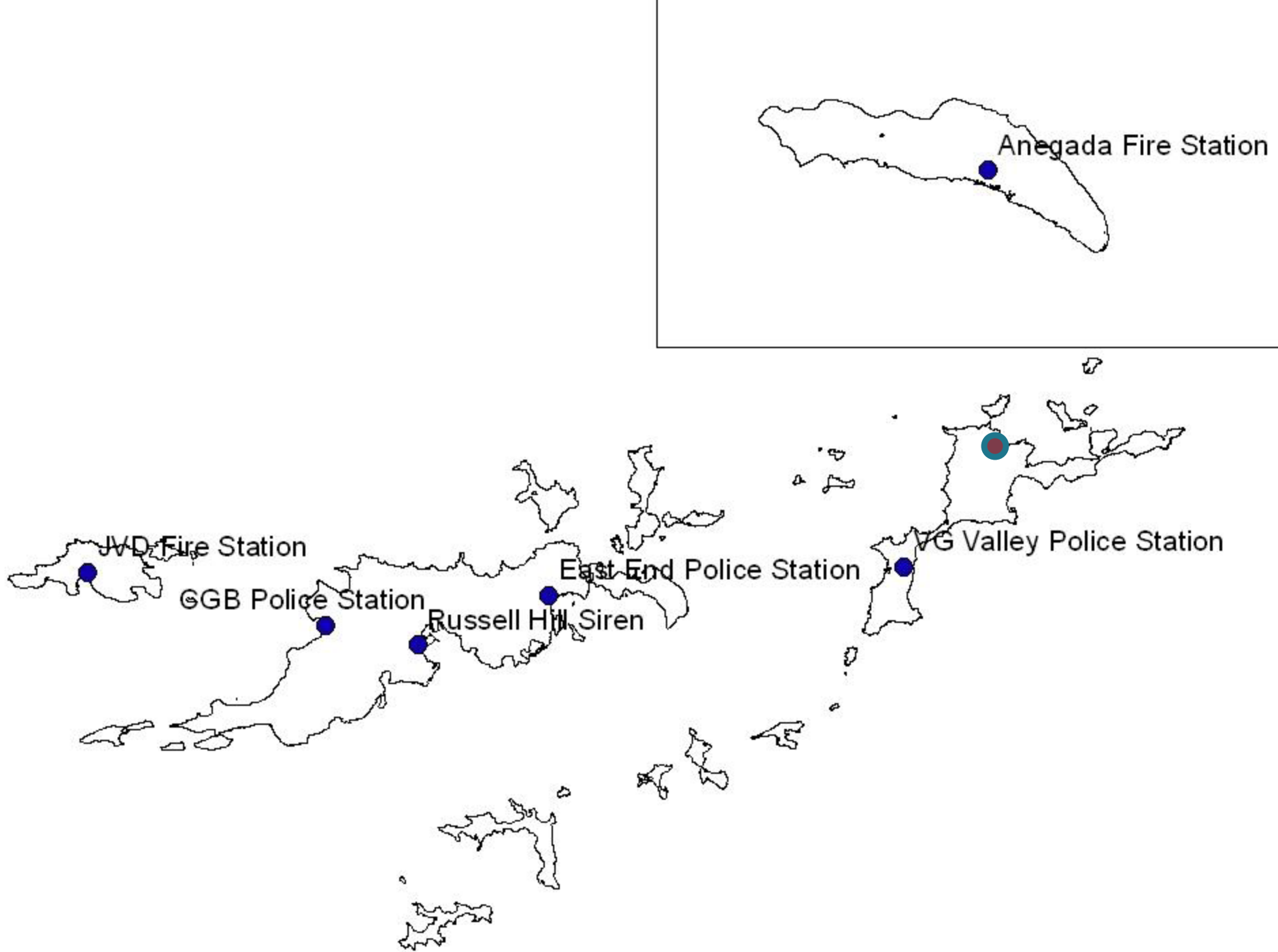
- **Physical Planning Act** – The VI Physical Planning Act 2004 requires developers to incorporate Hazard Vulnerability Assessments into the (Environmental Impact Assessment) EIA process; and it is a requirement that all Government projects as well as private projects completed this task.
- **HRAP** – Hazard Risk Assessment Project completed in 1997 identified and assessed the hazards to which the BVI was exposed and recommended hazard mitigation strategies.
- **QRAP** – Quantitative Risk Assessment Project Phases I and II completed in 2004 and 2006 respectively, highlights probable economic losses due to various natural disasters and illustrates what impact short and long term mitigation efforts would yield and brings all hazard related maps into a suitable GIS format.

SIREN NETWORK

- The Virgin Islands has installed a total of 7 sirens at strategic locations around the Territory.
- Three of the units have battery backup and each can run a total 15mins on battery power alone.
- All units are installed in areas where standby generator is available.
- The Siren Network is tested every fourth Friday in each month for no more than 1-2 minutes. The network includes:
 - (1) 2001 SRN – First and largest unit
 - (3) Eclipse NH Siren
 - (3) Model 2 Siren



2001 SRN Siren. Similar unit installed in the Virgin Islands. First mechanical siren installed in the VI.



LANTEX TSUNAMI EXERCISE

- The Virgin Islands had the opportunity to take part in the Lantex 2009 and 2010 Tsunami Exercise; a simulation conducted to test the preparedness levels along the U.S. and Canadian East Coasts, the Gulf of Mexico Coast, Puerto Rico and the Virgin islands



Government and Private Sector Employees evacuate to a designated point in Road Town during Lantex 2009 Simulation Exercise

Research: the Paleo-seismic study on Anegada

- US Geologists were investigating the historical tsunami hazard in the Anegada area in hopes of cataloguing historical tsunami impacts through terrestrial research and interviews with community groups.
- The very fact that this type of research was being conducted on Anegada made the local community more aware of the underlying threat that they constantly face.



Map of Anegada



Paleo Seismic Researchers on Anegada conducting studies to verify if Anegada was impacted by Tsunami many years ago.

Seismologist in the VI

- No acting seismologist in the Territory, seismic information is provided by PRSN
- No training/education is available in local Community College.
- Early Warning Officer at DDM is the person in charge to maintain communication with PRSN

FUTURE PROJECTS

- Expansion of siren network and installation of additional strong motion sensors
- The development of Tsunami Inundation maps through the R3I (Regional Risk Reduction) - UNDP project
- Seismic Microzonation study for areas of reclaimed land to be completed by PRSMP as part of the QRAP
- To have a EWS using the CAP protocol
- Finalize the process of acquiring the sea level gauge

REGIONAL COLLABORATION

- R3I Project – Regional Risk Reduction Initiative with Dutch and British OCT's for Hazard Vulnerability Mapping and Early Warning System
- Caribbean Tsunami Warning Center
- NSF – COCOnet program