PROGRAM B: HighFire

Fire, vegetation change and potential feedback to the global carbon cycle

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Outline

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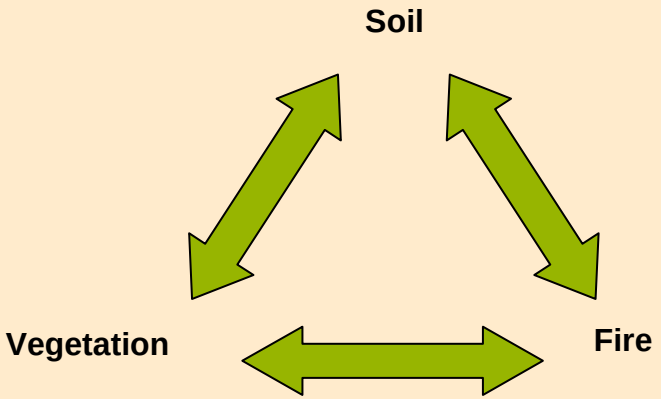
Fire



Direct

- Heat

Indirect

- Increased solar radiation leading to increased soil temperatures
- Chemical changes
- Physical changes
- Hydrophobicity
- Post-fire vegetation

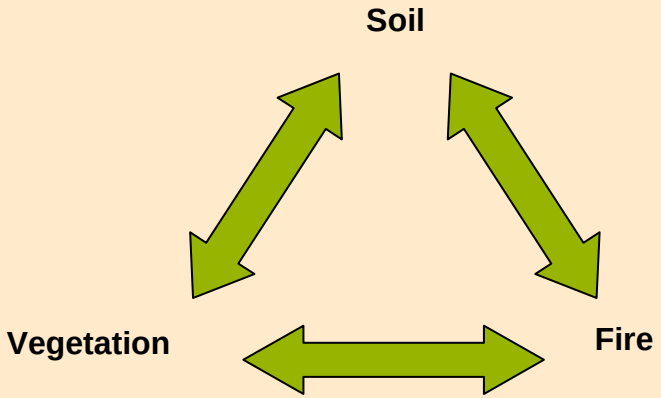
Carbon Fluxes

Ecosystem Fluxes

- Why is soil so important?

What influences these fluxes?

- Temperature
- Vegetation Type
- Soil depth



Why is this so important with respect to climate change?

