



A perpetual state of flux? 20 years of vegetation dynamics in beaver wetlands and what they tell us

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Why?

- Restoration objectifies convergence to a desirable state, over process of beavers.....?
- Fragmented agricultural landscape with beavers missing
- How do beavers change landscape at different scales?
- How do beaver restoration actions succeed or fail?
- How do the beaver restoration actions



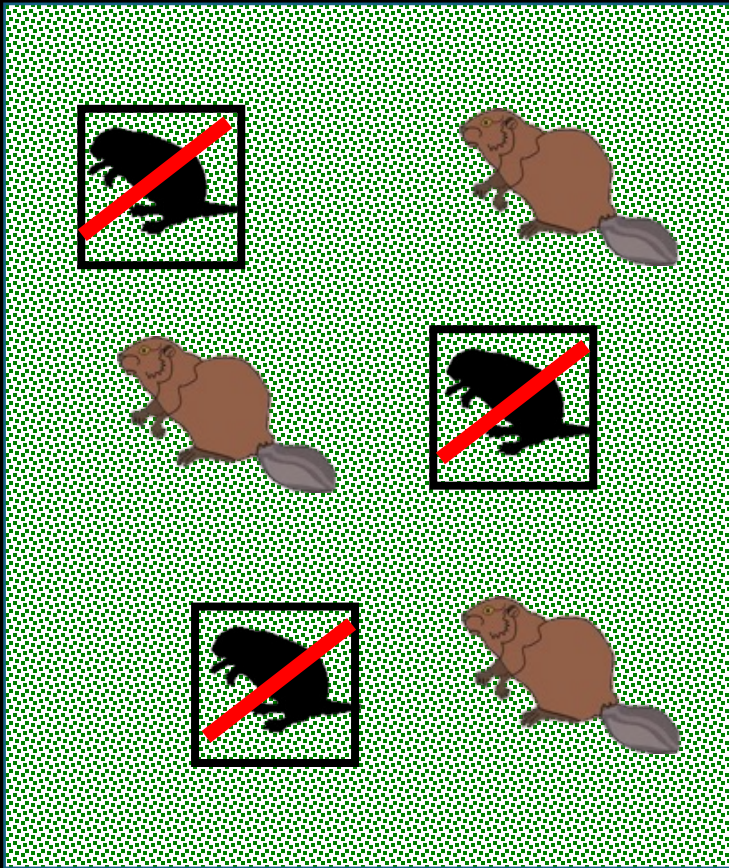
Beavers change vegetation

- Plants need light, water and nutrients
- Beaver activities change the availability of resources
- Beavers eat/disturb plants
- = Beavers change vegetation = plants are good indicators of beaver effects
- Monitoring change in vegetation cheap and efficient – quadrats, fixed point photos, drones

