GNS Overflight 18th July 2018 Wakaroa Forest Waimata

On the 18th of July, Dr's Rosser and Townsend from the Institute of Geological and Nuclear Sciences (GNS) and Murry Cave from GDC undertook two flights to assess the regional landsliding impact from the Queens Birthday storm and the subsequent event one week later. This segment of flight one approached from the north, crossing the operational part of Wakaroa Forest (Wakaroa West and south). It then headed nor-north east to cover the area immediately west of inspected on the 3rd of July. The flight then traversed Mangahouku Stream enroute to Uttings Bridge. (Figures One and Two). The Wakaroa forest covers two catchments; Waimata in the South East and Waipoa in the North West. The forest has been examined in detail since significant logging debris damaged the bridge at Uttings on the Waimata Road and this material has been traced back to this forest.

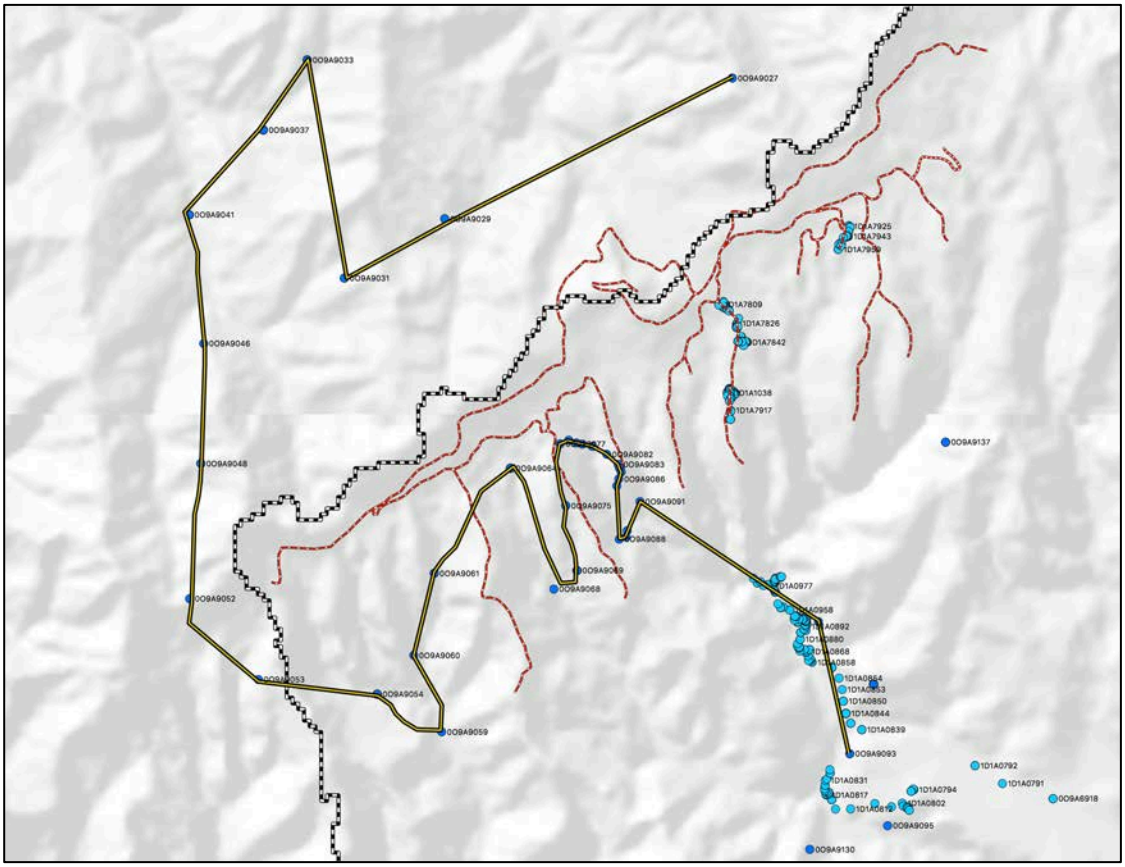

Figure One. *GNS Wakaroa Flight path showing the images taken. The west and north is in the Waipoa Catchment while the east is in the Waimata catchment.*

