



Revegetating Cyclone-Damaged Hillside in Hawke's Bay:

Trialing seedpod distribution via drone

30th November 2023

Prepared by Ainsley Harte, Between the Two Rivers Upstream Coordinator

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Revegetating Cyclone-Damaged Hillsides in Hawke’s Bay:

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Summary

The purpose of this project is to trial native revegetation on 5ha of slipped land, caused by Cyclone Gabrielle, using seedpods dispersed via drone. The project partners are Between the Two Rivers Community Catchment Collective Inc. (B2R), Envico Technologies and Hawke’s Bay Regional Council (HBRC). It is exciting to say that the trial has had a promising start with some germination present within just two months of the seed-podding! Not only are we excited to be a part of such an innovative trial, so are our two farmers who’s land the trials are on – these were the first farmers we approached, and both said yes straight away. The response from the community has been awesome as well – check out our Facebook page (Between the Two Rivers) to see the excitement.

Key Questions

- Is seed-podding via drone an effective method for revegetating terrain affected by Cyclone Gabrielle – particularly on steep slips which landholders are now looking to retire and where traditional planting methods are more difficult?
- In which situations / context is seed-podding via drone less effective?
- What types of plants are most suitable and in what terrains?

Scoping Visit – Friday 11th August 2023

The purpose of the scoping visit was to make sure the two trial sites B2R had earmarked were suitable in Envico Technologies’ and HBRC’s opinions, in which they were. These sites are located in the Waiwhare subcatchment:

Trial Site 1 – Tom Lane, 3ha (LUC 7)

Trial Site 2 – Graeme Fountaine, 2ha (LUC 6)

From the scoping visit the below actions were agreed:

- Select specific species to suit each trial site
- Spray-out with Glyphosate on Tom’s trial site due to the amount of weeds and grass germinating on the selected area
- Hard graze with ewes on Graeme’s site to allow seedpods to fall down to ground level – no weeds present, just grass

The Seedpods

- Manufactured by Envico Technologies
- Proprietary recipe of humates, seed and fertiliser
- Each pod weighs 2g (10kg = 5000 pods)
- Mānuka seed was eco-sourced the B2R team from local Mānuka stands
- With advice from HBRC and availability of seed, the below mixes were made for each

site:

Tom’s – Tree Lucerne, Flax, Cabbage Tree, Mānuka, Kanuka

Graeme’s – Mānuka, Kanuka, Cabbage Tree, Black Matipo, Kōwhai



Figure 1: Eco-source Mānuka seed & HB sourced Kōwhai seed

Trial Site 1 – Tom Lane

Located at the end of River Road, Tom’s place boundaries that Tūtaekurī River and the Waikonini Stream. Tom’s trial site is a steep, LUC 7 face with some established Mānuka but mostly slipped away into the flat basin paddock below. This is a good site for the trial as it has varied terrain from the steep top through to the moderately steep then flat at the bottom.

The site was sprayed with glyphosate by a local drone operator, Aerospread, 3 weeks prior to seedpods being flown on via drone. This was to minimise the weed and grass competition, ensuring the best start for the seedpods. Ideally, we would have sprayed at least 6 weeks prior to the seed-podding, however, the weather made it impossible.



Figure 2: Tom's site pre-glyphosate spray



Figure 3: Tom's post spray

Trial Site 2 – Graeme Fontaine

Graeme’s place is located 10km from Tom’s and is 200m higher. Graeme had been thinking of retiring this area as it boundaries the Waikonini Stream – the cyclone made it an easy decision by causing slips. B2R, Envico Tech and HBRC agreed it would be good to do a trail without using glyphosate as a spray out and instead intensively graze it with livestock to get the grass covers down enough for the seedpods to hopefully find soil contact.



Figure 4: Graeme's site pre-graze

Seed-podding via Drone – Thursday 21st September 2023

- 30kg seedpods / ha
- 5 monitoring sites per trail
- A peg was placed in the center of the plot and a 1m diameter circle marked (orange)
- All pods that landed in the plots were marked with marker pegs (yellow)
- Total time taken to complete both sites was 6 hours