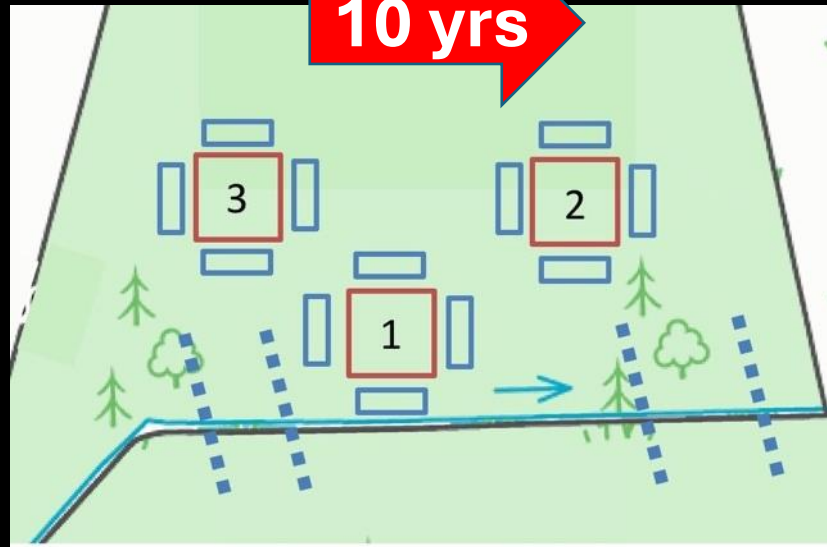


Experimental design

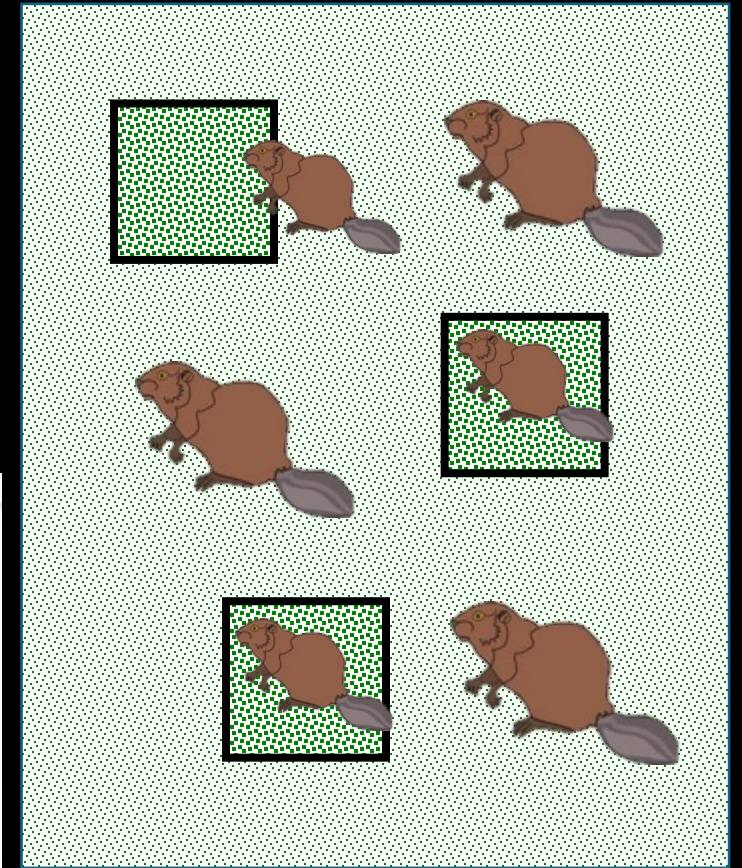
The dream: 2003



10 yrs



The reality: 2006



2003



**2.5 x increase
in species
richness; 70%
increase in
heterogeneity**

2014



Law, Gaywood, Jones, Ramsay & Willby (2017)

2003



2012



**3 x increase in
plant species
richness**

Law, Jones & Willby (2014) n.j.willby@stir.ac.uk

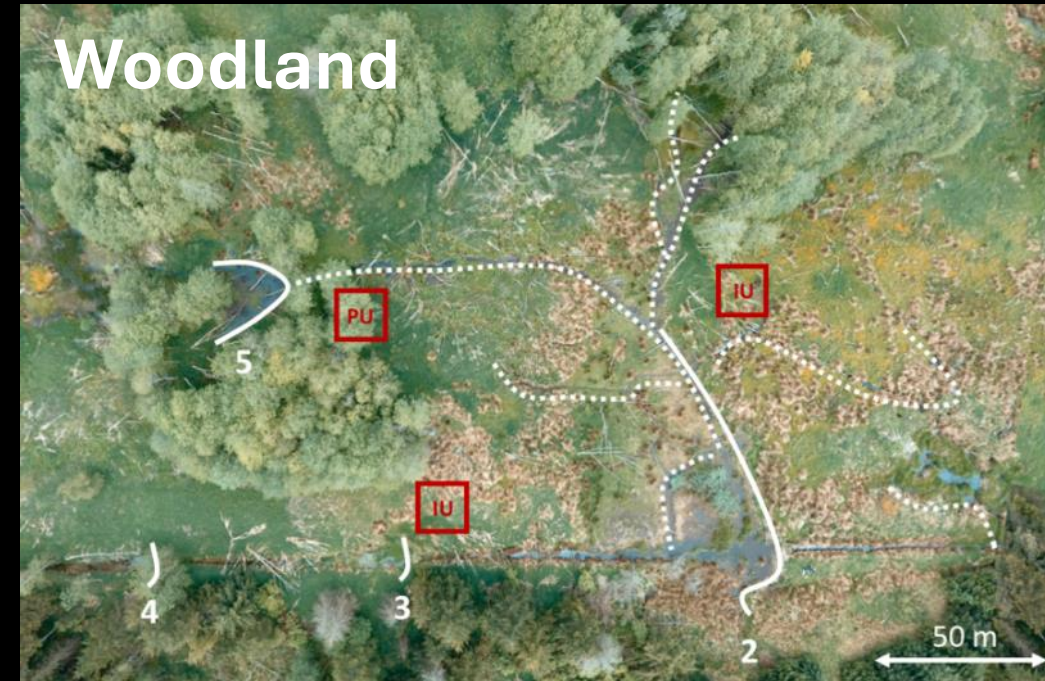
Where?



