


Effects of fire on soil and plants Bogong High Plains, Victoria

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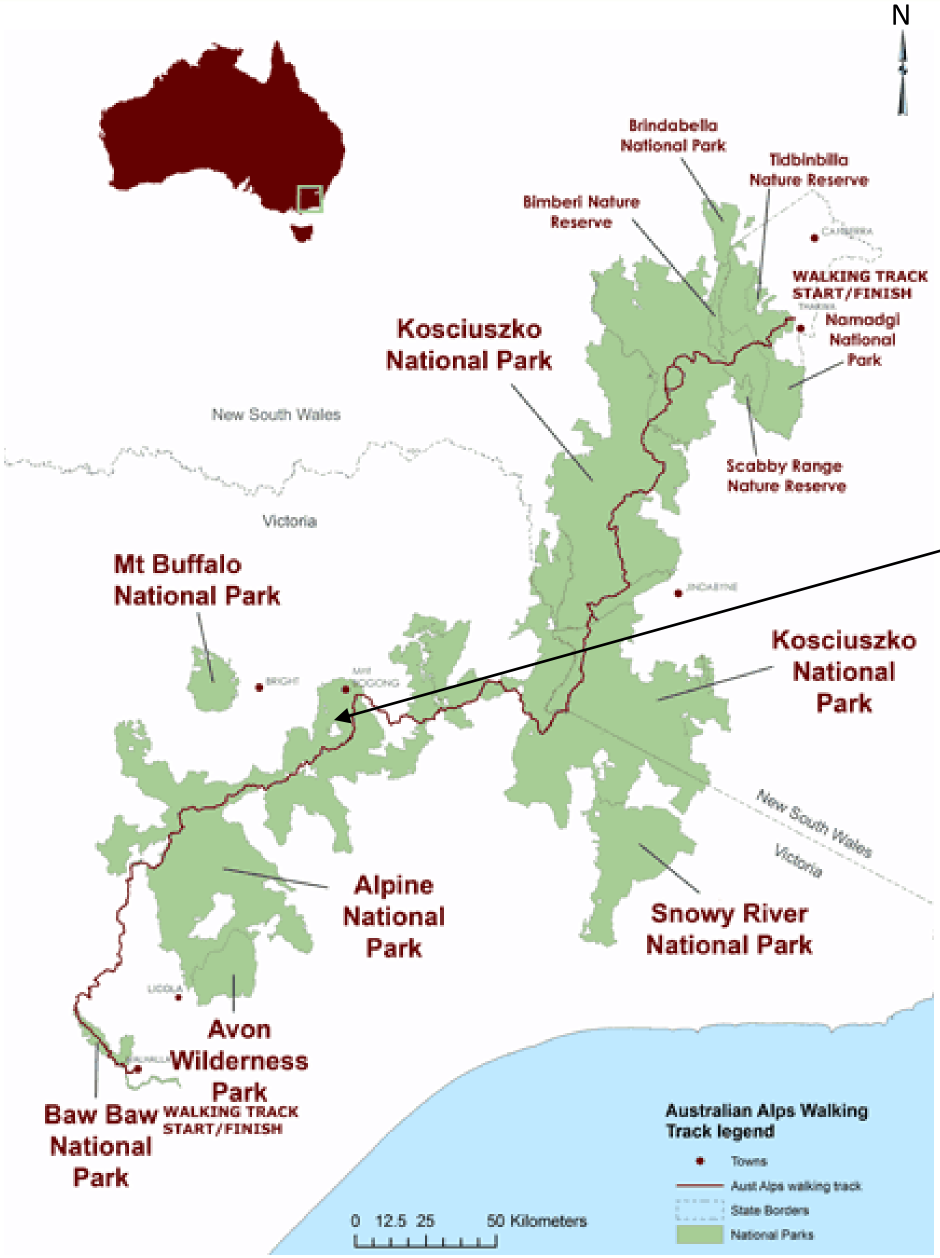
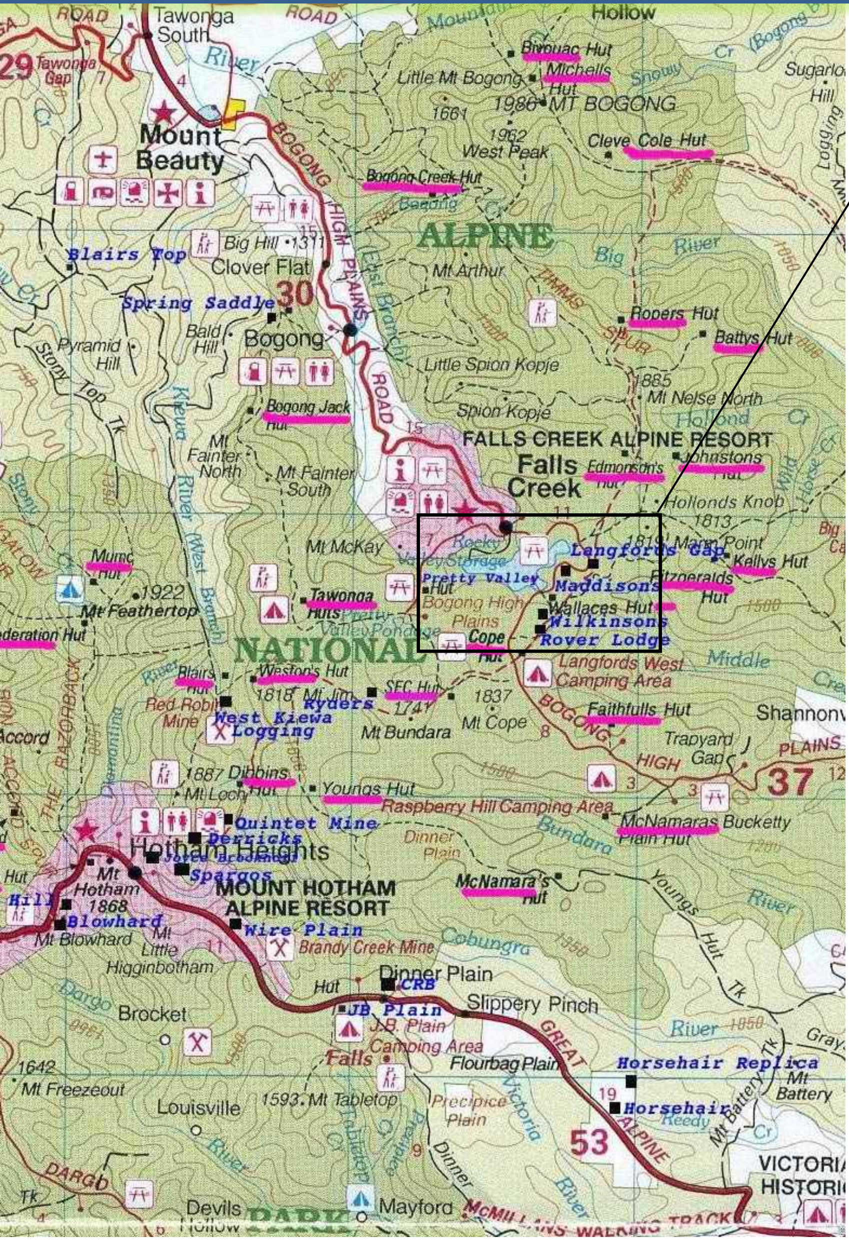
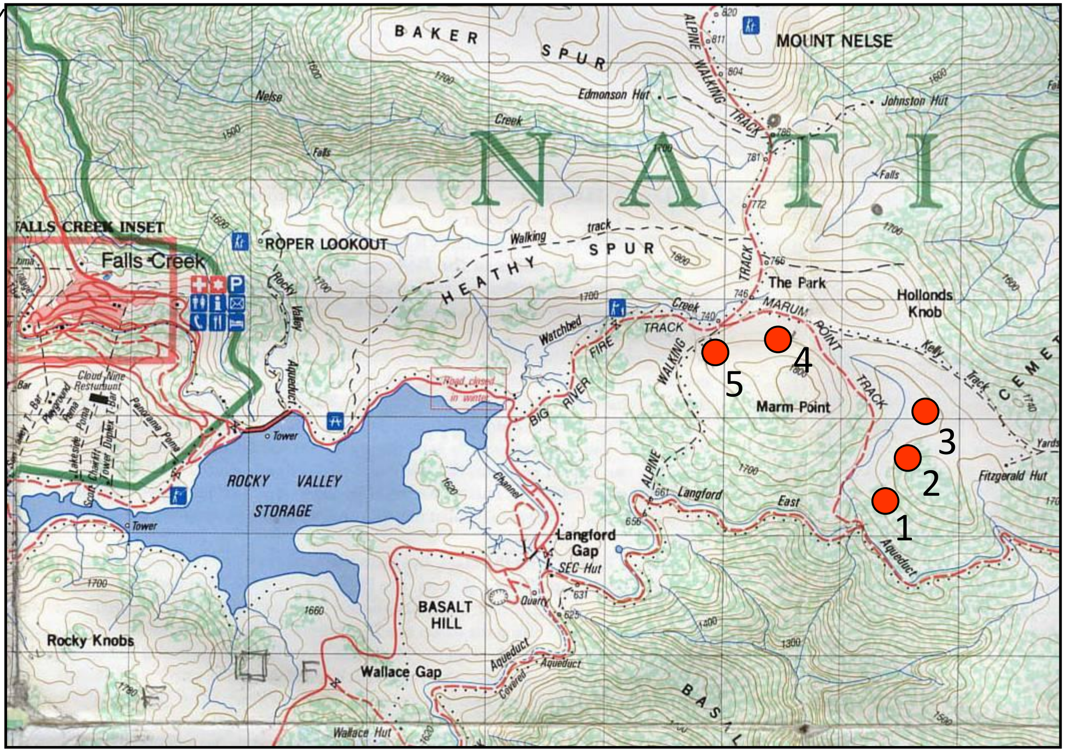