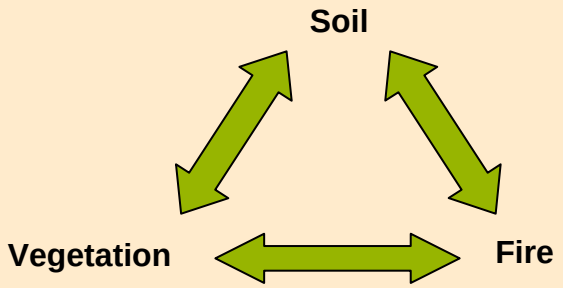
Soil store = 1500 Gt C

Soil respiration = 76 Gt C/yr

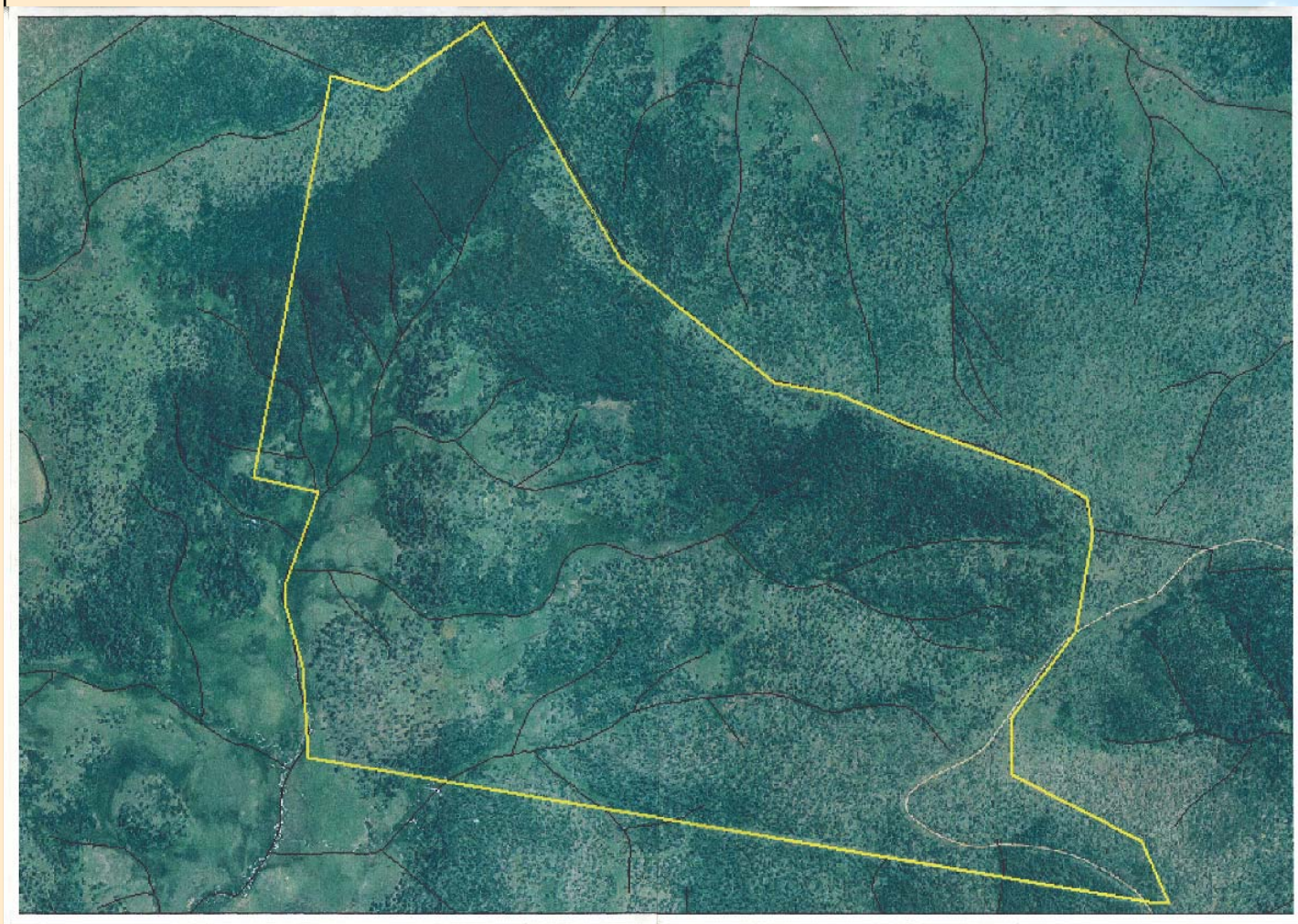
Anthropogenic emissions = 6.3Gt C/yr

Research Goals

1. Examine the response of soil respiration to fire.
   - Develop temperature dependence functions for alpine soils
   - Test effects of different vegetation types
   - Test effects of soil depth
2. Examine recalcitrant and labile pools of soil C – with and without fire
3. Examine substrate influence on soil respiration, especially effects of recently fixed C (e.g . root exudates) vs older C (e.g. litter)



