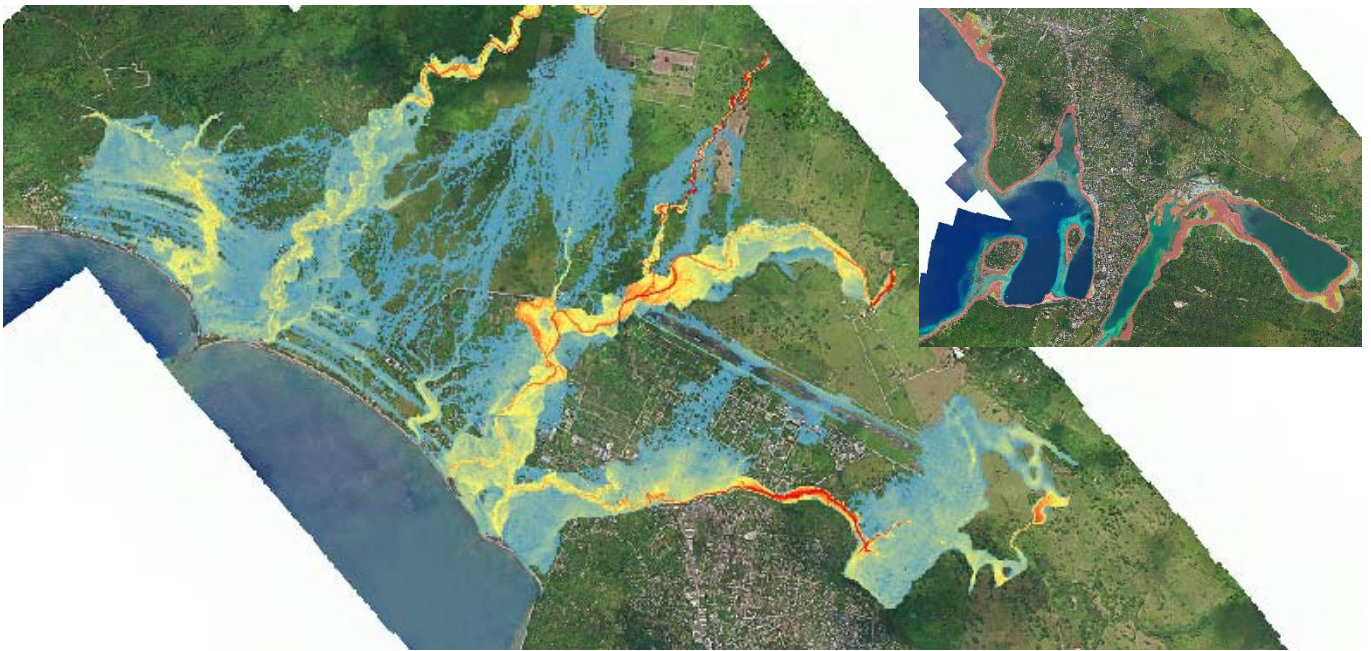


Mainstreaming Disaster Risk Reduction Project: Risk Mapping and Planning for Urban Preparedness



Client: Government of Vanuatu & World Bank

Location: Efate & Espirito Santo, Vanuatu

Duration: 2015

Services: Hydrological analysis, LiDAR based topographic mapping, roughness mapping, historic flood mapping, hydrodynamic modelling, coastal inundation hazard assessment

The Risk Mapping and Planning for Urban Preparedness Project was part of the World Bank funded Mainstreaming Disaster Risk Reduction Project (MDRR) being implemented by the Vanuatu Meteorology and Geohazards Department (VMGD). The project aims to support the development of hazard and risk models and maps at a scale suitable for urban and infrastructure planning based on probabilistic hazards models for key hazards, such as tsunami, ground shaking, tropical cyclone, coastal and river flooding. It also aims to develop the capacity of key agencies in Vanuatu in geospatial data management, the development of hazard and risk mapping products, and consultative processes and policies for land-use and urban planning and management in Port Vila and Luganville capitalizing on improved risk and climate change information.

NIWA was part of a team led by Beca International Consultants Ltd to implement the project. We were responsible for carrying out hydrodynamic modelling of the main rivers in the Port Vila region (Mele) and the Sarakata River in Luganville along with all major streams and tributaries entering the floodplains of these rivers. Hydrological investigations were performed in order to quantify flow rates for the return periods of 10, 50 and 100 years. The

hydrographs produced were then fed into an adaptive grid 2D hydrodynamic model of the two flood plains. Water depths and flow velocities within the rivers, streams and floodplain were mapped for the various return period events.

The modelling showed flooding of highly populated areas in Port Vila and Luganville for all design floods. However, even in extreme flood events, high flood intensities are restricted in extent to certain areas. Erosive processes in the past have created steps in the floodplain terrain, which prevent the water from spilling freely over the entire floodplain, concentrating high flood depths and velocities close to the main channels.

Indicative coastal inundation exposure classification maps were also prepared based on consideration of the various return period extreme sea levels, wave run-up and overwashing zones, and how they are likely to vary out to the 2090s for both Port Vila and Luganville coastal zones and adjacent peri-urban areas.

This hazard information is being collated in to multi-hazard risk maps to help inform urban and infrastructure planning decision making in Vanuatu.