Cyclone Gabrielle landslides; response and mapping in the Tairāwhiti region

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# ABSTRACT

Between 12-16 February 2023, Cyclone Gabrielle delivered up to 600 mm of rain to northern and eastern parts of New Zealand’s North Island, causing widespread damage. This severe event resulted in a national level emergency response coordinated by the National Emergency Management Agency (NEMA), with States of emergency declared in seven regions of New Zealand. Along with extensive flooding, the event triggered more than 140,000 landslides and destroyed infrastructure and livelihoods across the North Island. Eleven fatalities resulted from the storm, six associated with landslides.

Cyclone Gabrielle was the third severe weather event to affect the upper North Island for 2023, following Cyclone Hale (January 10-12) that particularly impacted the Tairāwhiti region, and the Auckland anniversary weekend floods (January 26-27). It was the wettest summer on record for Whangarei, Auckland, Tauranga, Tairāwhiti/Gisborne and Napier. As part of the national response to Cyclone Gabrielle, a GeoNet Landslide Response was initiated. Five teams of landslide experts from GNS Science and local authorities conducted helicopter aerial reconnaissance of the six regions where widespread and severe landsliding occurred. Aerial reconnaissance focused on identifying life risk issues, and documenting the extent, severity and impacts of the landslides triggered by Cyclone Gabrielle. Flightpaths were informed by the rainfall distribution and intelligence gathered from social media, endusers, councils, and iwi. Data (photographs and observations) was shared with stakeholders in near-real time via a custom mobile app (Fulcurm). Outputs from a GNS Science Rainfall Induced Landslide (RIL) Forecast Tool were also shared with Endusers, along with impact forecasts derived from RiskScape (riskscape.org.nz/) to identify the location of houses, roads and rail that were expected to be impacted by landslides. Some of the highest rainfall amounts, and greatest landslide damage (see Wolter et al poster), was experienced in the Tairawhiti region and will be highlighted in this talk. We worked very closely with Ngāti Porou and Gisborne District Council before, during and after the response, ensuring an effective response and recovery in a very vulnerable region.

GNS Science, in collaboration with Manaaki Whenua, University of Canterbury, and the University of Auckland are mapping the landslides triggered by Cyclone Gabrielle (Leith et al, 2023). This detailed landslide inventory documents locations and selected attributes of landslides triggered by Cyclone Gabrielle. The inventory is now being used to develop landslide susceptibility, runout and risk models, which will assist in post-event recovery decision making.

# REFERENCES

Leith K, McColl S, Robinson T, Massey CI, Townsend DB, Rosser BJ, Smith H, Barrell DJA, Zoeller A, Lukovic B, et al. 2023. Cyclone Gabrielle (12–16 February 2023): landslide inventory for North Island, New Zealand, version 1.0. Lower Hutt (NZ): GNS Science. 72 p. (GNS Science report; 2023/28). doi:10.21420/MMFP-S330.

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