

Vegetation cover 2024

	Sum sq	Mean sq	NumDF	DenDF	F value	p-value
treatment	0.00049	0.000243	2	24	0.0417	0.9593
location	0.38352	0.127840	3	24	21.9115	4.685e-07
treatment:location	0.05695	0.009492	6	24	1.6269	0.1830

Parameter	Omega2	95% CI
treatment	0.00	[0.00, 1.00]
location	0.69	[0.48, 1.00]
treatment:location	0.11	[0.00, 1.00]

The mixed linear models showed a significant effect of location on the 2024 vegetation cover ($p < 0.001$), indicating substantial differences between locations. Neither the main effect of treatment ($p = 0.96$) or the interaction between location and treatment ($p = 0.18$) were statistically significant.

Vegetation cover 2025

	Sum sq	Mean sq	NumDF	DenDF	F value	p-value
treatment	0.003612	0.0018066	2	16	0.2529	0.77959
location	0.091422	0.0304739	3	8	4.2660	0.04478
treatment:location	0.017032	0.0028387	6	16	0.3974	0.86993

Parameter	Omega2	95% CI
treatment	0.00	[0.00, 1.00]
location	0.69	[0.48, 1.00]
treatment:location	0.11	[0.00, 1.00]

The mixed linear models showed a significant effect of location on the 2025 vegetation cover ($p = 0.04$), indicating substantial differences between locations. Neither the main effect of treatment ($p = 0.77$) or the interaction between location and treatment ($p = 0.87$) were statistically significant.

Random Roughness

	Sum sq	Mean sq	NumDF	DenDF	F value	p-value
treatment	0.0022056	0.0011028	2	16	0.2708	0.7662
location	0.263253	0.0087751	3	8	2.1549	0.1914
treatment:location	0.0107722	0.0017954	6	16	0.4409	0.8408

Parameter	Omega2	95% CI
treatment	0.00	[0.00, 1.00]
location	0.22	[0.00, 1.00]
treatment:location	0.00	[0.00, 1.00]

The mixed linear models did not show a significant effect of treatment ($p = 0.77$) or the interaction between treatment and location ($p = 0.84$) on the random roughness. Furthermore, no significant effect of location was found ($p = 0.19$)

Erosion

	Sum sq	Mean sq	NumDF	DenDF	F value	p-value
treatment	0.07938	0.039692	2	16	1.4489	0.26404
location	0.40524	0.135080	3	8	4.9309	0.03165
treatment:location	0.20102	0.033503	6	16	1.2230	0.34526

Parameter	Omega2	95% CI
treatment	0.05	[0.00, 1.00]
location	0.40	[0.00, 1.00]
treatment:location	0.05	[0.00, 1.00]

The mixed linear models showed a significant effect of location on the erosion ($p < 0.03$), indicating substantial differences between locations. Neither the main effect of treatment ($p = 0.26$) or the interaction between location and treatment ($p = 0.35$) were statistically significant.

Post-Hoc Power / MDE

Minimum Detectable Effect: The effect size that ensures that 80% of the probability mass of the alternative distribution is to the right of the critical value.

$$MDE = \left(t_{1-\frac{\alpha}{2}, df} + t_{power, df} \right) \times \sqrt{\frac{2\sigma^2}{n}}$$

- With $\alpha = 0.05$,
- Power = 0.80,
- $n = 12$,
- $df = (areas * blocks - 1) = 11$
- $t_{0.975, 11} \approx 2.20$
- $t_{0.80, 11} \approx 0.85$
- $MDE = 3.05 \times \sqrt{\frac{2\sigma^2}{12}} \approx 1.25\sigma$

Conclusion: the experimental setup can detect differences of 1.25 standard deviations or larger. The experimental setup is underpowered for small to moderate differences. Non-significant effects should be seen as evidence against large treatment differences rather than evidence of no effect at all. However, given that the treatment sum of squares in all mixed linear models were (extremely) small relative to location effects, the absence of statistical significance is unlikely to be only a consequence of low power. The results suggest that if any true treatment effects were present, they would be small compared to the variability between locations.