Snowy Plains, NSW



Sites

- Snow gum with shrub understorey
- Snow gum with grass understorey
- Grassland

Sampled at 3 soil depths

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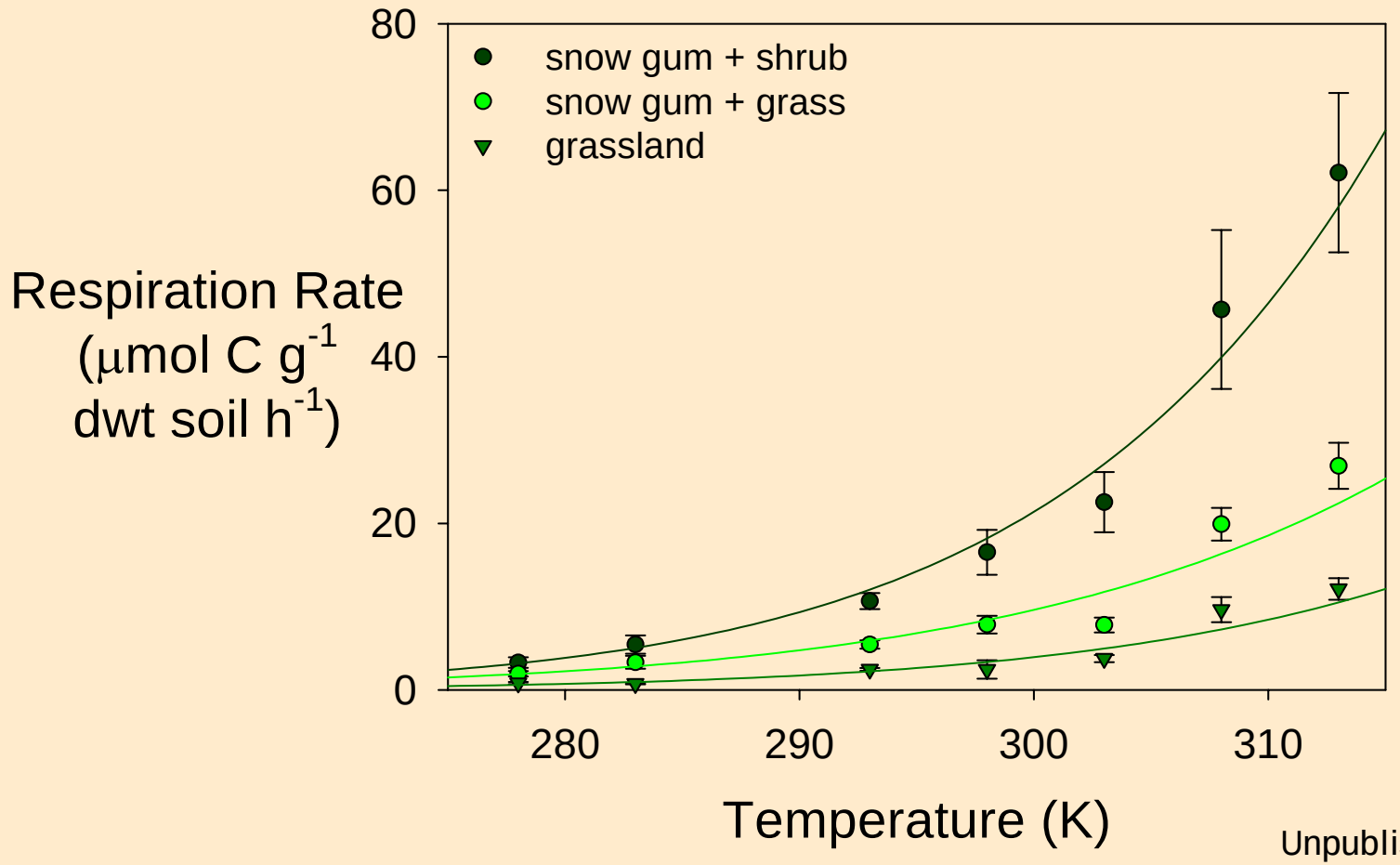
Results to Date

Soil analysis for vegetation type at different depths.

	Loss on Ignition %	SE	Organic C %	SE	C:N	Available P (Olsen) mg/kg	SE
Snow gum + shrub understorey							
0-10	24.2	2.4	6.8	0.4	7.7	22.4	2.4
10-30	19.8	3.4	6.0	0.1	10.0	19.1	4.0
30-50	10.2	2.7	5.2	0.9	15.4	7.7	3.1
Snow gum + grass understorey							
0-10	17.9	1.5	6.3	0.1	10.7	11.1	1.5
10-30	12.4	0.7	5.6	0.3	13.9	5.7	0.4
30-50	8.3	0.4	3.7	0.3	14.0	3.5	0.2
50-70	6.4	1.3	2.3	0.4	12.3	4.5	1.0
Grassland							
0-10	10.2	0.8	6.7	0.4	13.9	5.0	0.4
10-30	8.6	0.8	5.0	0.3	13.4	2.9	0.2
30-50	5.0	0.6	2.8	0.2	13.0	1.9	0.3