Bogong High Plains

STUDY AREA

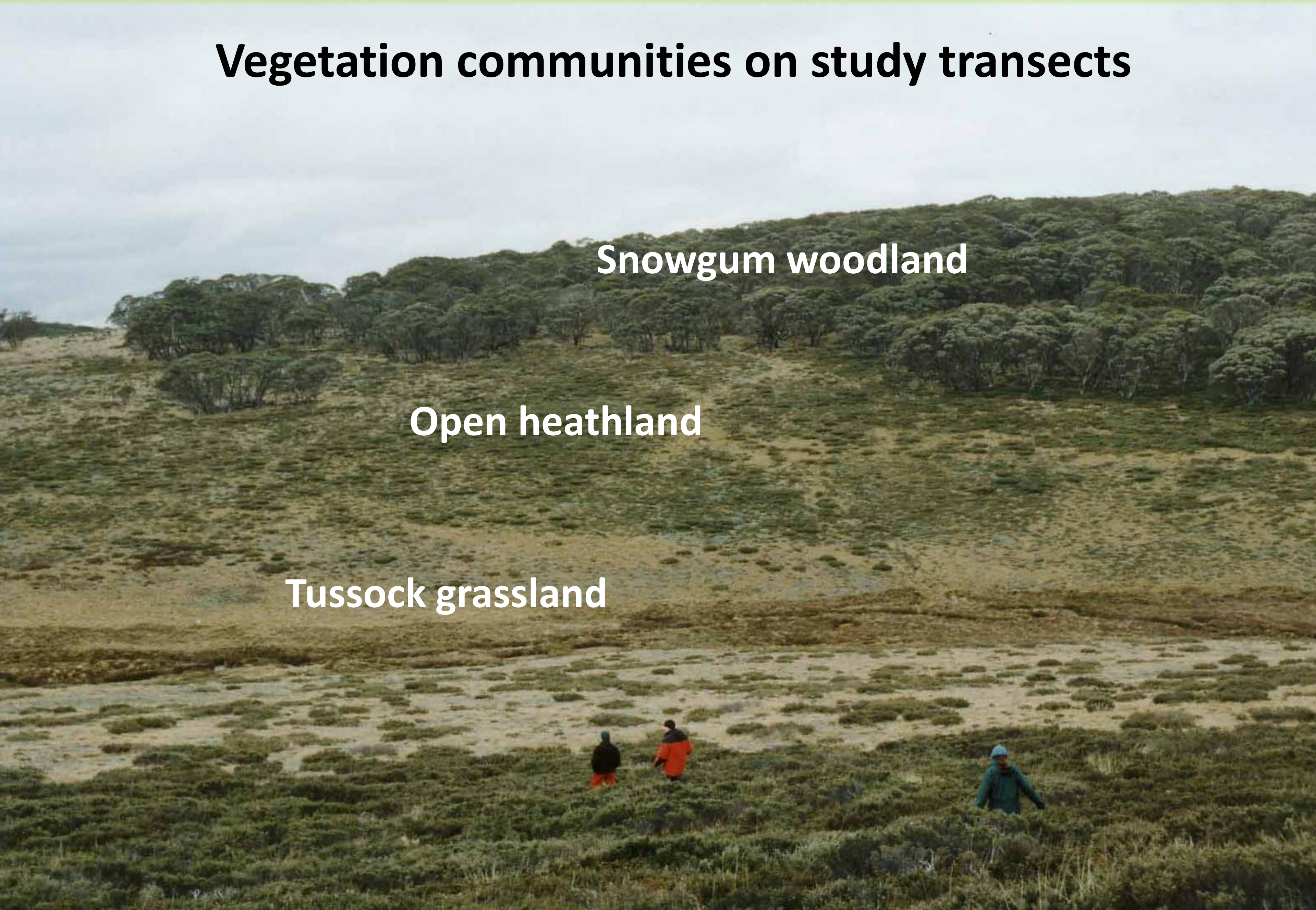


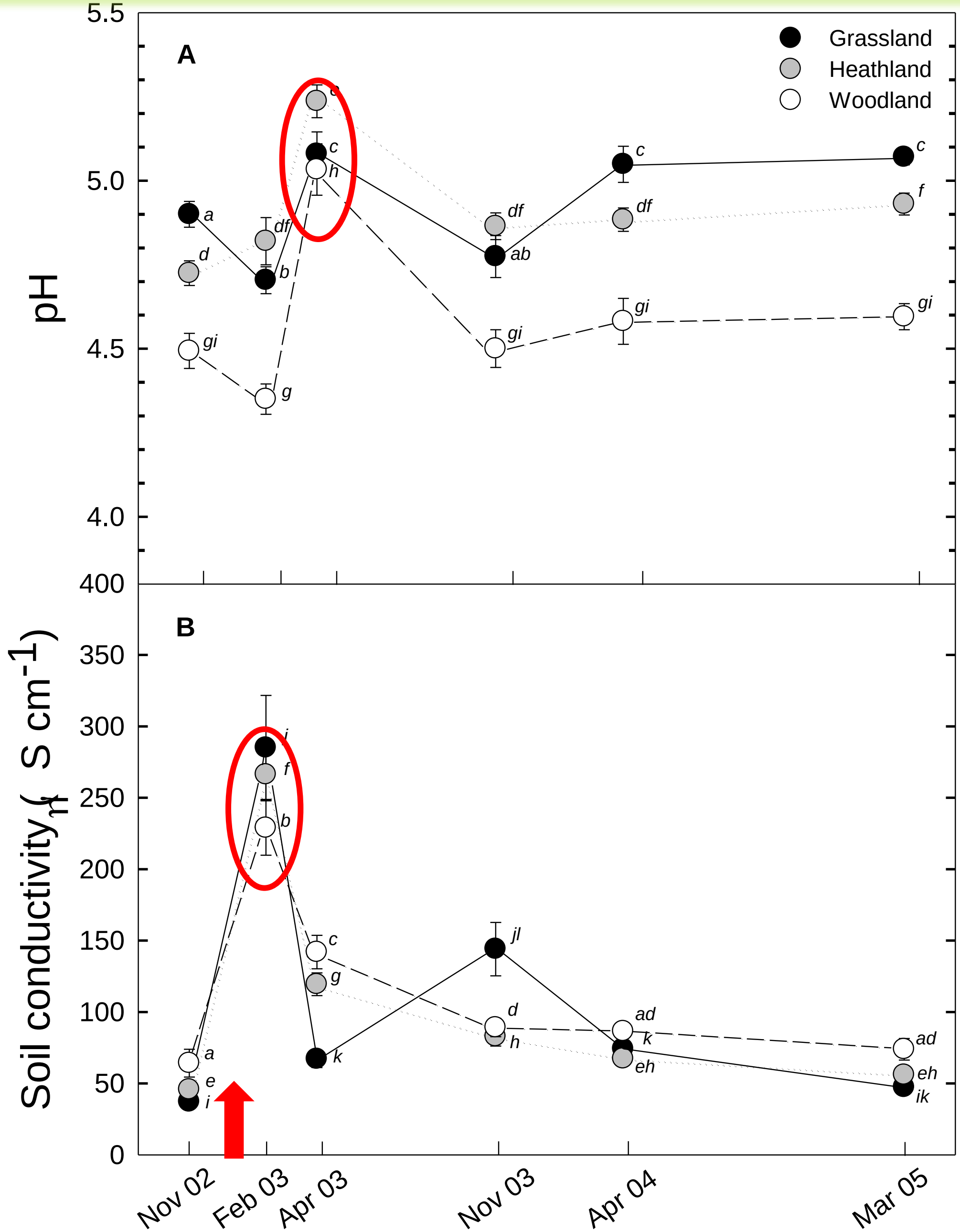


● Study transects

