

## 2.2

# STREAMBANK IMPACTS

## USING DRONES TO MONITOR STREAMBANK IMPACTS OF FERAL HORSES IN KOSCIUSZKO NATIONAL PARK

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This project monitors damage to drainage lines caused by feral horses in Kosciuszko National Park. The focus is horse trampling of streambanks and the erosion it causes. The project complements and extends prior field assessments of feral horse impacts in Victoria, NSW and the ACT in 2011 and 2012 (Robertson et al. 2015). Those assessments found that riparian systems of the Australian Alps national parks were being extensively degraded by feral horses, as indicated by loss of streambank stability and ‘pugging’ damage from hooves, amongst other measures.

Preliminary trials into the use of unmanned aerial vehicles (i.e. drones) for remotely sensing streambanks commenced in Kosciuszko National Park in October 2013. Aerial imagery of treeless, sub-alpine streams was captured in the form of overlapping, near-vertical photographs. Ground control markers placed along the banks of the streams were included in the imagery and their precise locations were surveyed with a Real-Time Kinematic Geographic Positioning System. After fieldwork, a methodology known as structure-from-motion modelling was applied to produce three-dimensional, computer point-cloud representations of the streams, which were geographically referenced based on the ground control information. High-resolution digital elevation models and aerial photo-mosaics having centimetre to sub-centimetre accuracy were then exported to a Geographic Information System where geomorphological metrics were derived.

Stream reaches, each of about 50 m length, are now being monitored in this way over a three-year period (2016/17–2018/19), with funding generously granted by the Australian Alps Liaison Committee and considerable in-kind support from the University of New South Wales. The objective is to measure changes over time to channel cross-sectional profiles and sediment lost from streambanks impacted by feral horses. Between October 2016 and March 2017, 32 baseline monitoring sites were established. Most of these streams were resurveyed in the summer of 2017/18. An initial estimate of sediment lost from the very heavily horse-impacted Ingeegoodbee River in the Pilot Wilderness of Kosciuszko National Park indicates that up to 0.07 tons of sediment per metre of bank length might be lost per year (Figure 10). Additional experiments are now being conducted to survey and model much longer reaches—for example, 400–500 m. The aim here is to eventually up-scale the finer measurements. The summer of 2018/19 will see the final round of surveys of these sites. The watercourses and their associated digital models comprise an important future reference against which the continued impacts of feral horses can be gauged, along with widespread but less obvious damage caused by feral pigs and deer.

## Reference

Robertson, G., Wright, J., Brown, D., Yuen, K. and Tongway, D. (2015). *An Assessment of Feral Horse Impacts on Treeless Drainage Lines in the Australian Alps*. Report Prepared for the Australian Alps Liaison Committee, Canberra.

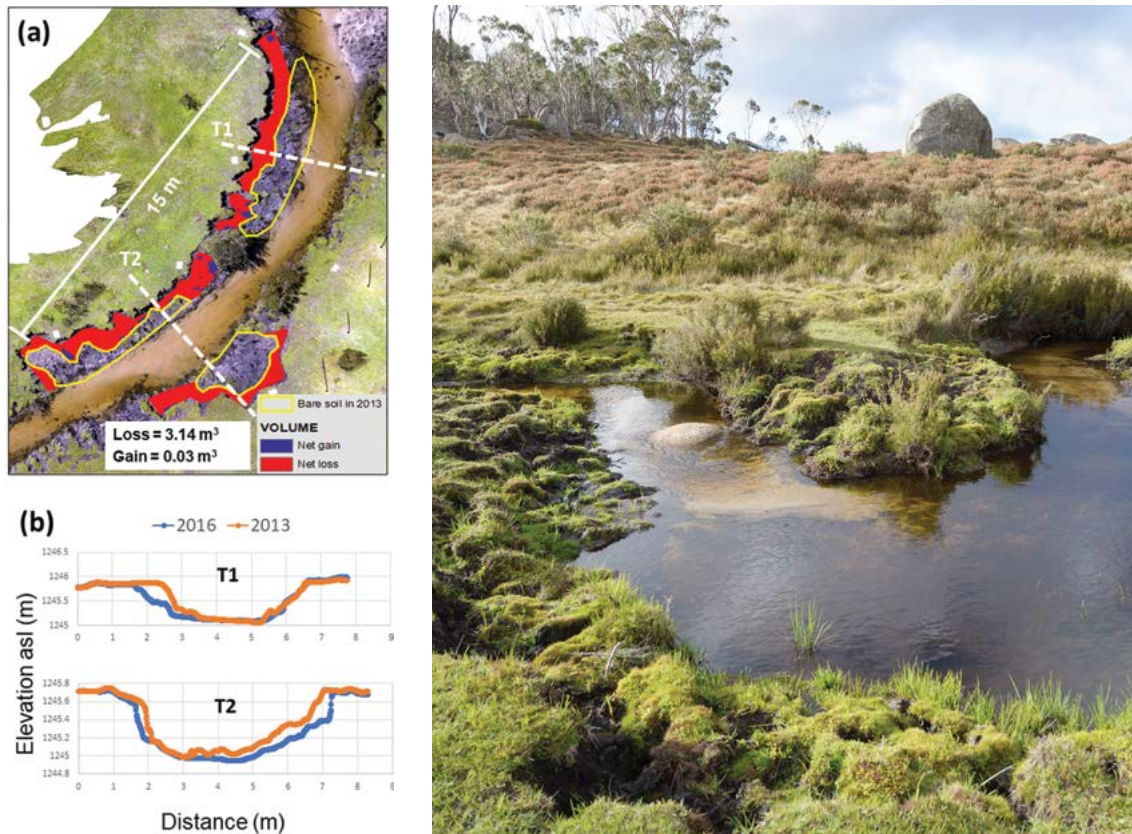


Figure 10. Structure-from-motion model of the Ingeegoodbee River, Kosciuszko National Park.

An assessment of horse impacts between 2013 and 2016 as indicated by (a) volume of sediment lost, and (b) cross-sectional profile changes along T1 and T2.

Source: D. J. Paull, unpublished data.

Streambank damage by feral horses, Ingeegoodbee River, Pilot Wilderness, Kosciuszko National Park, 2013.

Source: Graeme L. Worboys.

Right: Northern Corroboree Frog, *Pseudophryne pengilleyi*.

Source: Murray Evans.