

EXECUTIVE SUMMARY

Tsunami modelling undertaken by Geoscience Australia (GA) in 2009 indicated that Southeast Tasmania could be significantly impacted by a maximum credible tsunami generated from a rupture of the Puysegur subduction zone, which is located off New Zealand's southwest coast. Since the release of the GA report, emergency managers in Tasmania have sought greater detail on areas of potential inundation and have raised further questions regarding maritime hazards that were not in the original GA project brief. Mineral Resources Tasmania (MRT) received funding from the Natural Disaster Resilience Grant Programme in order to re-model the impacts of a maximum credible earthquake/tsunami/high tide scenario in southeast Tasmania (a Mw 8.7 earthquake that represents a 1 in 13000 year tsunami hazard) using newly available high-resolution data and to explore the maritime hazard posed by such an event. The study area extends from South West Cape to Bicheno and covers an area of 17 000 km².

The main body of this report documents the methods, results and implications of this project. All data, scripts, map outputs and contributing reports have been reproduced in the Appendices (supplied digitally on the attached DVD).

Modelling was performed using the ANUGA hydrodynamic modelling library, which is free and open source code that was developed by GA and the Australian National University (ANU). The modelling strategy comprised five scenarios, of which the first two were designed to reproduce the 2009 modelling and validate our new input data. The Maritime Hazard scenario (Scenario 3) was run as a 13 hour simulation of tsunami activity, with the Coastal Inundation modelling (Scenario 4) and Airport Hazard plus Dune Erosion modelling (Scenario 5) run as 4 hour simulations.

Modelling results predict severe inundation (> 4 m) in exposed eastern coastal areas (Tasman Peninsula, Eaglehawk Neck, Bruny Island). Significant but less severe inundation (\leq 3 m) is predicted at Hobart city waterfront and many of the embayments on both shores of the Derwent estuary. The maritime hazard assessment suggests that the expected water disturbance would pose a significant threat to marine craft. The feasibility of shipping evacuation is questionable given the timeframes involved, and suggested management options for various shipping types are detailed in Appendix 3. Inundation and dune erosion modelling of the Hobart Airport vicinity shows

that a tsunami of maximum credible magnitude would not breach the current dune line at Seven Mile Beach and so the airport would not be inundated. However, breaching could occur if the dune ridge was to be lowered or partially removed. Other areas where tsunami-induced dune erosion could cause greater tsunami inundation were also identified.

It is important to note that these results represent the risk from a maximum credible tsunami event and do not cover the variety of scenarios with different return periods and magnitudes that would be required for a comprehensive tsunami hazard assessment. From the map series produced in this study, an analysis of vulnerable places, properties and infrastructure should be undertaken alongside a review of Southeast Tasmania's tsunami emergency response plan(s). Particular attention should be focused on the maritime response procedures, given that the impacts of a large tsunami in the port of Hobart had not been investigated in detail prior to this project. Further detailed modelling of some of the heavily impacted eastern areas is also recommended (e.g. Eaglehawk Neck), as well as an investigation of the effect of the Hobart Rivulet on possible inundation at Royal Hobart Hospital. In addition, palaeotsunami studies would be useful to explore modelled inundation distances.

The key outputs from this project (in addition to the main body of this document) that may be most useful for tsunami planning and emergency management are as follows:

- A report detailing the maritime hazard assessment compiled by the Australian Maritime College (AMC; Appendix 3).
- A coastal inundation map series, which covers 71 coastal communities. These maps detail the maximum inundation extent, flooding depths and nearshore velocity at each location and provide a graph of tsunami water level fluctuations over time for each community (Appendix 4).
- Further comments on the results of the Hobart Airport inundation assessment and tsunami dune erosion modelling, performed by E Rigby (Appendix 5).