

Q&A: The ecological impacts of Cyclone Gabrielle

Q1. Were there any examples of better managed catchments that were less impacted in the areas analysed?

Q2. Was there any analysis done to explore whether different farming practices offer greater resilience to weather-related impacts?

A. As far as I'm aware, there have been no studies attempting to relate farm- or catchment-scale management practices to cyclone impacts. It would certainly be an interesting (and challenging) question to try and answer.

Q3. How did McMillan account for activity created bare ground vs storm damage. This will be particularly important with Plantation Forestry harvesting?

A. Accounting for post-cyclone cultivation and harvesting is an important consideration. McMillan et al. include some details on how they addressed this in their report:

"For this assessment, the before and after images were mosaics comprising cloudfree pixels that were selected preferentially from images acquired as close as possible in time to when the cyclone occurred. The change detection algorithm was designed to detect new bare ground appearing in the after imagery. This was achieved by finding pixels in the after imagery that had increased significantly in brightness in the visible bands.

The change detection algorithm was optimised for the detection of new bare ground due to landslide damage caused by the cyclone. However, it was also sensitive to



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other effects unrelated to the cyclone, such as cultivation. For this reason, the analysis focused on Land Use Capability (LUC) Classes 6 and 7 [1]; that is, steep land where most landslides occur and little cultivation occurs. To minimise any remaining false positives caused by forest harvesting or agricultural practices we visually checked the before and after imagery of all mapped damage areas larger than 3ha (871)."

Q4. Please get these messages into mainstream media, loud and strong. The NZ public need to know this!!

A. Thank you – we agree and are doing all we can to publicise this research. Please feel free to share with your colleagues, friends, whānau, and anyone who may be interested.

Q5. Tell us more about what underpinned your success in partnering with mana whenua?

A. I can only comment from the MWLR perspective, but I can highlight what I think are three key factors: 1) early engagement allowed time to build trust and discuss how each party could contribute to and benefit from collaboration; 2) working together in the field helped to build connections and encourage knowledge exchange; 3) taking the time to report back to communities we worked with was an important and rewarding experience.

Q6. Was there any analysis possible looking at the mortality of 'early successional' species (e.g. mānuka)?

The McMillan et al. report assessed how erosion varied across land use types, including mānuka/kānuka forest. Their analysis suggested that mānuka/kānuka forest



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was more prone to erosion than 'mature' broadleaf-podocarp indigenous forest types, but still far less erosion-prone than plantation forestry or pasture.

We focused our field work on assessing the cyclone impacts on lowland kahikatea forest because this is a regionally rare ecosystem type where significant impacts were being reported. However, unpublished data from a stand of flooded kānuka in Canterbury suggests they were largely resilient to flooding (up to 2 m) and sand deposition (up to 40 cm). In general, there is an urgent need for more research on flooding and sediment impacts on NZ indigenous species. As suggested during the webinar, this type of information would be useful for planting the right species in the right places when planning for native afforestation.

Q7. Great presentation! It's worth sharing more broadly!

A. Thanks for all the positive feedback. Yes, let's hope at least some lessons have been learned, and appropriate actions will be taken, to help mitigate future impacts. The recording and associated documents can be found here: <u>https://www.landcareresearch.co.nz/events/linkonline/#previous-events</u>.