<https://bamff.land/>



- Surveyed 2003/4, 2012 & 2024
- 48 quadrats (1x1m) each year
- Replicate plots in swamp, sedge bed and open water, open and enclosed
- Drone and fixed-point photography



- Surveyed 2003/4, 2012/14 & 2023/24
- 192 quadrats (1x1m) each year
- 3 large exclosures and open areas
- Drone and fixed-point photography

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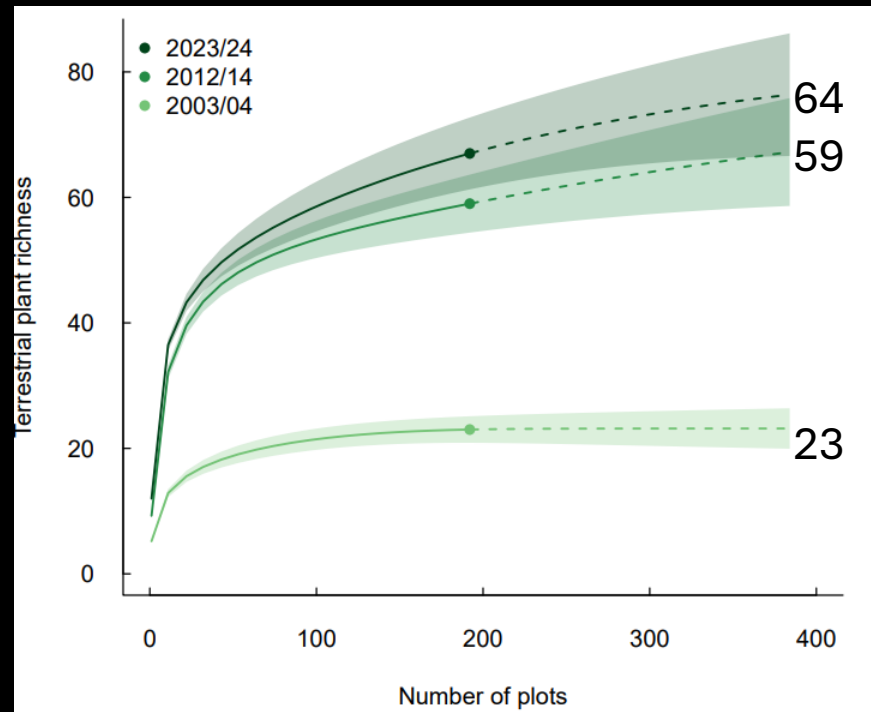
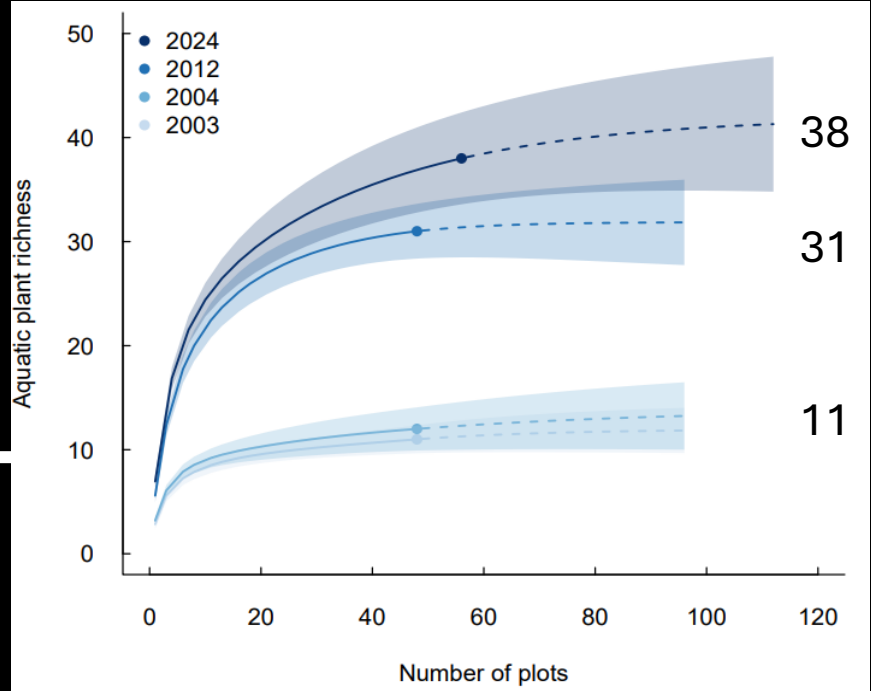
2003