Unpublished Data

Vegetation type



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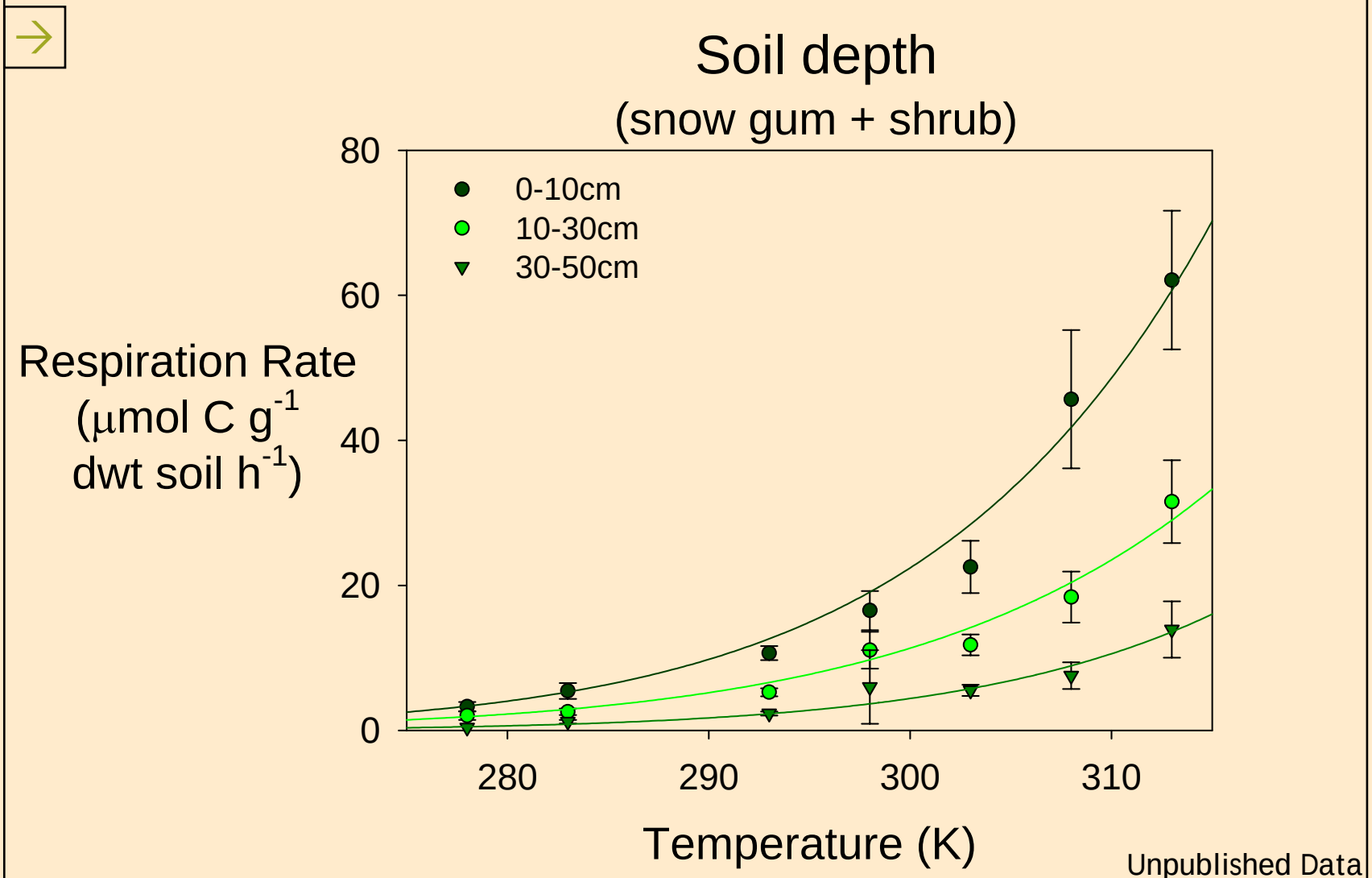