www.kosciuskohuts.org.au/Maps/KHA_Bogong%20HP

Vegetation communities on study transects



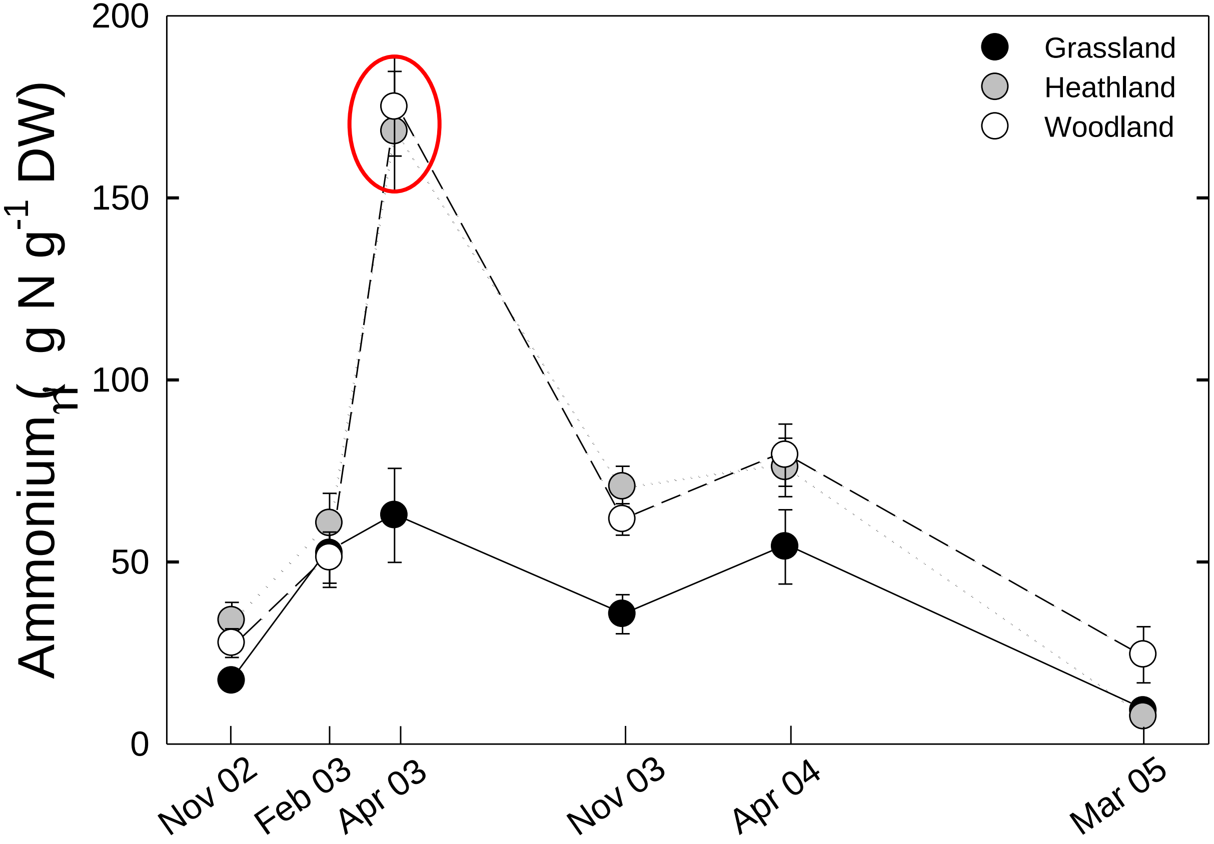