2013



2024



2004



2014

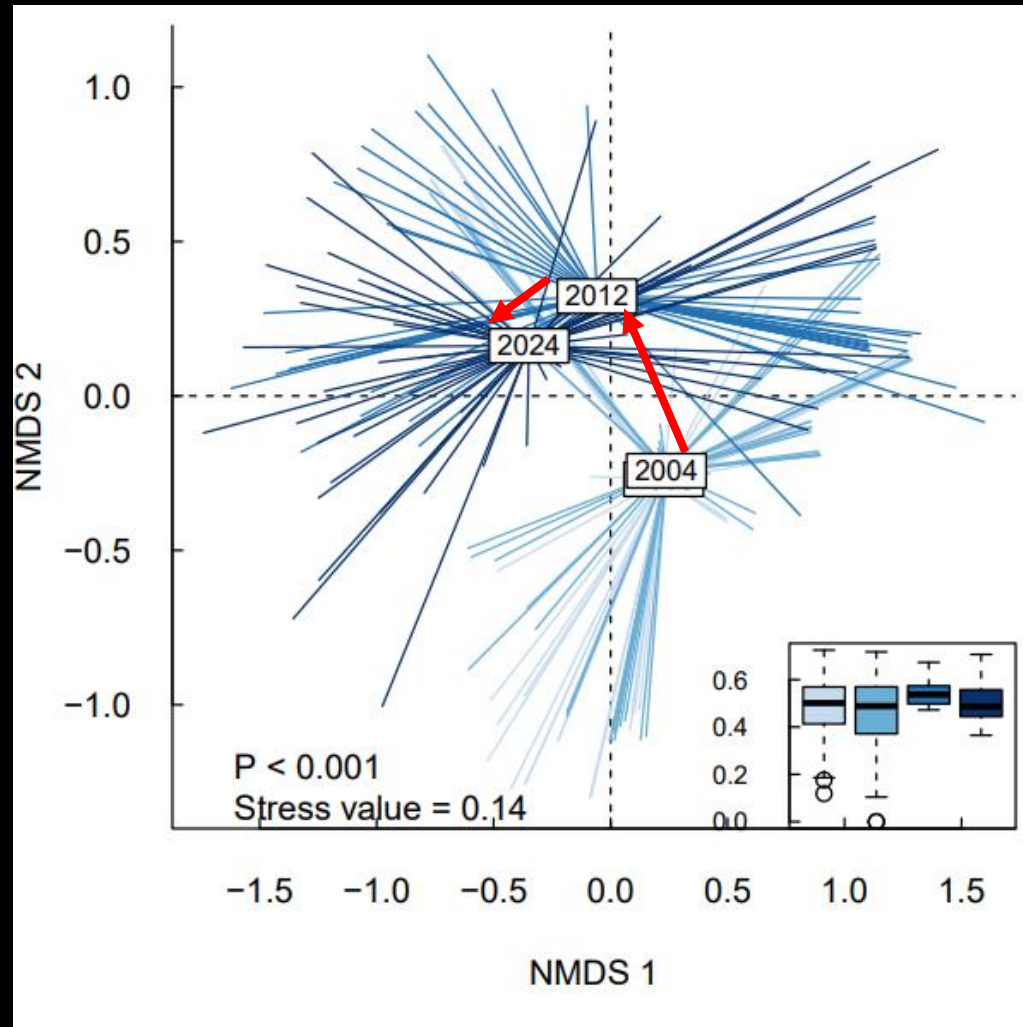


2024

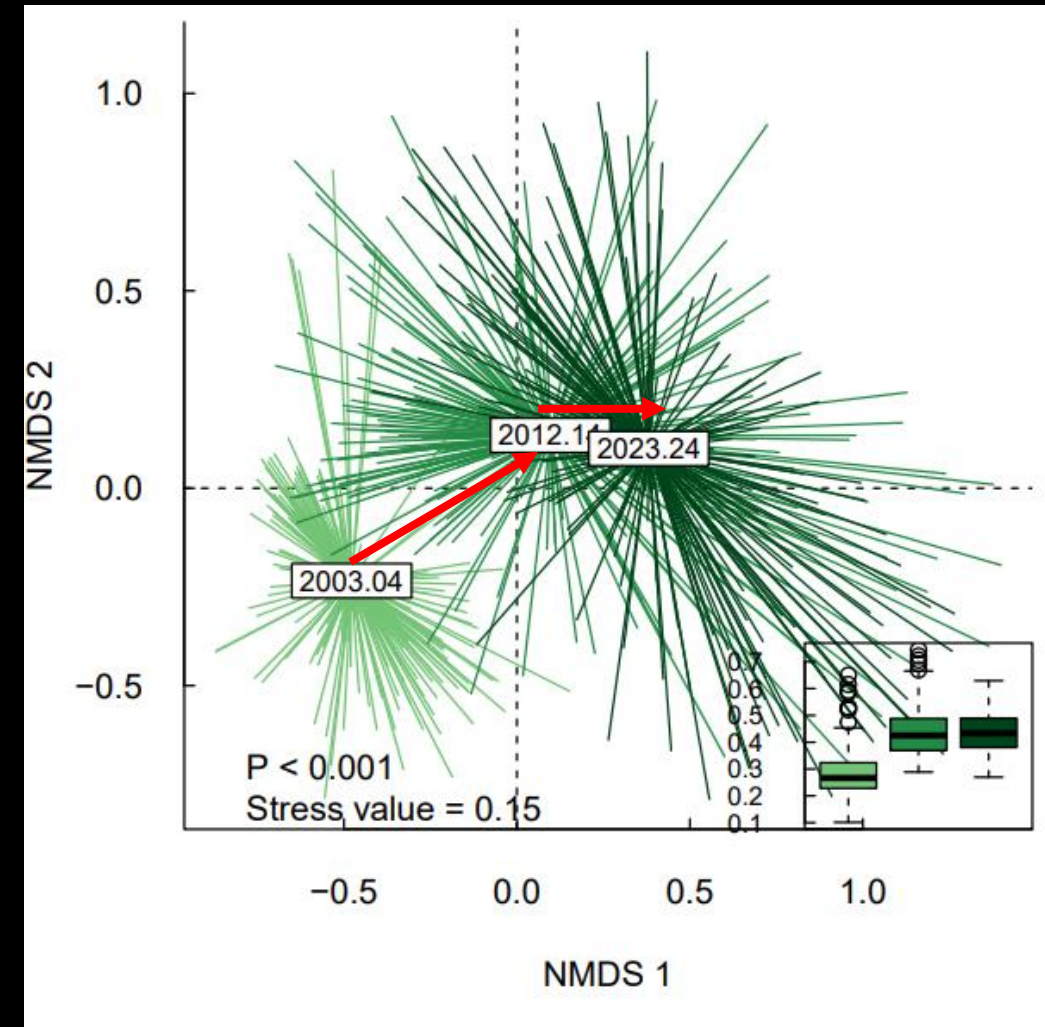


Compositional change

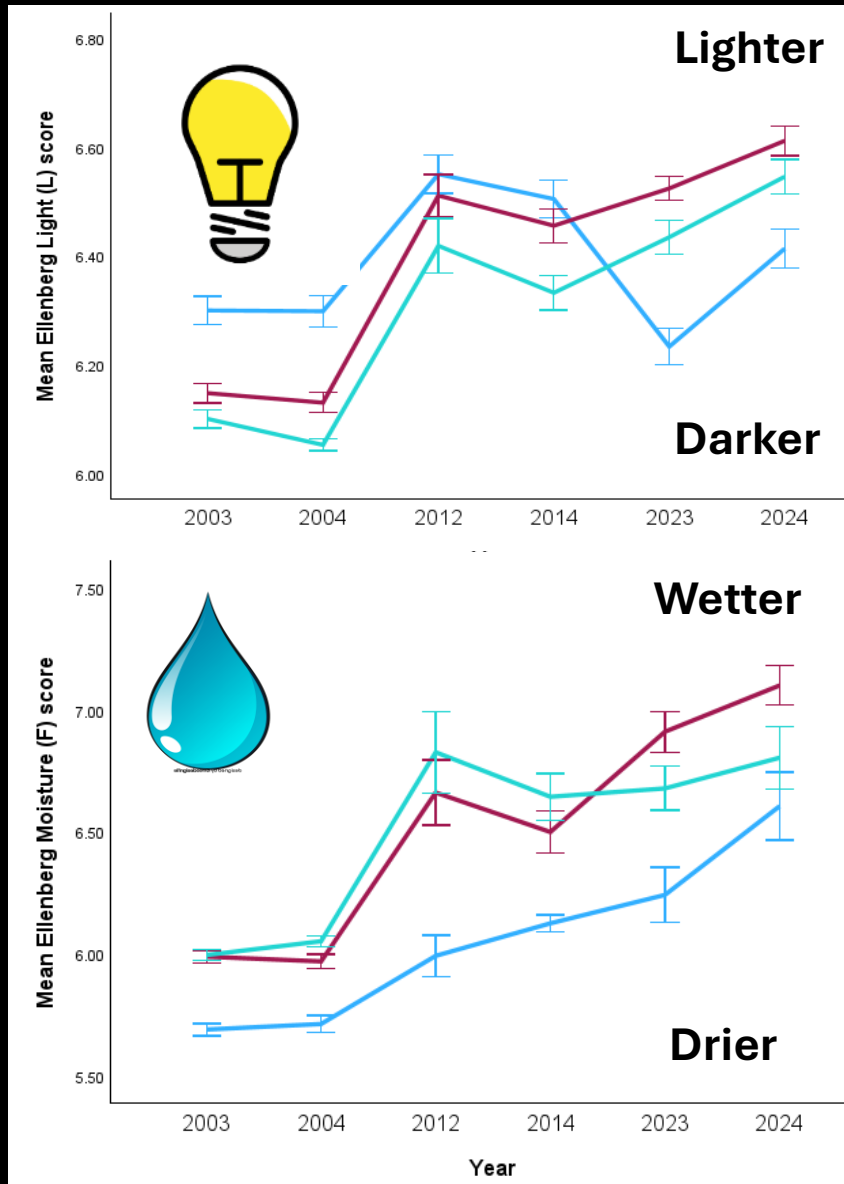
Wetland



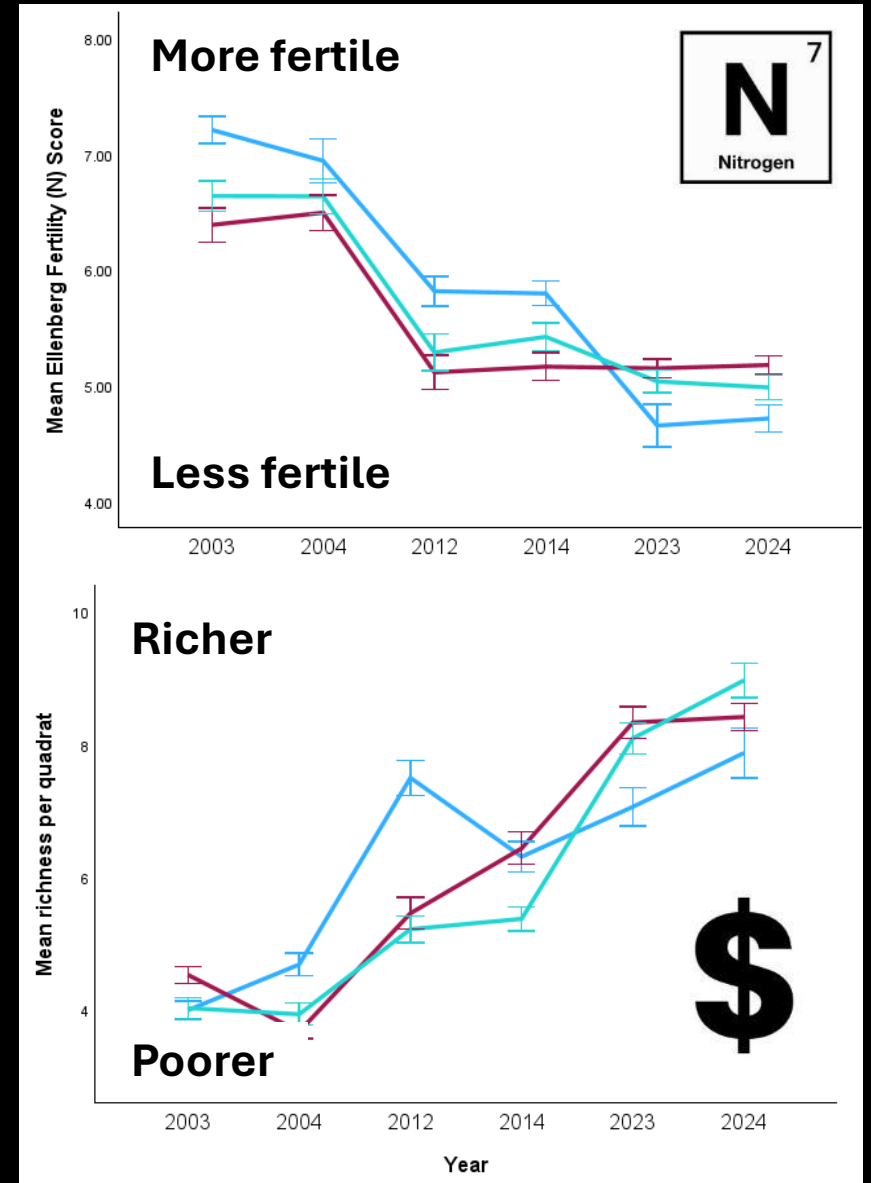
