



Upstream Thinking: SWW's catchment management

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Upstream Thinking



Flagship environmental project
£9m (2010-15) £10.5m (2015-20)

Partnership delivery

2 strands of work:

- moorland restoration
- agricultural improvements

Cornwall
Wildlife Trust 


THE wildlife TRUSTS
Devon


Westcountry
Rivers Trust



Improving natural water
quality and water storage in
the landscape

Upstream Thinking: on the farm

Working with farmers and landowners to **minimise impact on watercourses**



Upstream Thinking: on the farm

Diffuse pollution



Low cost improvements



Upstream Thinking: reducing organics from farming



Upstream Thinking: capital investment on farms

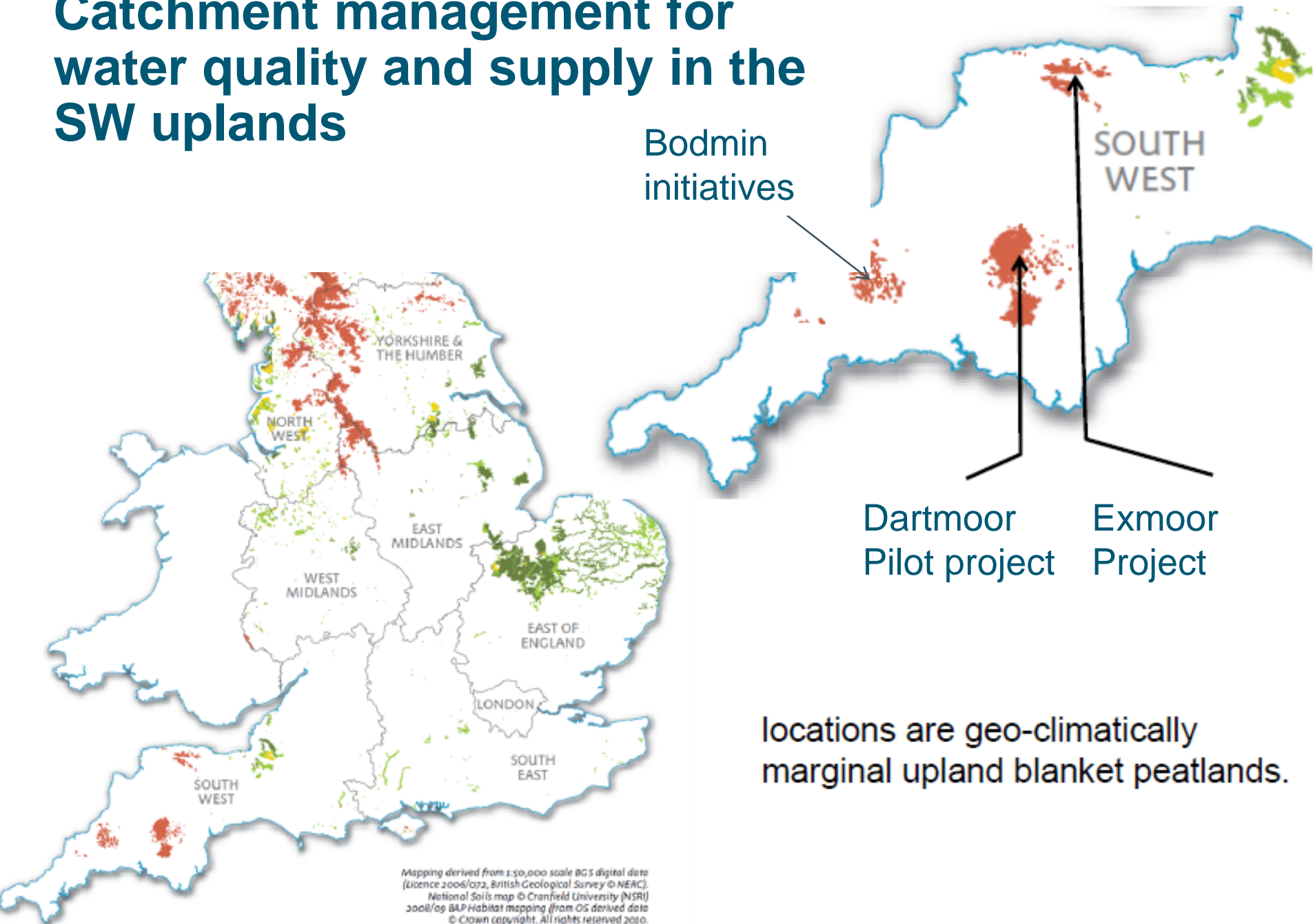
Potential organic source risk



Co-funded solution



Catchment management for water quality and supply in the SW uplands



Most of Exmoor's peatlands have been affected by past peat-cutting, drainage, burning and grazing: Heavily modified, dry and dominated by Molinia.



Severe erosion Winney's Down Area 1

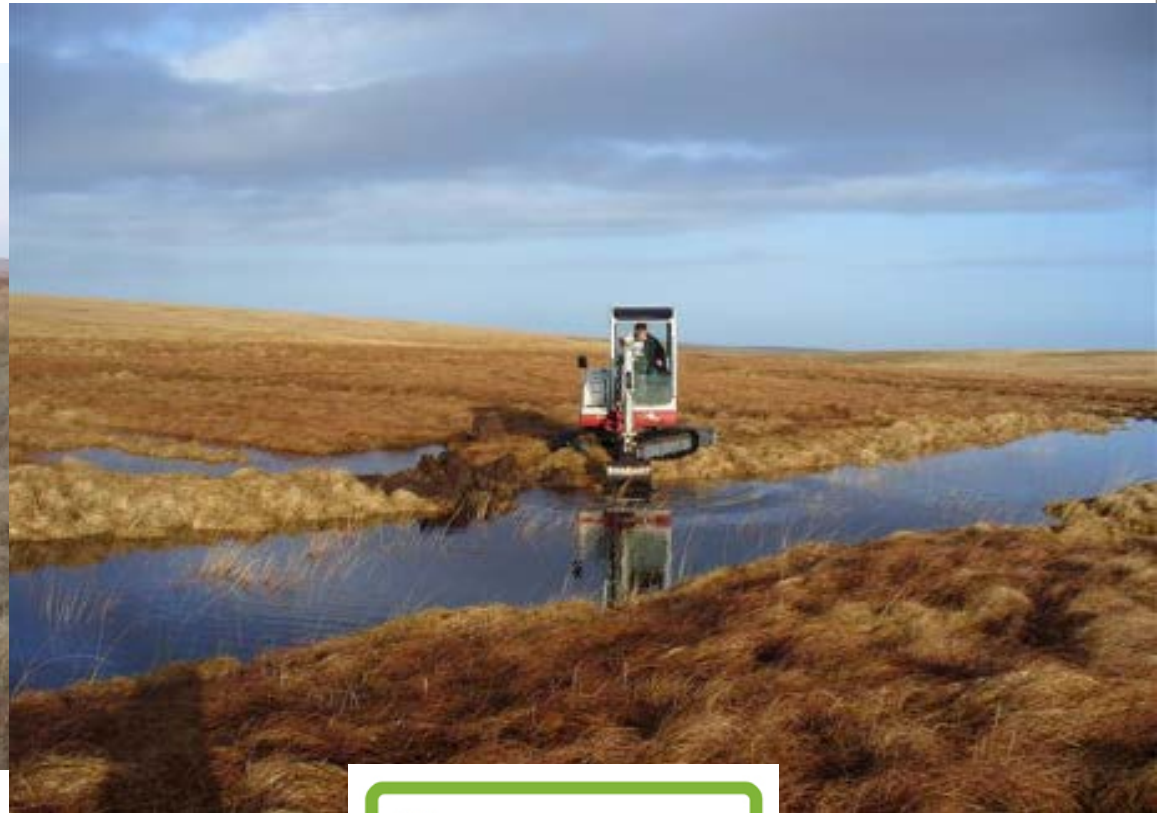
Dartmoor
mires
PROJECT



Bodmin Moor peatland: degraded western climatic mires within reservoir draw down zones