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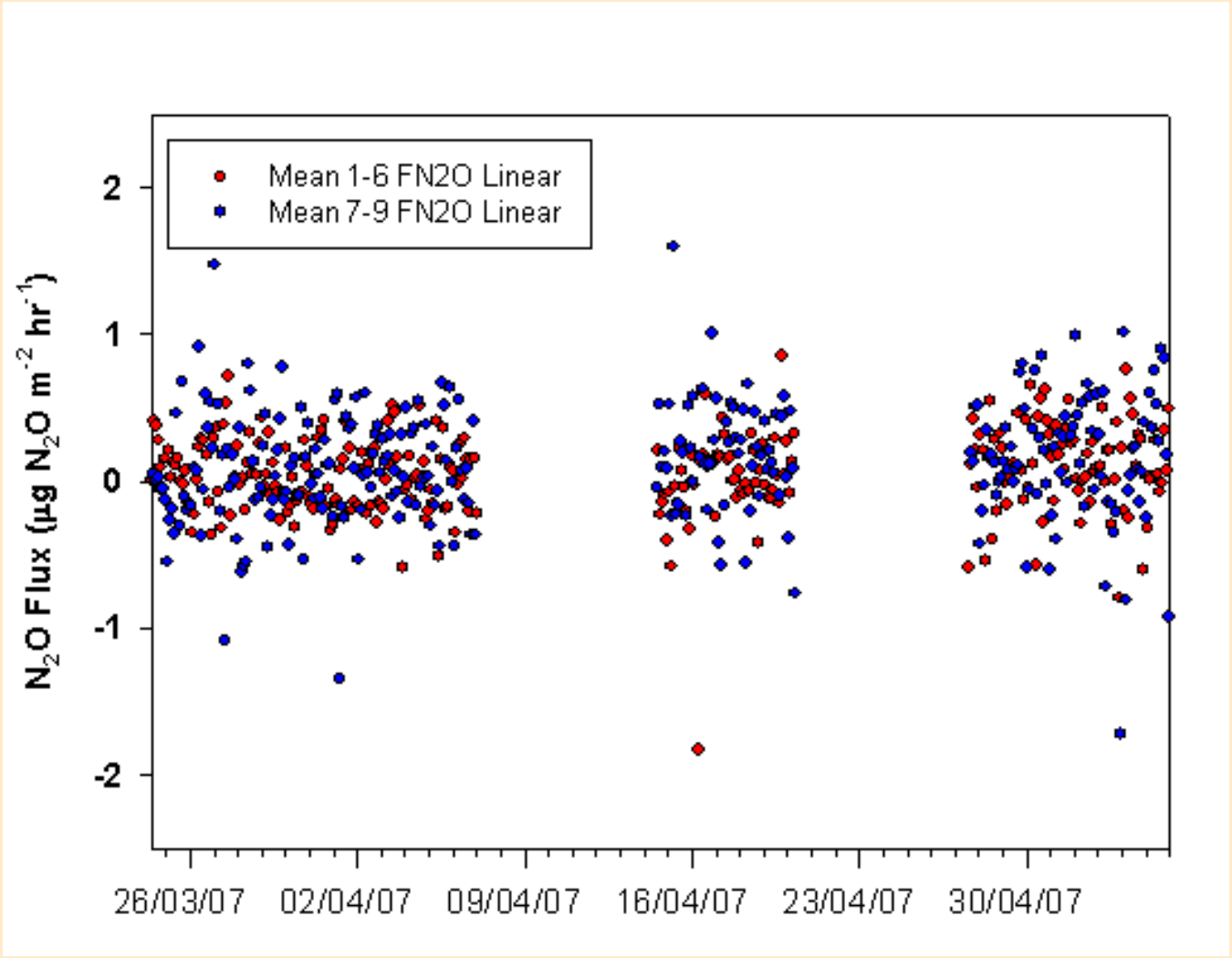


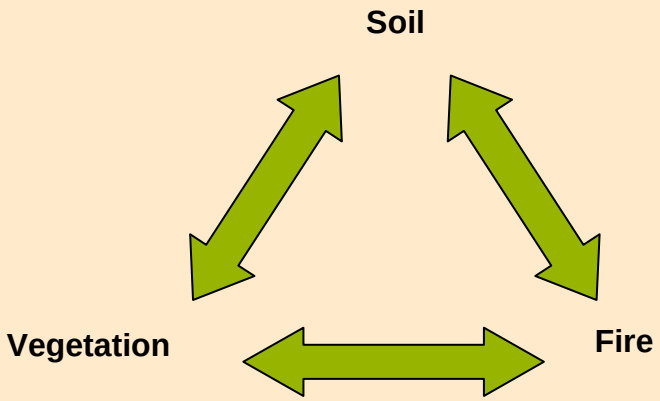
Future work

Addition Experiments:

- Influence of Litter type on C fluxes
- C substrates as drivers of C fluxes
- Influence of Charcoal on C fluxes

Conclusion

- Fire plays a major role in ecosystem function
- Important to understand the driver of soil C fluxes



Acknowledgements

Megan Webb, Mark Adams, Steve Roxburgh, Chantelle Doyle and Julie Carolane for field & lab assistance

Mike Kemp and Robert Simpson for technical assistance

Tarryn Turnbull and Andrew Merchant for advice

Barry Aitchison and Darvall Dixon

Berridale RFS

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