Woodland



Habitat preferences

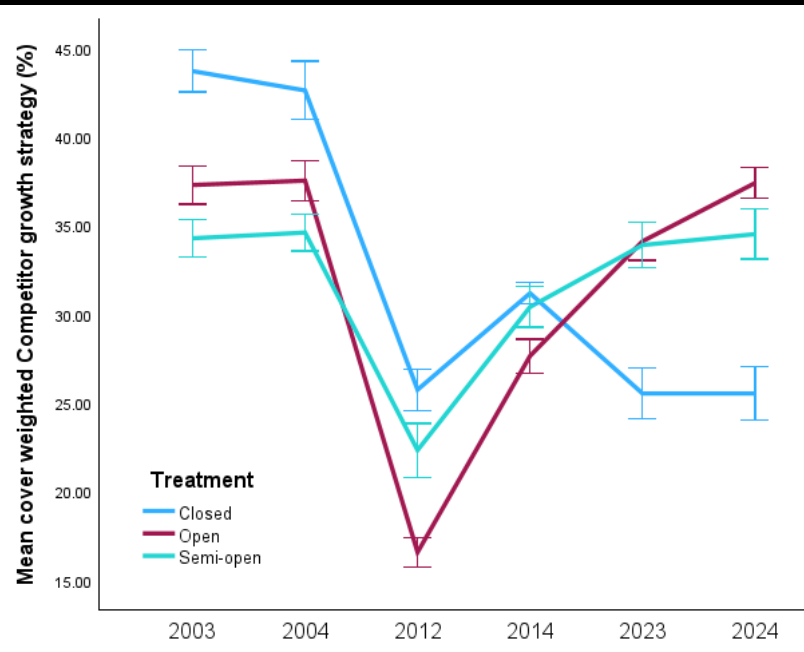


Closed
Open
Semi-open

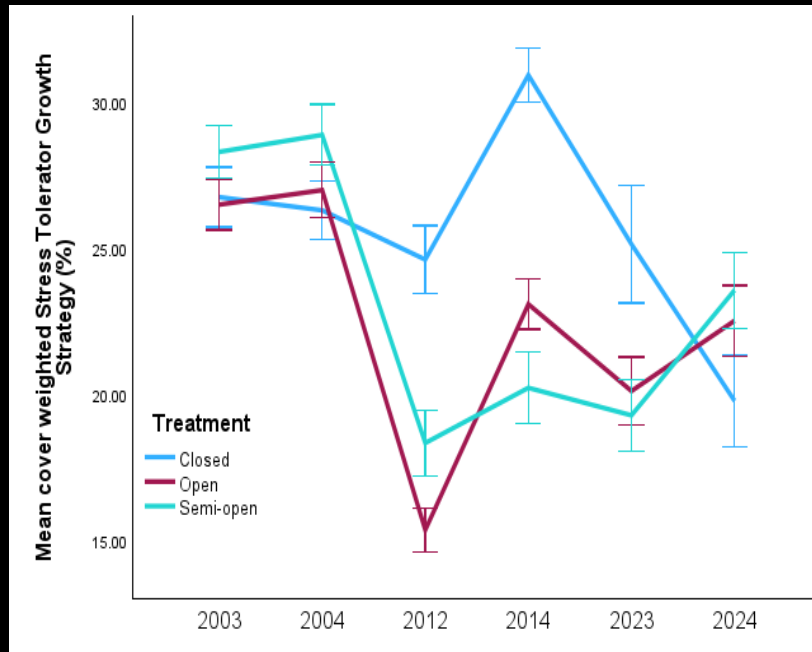


Plant growth strategies

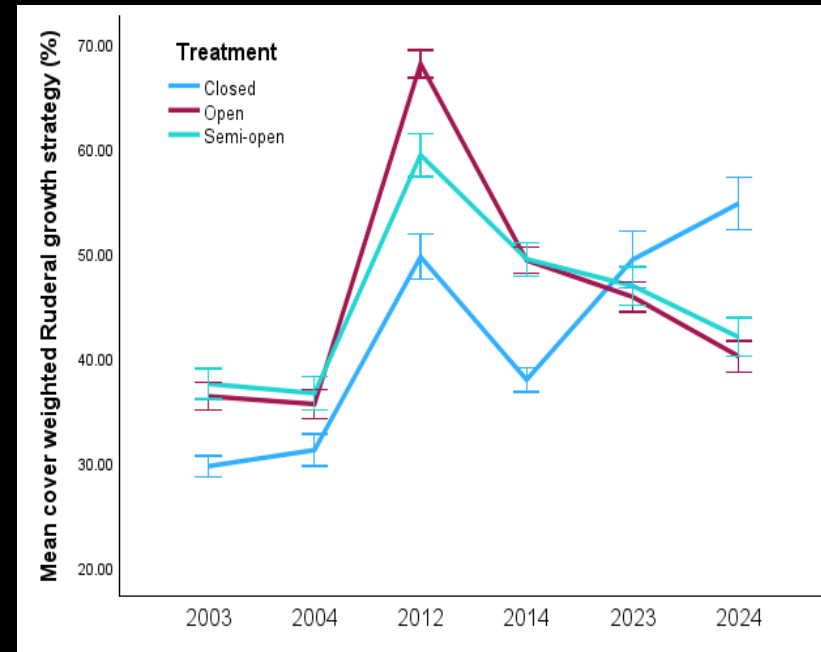
Competitors