Hydrological restoration by blocking up ditches, cuttings and gullies



Simple practical solutions

Peat blocks, sometimes wood or bales



Typical peat and wooden block 6 weeks after restoration on Exmoor



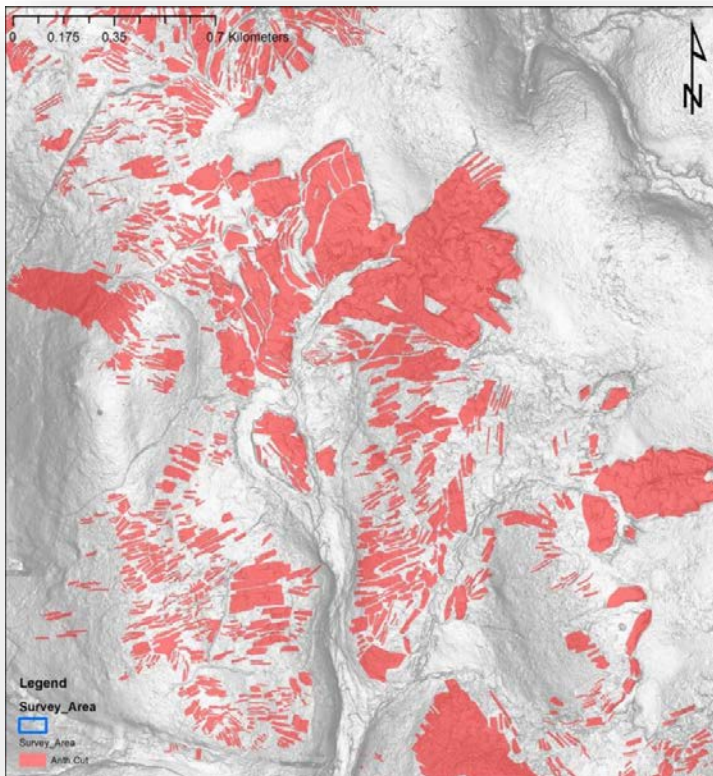
Exmoor
mires
Partnership

Eroded area immediately after restoration

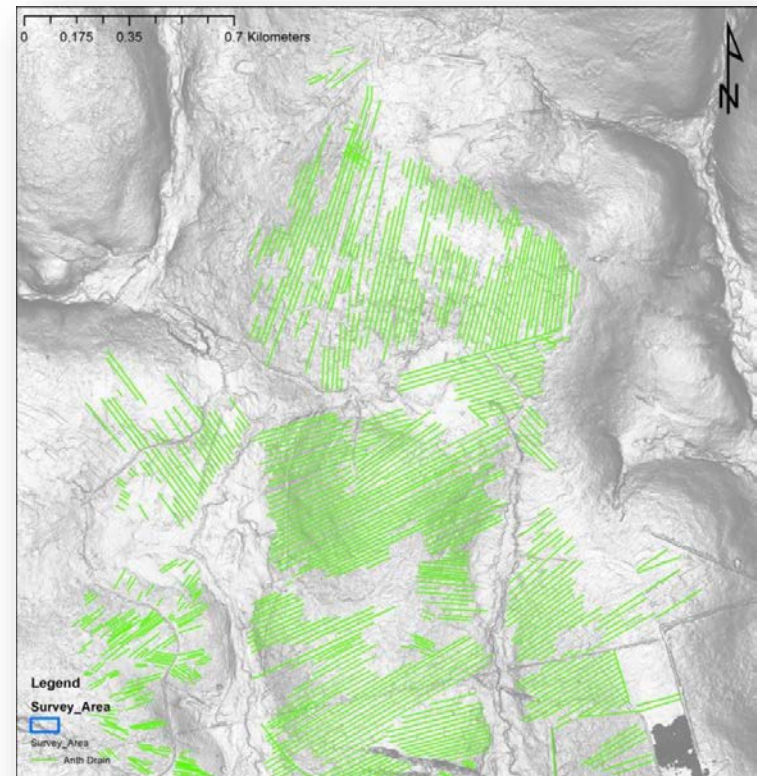


Evaluation of future work on Dartmoor: University of Exeter team have carried out mapping of all the ditches, gullies, bare peat and peat cuttings.

Peat cuttings



Ditches



Restoration of Spooners: monitoring catchment, April 2013