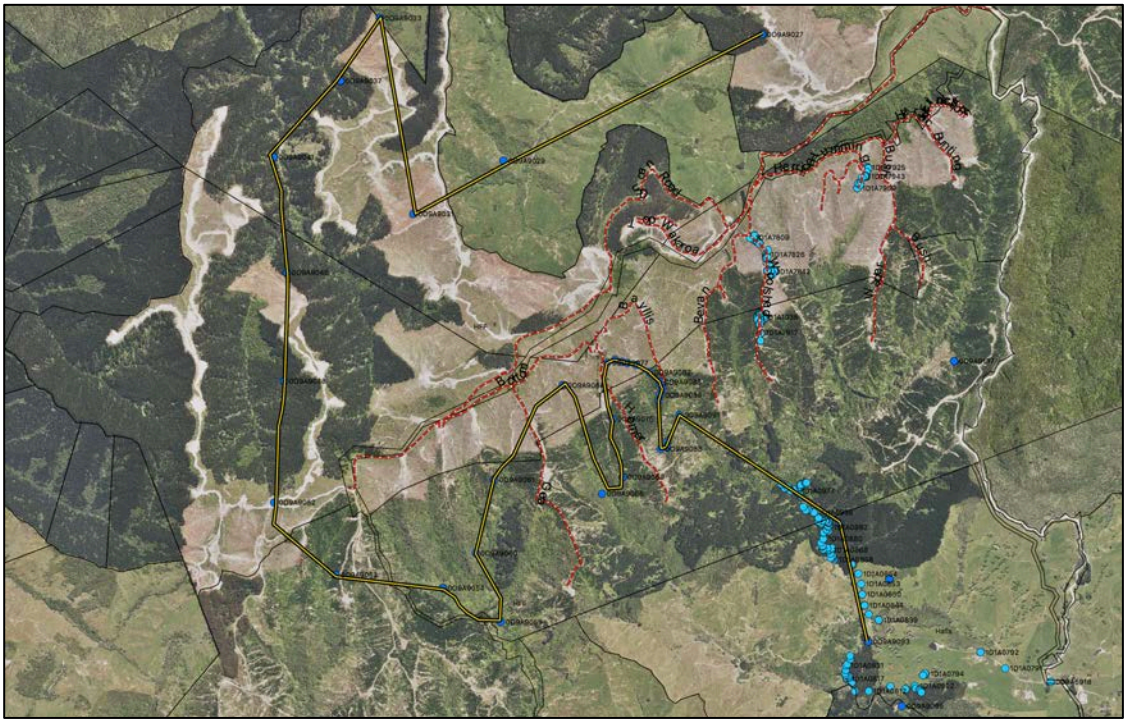

Figure Two. *Orthomosaic image of GNS flight one showing the extent of forestry harvest at by December 2017. The first segment of the flight was over the areas of present active harvest while the remainder was over earlier harvest areas.*

A total of 37 photos were taken during this flight segment and these are described below.

Image 0O9A9041

Figure Three. *View looking east showing a significant debris flow from a roadway as well as a smaller failure from the end of a rough track.*

Image 0O9A9043

Figure Four. *View looking east showing a skid site looking east showing a slope failure from a drainage channel cut at the edge of the skid site and generally messy housekeeping.*

Image 0O9A9045

Figure Five. *View looking east showing a skid site with logging debris in the watercourse and over the edge of steep slopes.*

Image 0O9A9047

Figure Six. *View of operational log hauler operation (blurred) showing two significant failures from the edge of the site.*

Image 0O9A9048

Figure Seven. *View looking east showing two failures in side cast material originating from a roadway.*

Image 0O9A9050

Figure Eight. View looking east towards several slope failures originating from a roadway.

Image 0O9A9053

Figure Nine. View looking north towards the actively harvested part of Wakaroa Forest.

Image 0O9A9053

Figure Ten. *View looking upstream into a tributary of the Mangahouku Stream showing logs and debris flow materials in the watercourse.*

Image 0O9A9060

Figure Eleven. *View looking north into the western end of the early harvest area in Wakaroa Forest. At the far left a slope failure from the roadway has generated a debris flow which has migrated through 5+ year old pines towards the valley floor. Additional failures down to the rock base have also occurred from what appears to be a bench or rough track while on the right there is a slope failure from the edge of the roadway.*

Image 0O9A9061

Figure Twelve. Detail view of the failure shown in Figure Eleven showing the path of the debris flow middle left and a subsequent failure on the right resulting from toe failure.

Image 0O9A9062

Figure Thirteen. View of the bench shown in Figure Eleven.