pH and conductivity increased after the fire

Inorganic N

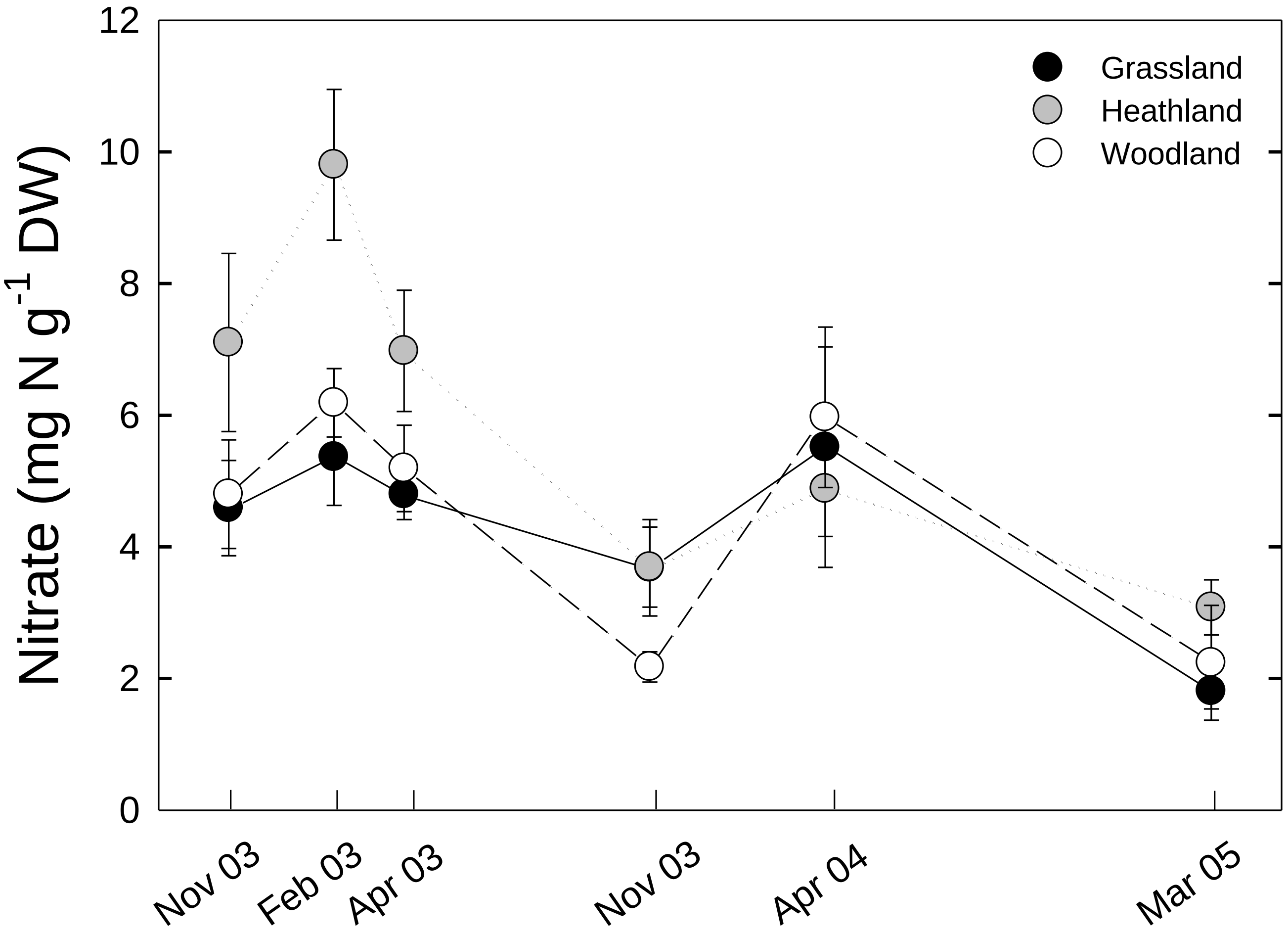
Mineralisation: Organic material → Ammonium