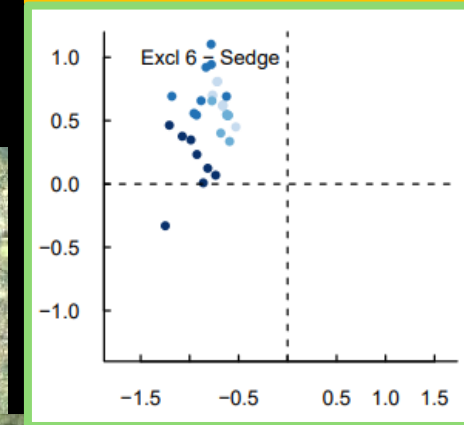
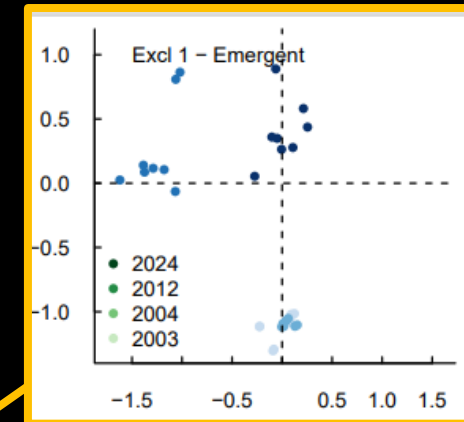
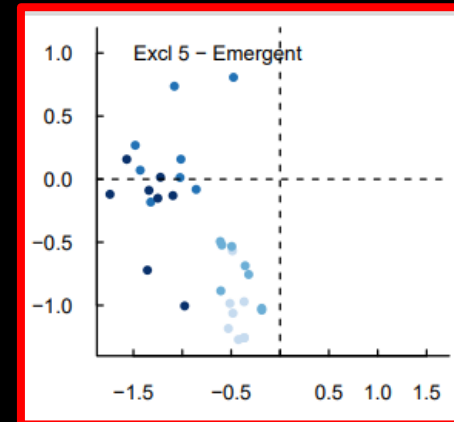
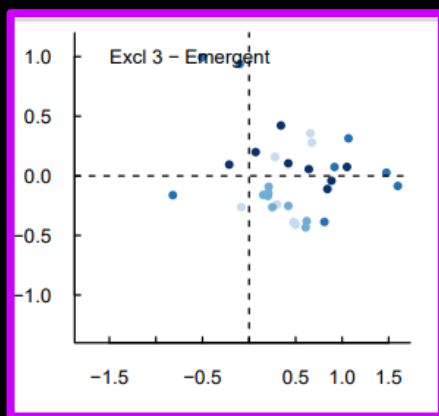
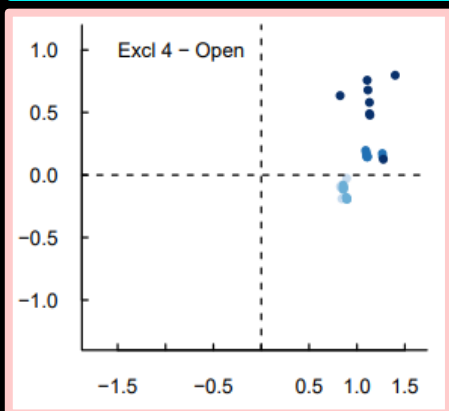
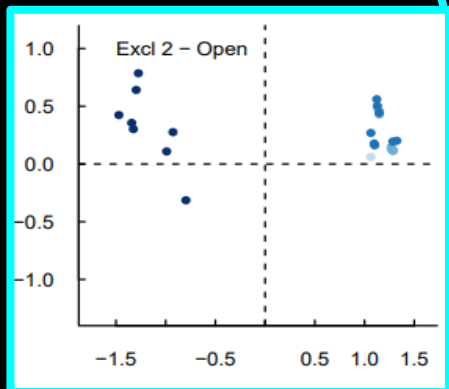
Stress-tolerators



Ruderals



Closed —
Open —
Semi-open —



Implications

- Ongoing flux, some directionality but non-linear, no convergence towards endpoint
- Potential for atypical dynamics in productive, fragmented landscapes with high site fidelity
- Bulldozers and beavers are v different
- Shifting baseline syndrome must embrace dynamics & heterogeneity too
- Long term studies are important sources of evidence – they don't need to be hard but do need resourcing