Image 0O9A9063

Figure Fourteen. *View looking northwest towards a skid site on a spur off Bottom Road showing significant logging debris on the slopes and pronounced rilling in sidecast material.*

Image 0O9A9064

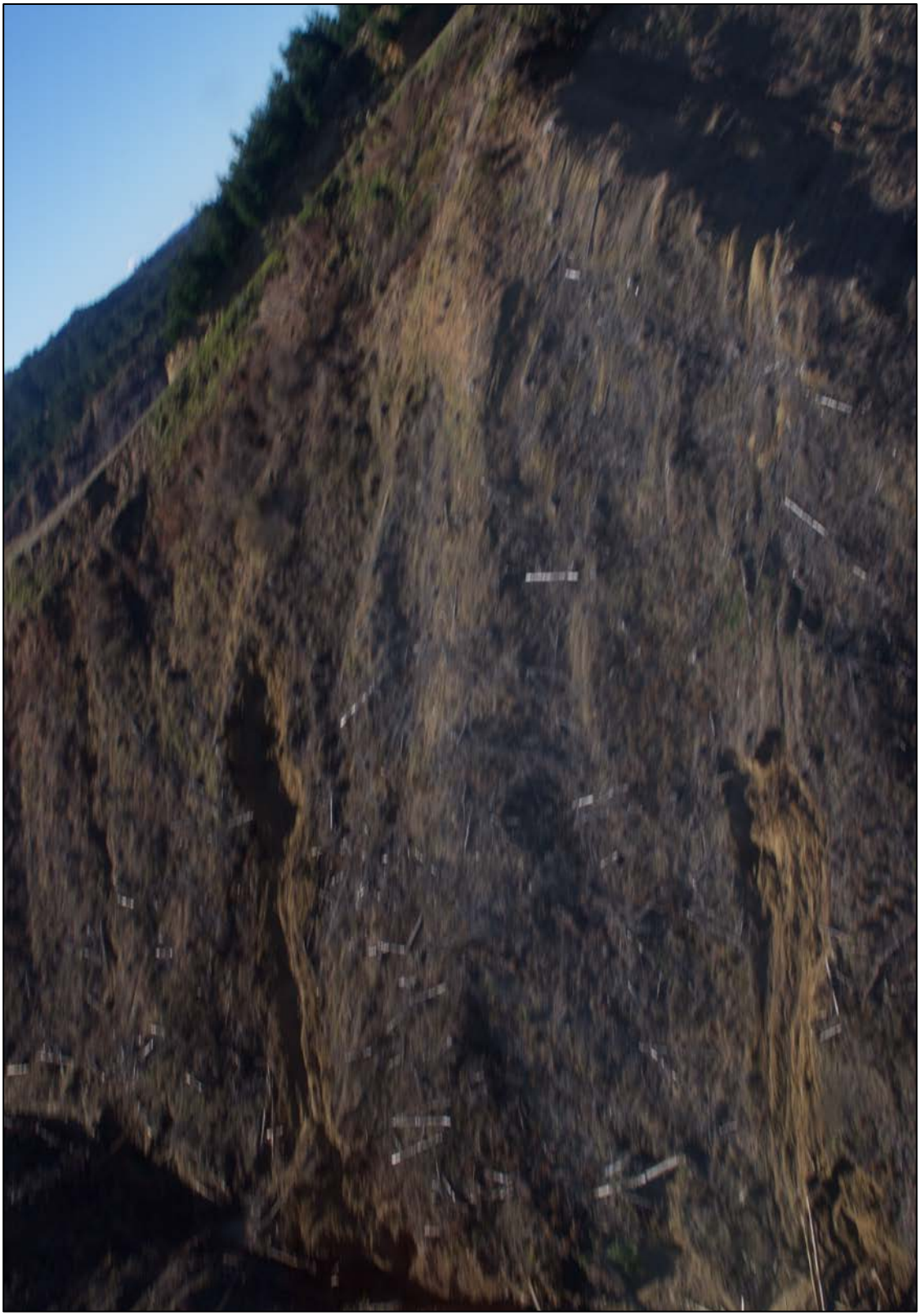

Figure Fifteen. Image quality is poor but shows a slope failure initiated from deep gouging from a log hauler line (right).

Image 0O9A9064

Figure Sixteen. View of skid site associated with the gouging shown in Figure Fifteen showing slash perched on the edge of the skid site as well as undercutting.

Image 0O9A9069

Figure Seventeen. View looking west of major debris flow from Goat Road.

Image 0O9A9073

Figure Eighteen. View of slope failures on Goat road north of Figure Seventeen. On the right is a major failure where the edge of a skid site has failed, while on the left "mid slope" failures appear to connect to the valley floor and could be toe failures. On the right are "midslopes" clearly connected to the valley floor and thus most likely toe failures.

Image 0O9A9075

Figure Nineteen. View of debris flow from skid site on Homer Road. Note extensive toe failures in background.

Image 0O9A9078

Figure Twenty. View of slash on slope at skid site on Bottom Road (left) with failure from skid site (partially obscured) on far right. Note volume of logs on valley floor and slips from the roadway in the middle ground.

Image 0O9A9079

Figure Twenty One. View looking north east towards skid site on Bayllis road showing two main failures from a skid site.