Nitrification: Ammonium → Nitrite → Nitrate

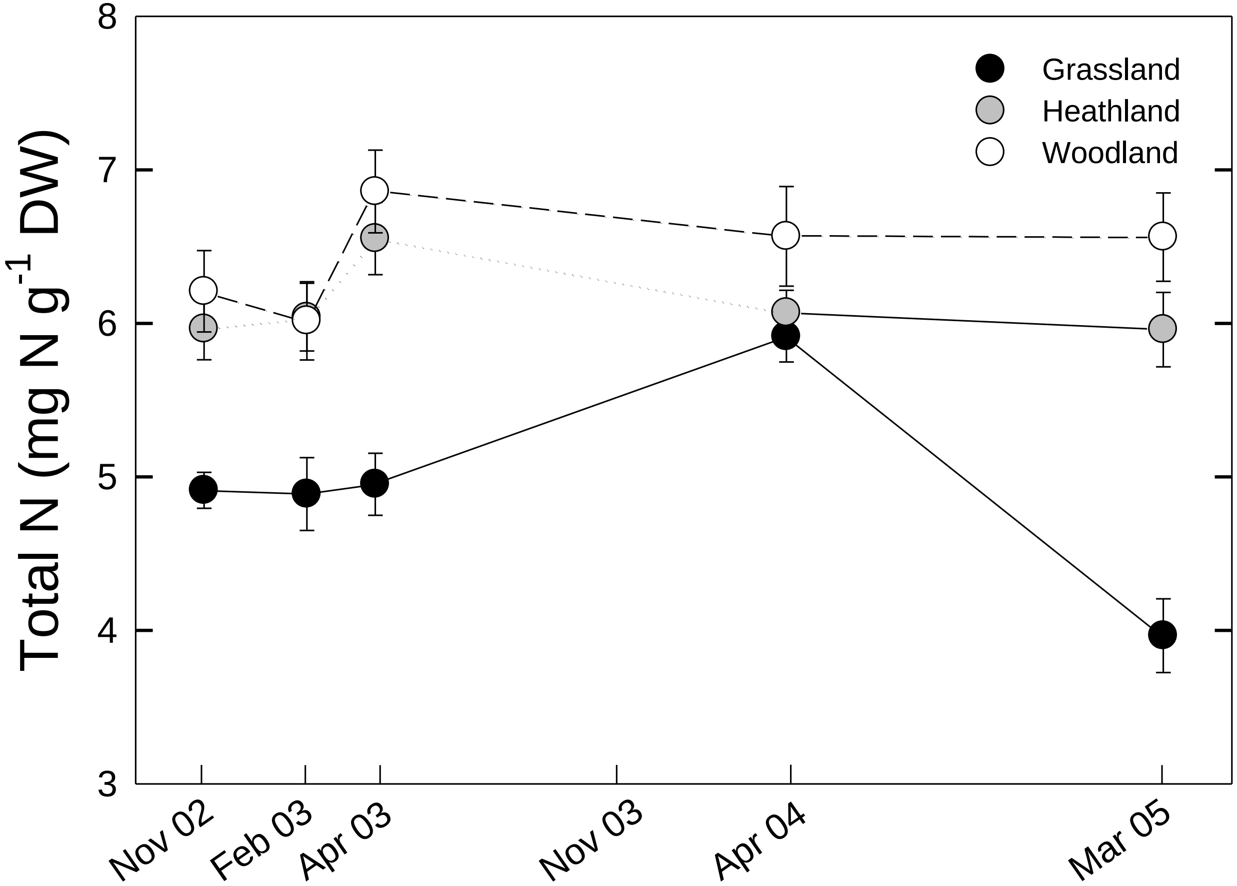


Concentrations of ammonium strongly increased three months after the fire

Smaller increase in grassland



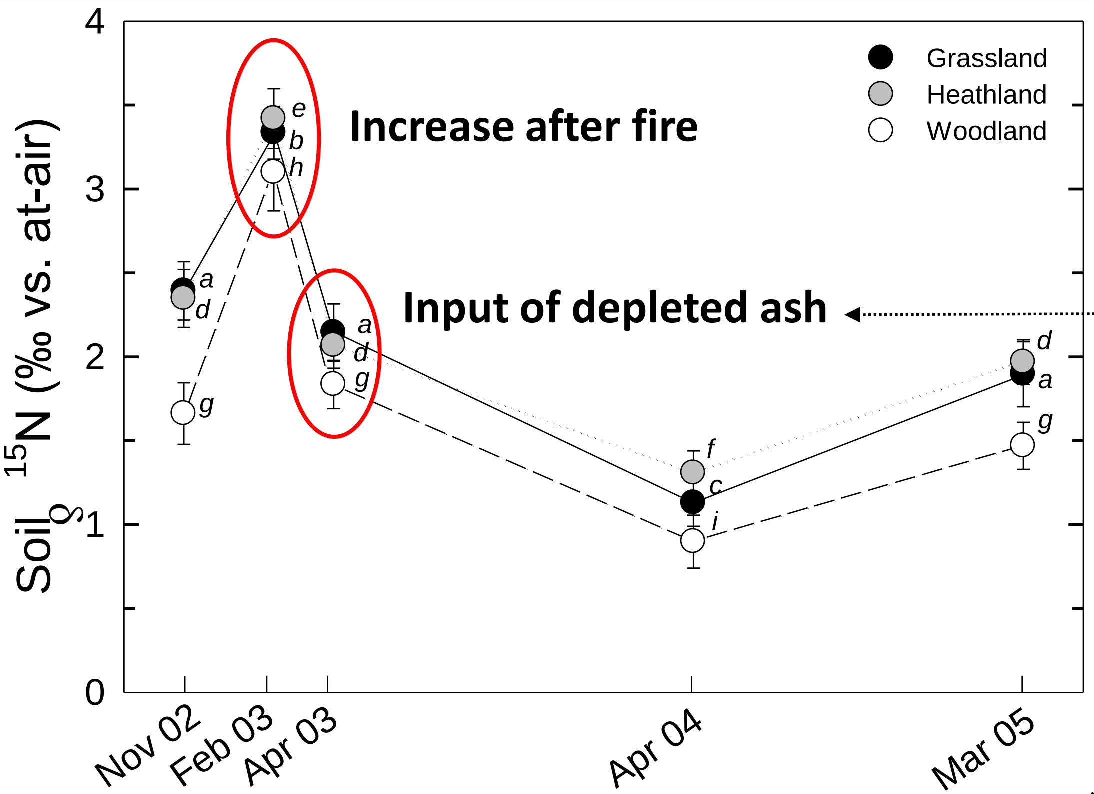
Nitrate remains relatively unchanged



No apparent loss of total N in surface soil

Ash, charred organic material (OM) and surface soil – Total N and pH

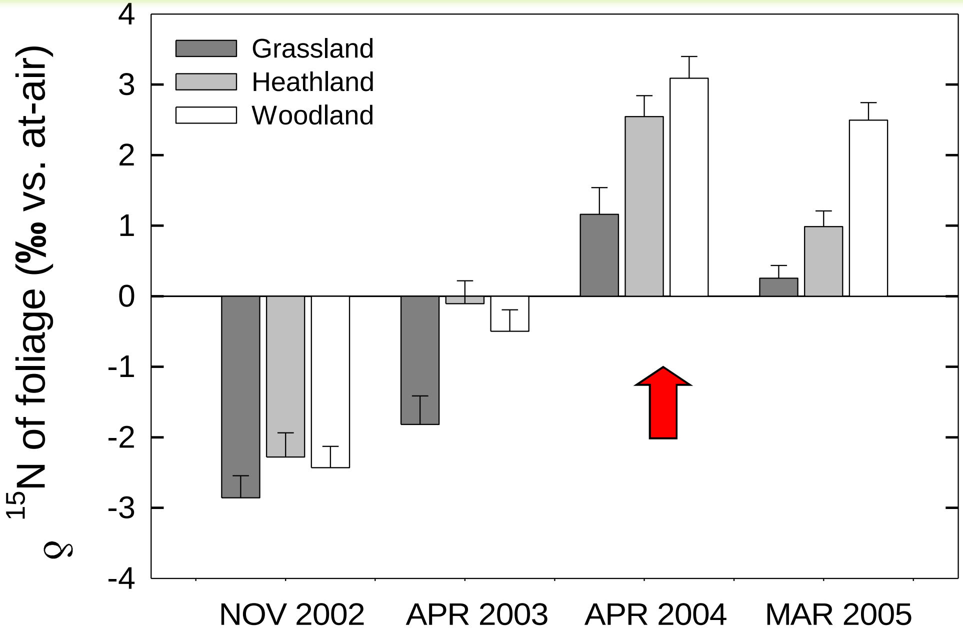
	Grassland		Heathland		Woodland	
Total N (mg N g^{-1} dw)	Mean	*SE*	Mean	*SE*	Mean	*SE*
Ash	11.63	*0.80*	15.47	*1.85*	17.49	*1.82*