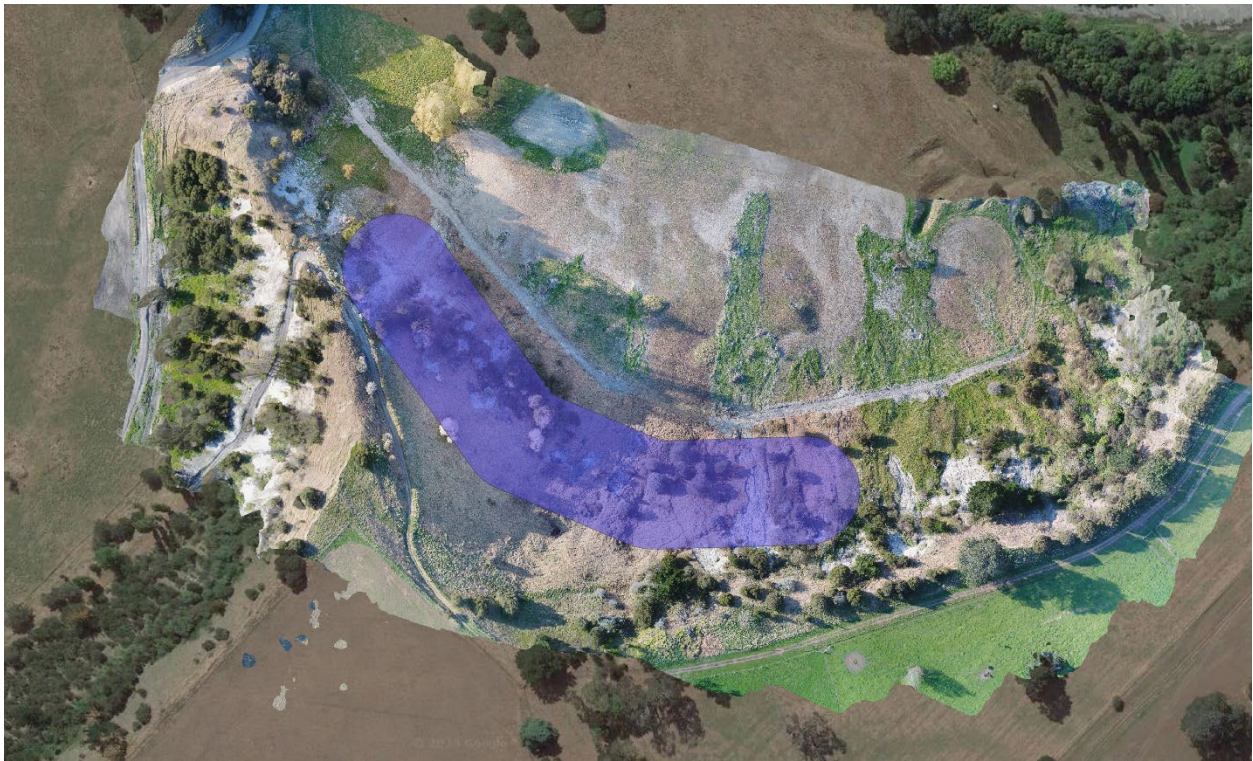


Figure 5: Tom's flight path



Figure 6: Graeme's flight path



Figure 7: Weighing seedpods



Figure 8: Filling drone with seedpods



Figure 9: Drone ready for take off



Figure 10: Drone controls



Figure 11: Monitoring plot Graeme's



Figure 12: Monitoring plot Tom's



Figure 13: Seedpod marker Tom's



Figure 14: Seedpods Graeme's



Figure 15: Seedpod Graeme's

Initial Monitoring Visit – 17th November 2023

This visit was before the scheduled 6-month visit; the reasons listed below.

- See if there was any pest animal sign in the trial areas – **very little**
- See if there were any signs of germination – **success!**
- Check on ground conditions – **good moisture present due to the 280ml rainfall since 30th**

September

Envico Technologies Conclusions Thus Far

- Normal monitoring is 6 – 12 months (monitoring 55 days after seed-podding is to early for any conclusive results)
- Both sites show signs of germination
- Tom’s property has the most sign of early germination

- Low germination sign in exposed plots on slip faces



Figure 16: Manuka plot 1 Tom's



Figure 17: Germination plot 1 Tom's



Figure 18: Germination plot 1 Graeme's

Budget to Date

<u>DESCRIPTION</u>	<u>AMOUNT NZD (GST INCLUSIVE)</u>
SEED SUPPLY (DOESN'T INCLUDE ECO-SOURCED MANUKA)	\$1,910.70
SCOPING VISIT	600.00
SEEDPOD TRIAL – TRAVEL, SET UP, APPLICATION, SEEDPOD MANUFACTURE	\$19,100.00
DRONE SPRAYOUT – TOM’S SITE	\$1,420.36
B2R TIME	\$2,400
REMAINING BUDGET AT 30.11.2023	\$2,513.94

We have saved roughly \$4,000 on seed by eco-sourcing the manuka ourselves and there was only one scoping visit by Envico Technologies prior to seed-podding.

With the remaining budget of **\$2,513.94**, B2R will be using this through to January 2025 in the way of site visits, and monitoring / controlling the weed and pests pressures if required. Another risk to the trial on our minds is the El Nino weather event that is predicted. Therefore, we have some of this remaining budget earmarked to water these sites via drone if the drought comes to fruition.

What Next?!

- Site visit and report from Envico Technologies Spring 2024
- HBRC & B2R to continue monitoring of weed and pest pressures along with the farmers
- B2R to continue communications between all parties and help in monitoring
- Once the trial is ‘completed’ in January 2025, B2R would love the opportunity to present the findings of the trial to Pan Pac Environmental Trust if it was something they were interested in

hearing. By then we hope to have a more conclusive understanding of where this method of revegetation is most effective.

- Watch this space!