OM	7.95	*0.51*	9.54	*0.91*	13.35	*1.41*
0-5 cm	4.88	*0.24*	6.03	*0.22*	6.01	*0.26*
pH						
Ash	7.15	*0.05*	7.55	*0.08*	7.30	*0.08*
OM	4.93	*0.06*	5.07	*0.09*	4.31	*0.08*
0-5 cm	4.70	*0.04*	4.81	*0.07*	4.36	*0.04*



Redistribution of N into the soil from ash and charred organic material?

Evidence from $\delta^{15}N$ of ash

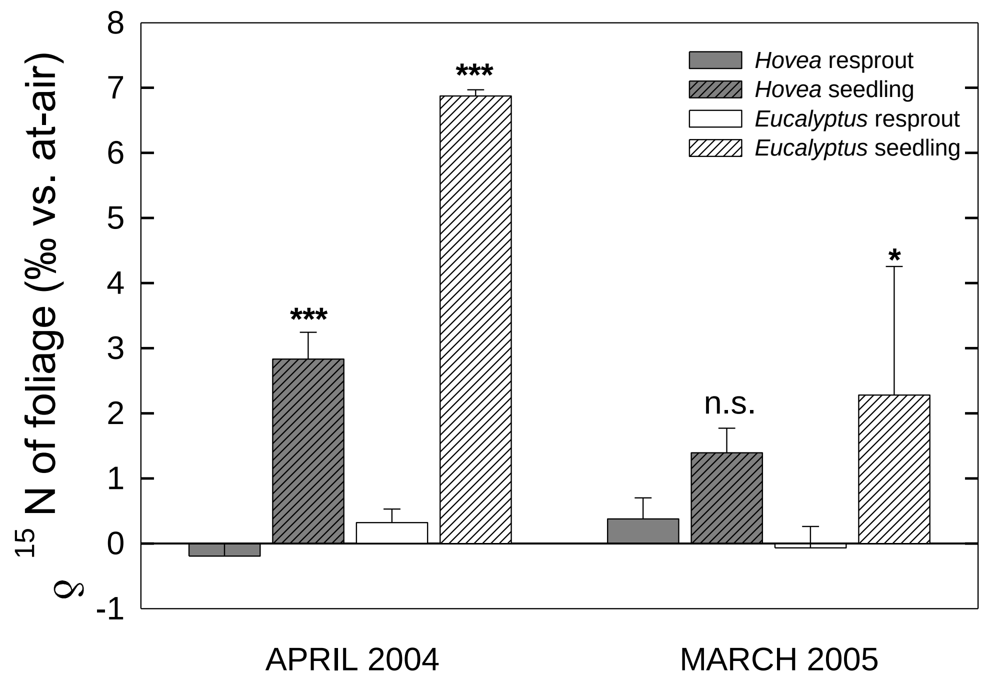
	Grassland		Heathland		Woodland	
$\delta^{15}N$	Mean	*SE*	Mean	*SE*	Mean	*SE*
Ash	-0.81	*0.20*	-0.35	*0.22*	-0.53	*0.20*
OM	0.52	*0.19*	0.71	*0.17*	0.34	*0.21*
0-5 cm	3.33	*0.16*	3.42	*0.18*	3.10	*0.23*



Change in $\delta^{15}N$ of N source

Seedlings were more enriched in ^{15}N than resprouts

Seedlings rely on N from soil earlier, resprouts can draw N from storage for longer



Summary

- **Fire changes soil environment, microbial activities and N availability**
- **The 2003 fires did not lead to significant loss of N from the soil, but what happens with more frequent fire?**
- **Ash contains considerable amounts of N**
- **Plant communities along inverted treelines are adapted to local micro-environmental conditions**