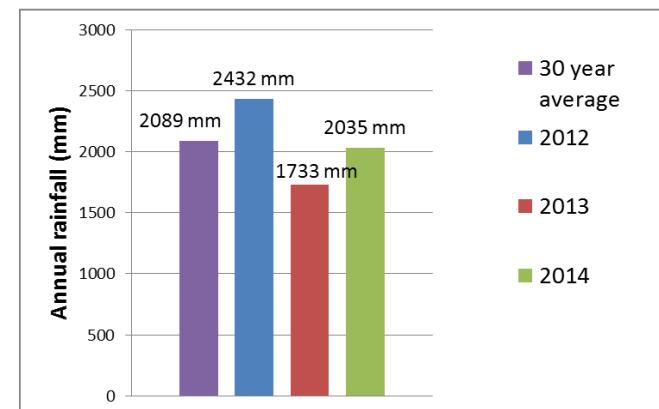
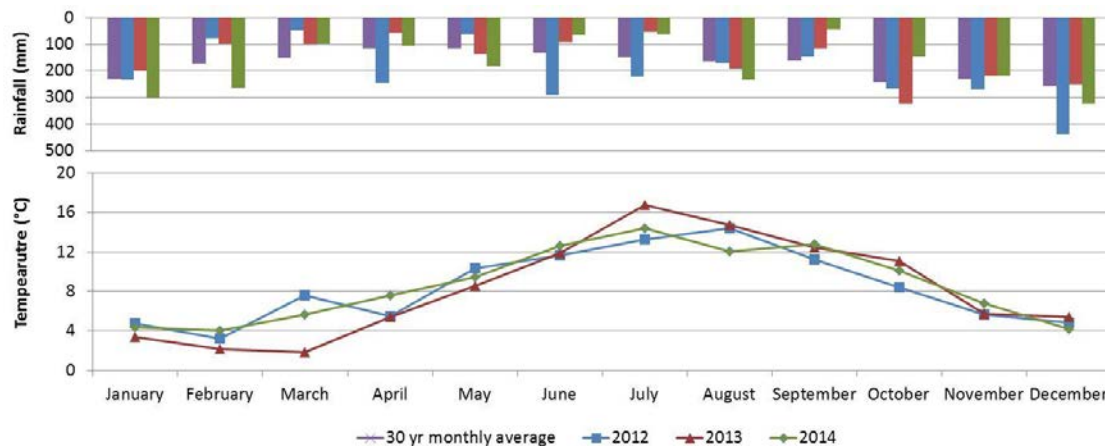
Monitoring – Water quality results on Exmoor



Monitoring results: the context



Period	Site	Restoration times	# Events sampled	# Samples collected
Pre-restoration	Aclands	Jan 12 – Apr 14	50	578
	Spooners	Mar 12 – Apr 13	49	470
Post-restoration	Aclands	May 14 – Dec 14	13	141
	Spooners	May 13 – Dec 14	49	541



Monitoring results: methods



- Storm-flow sampling (ISCO pump sampler)
- DOC measurements (UV spectrophotometer)
- Colour: UV - vis Spectrometer

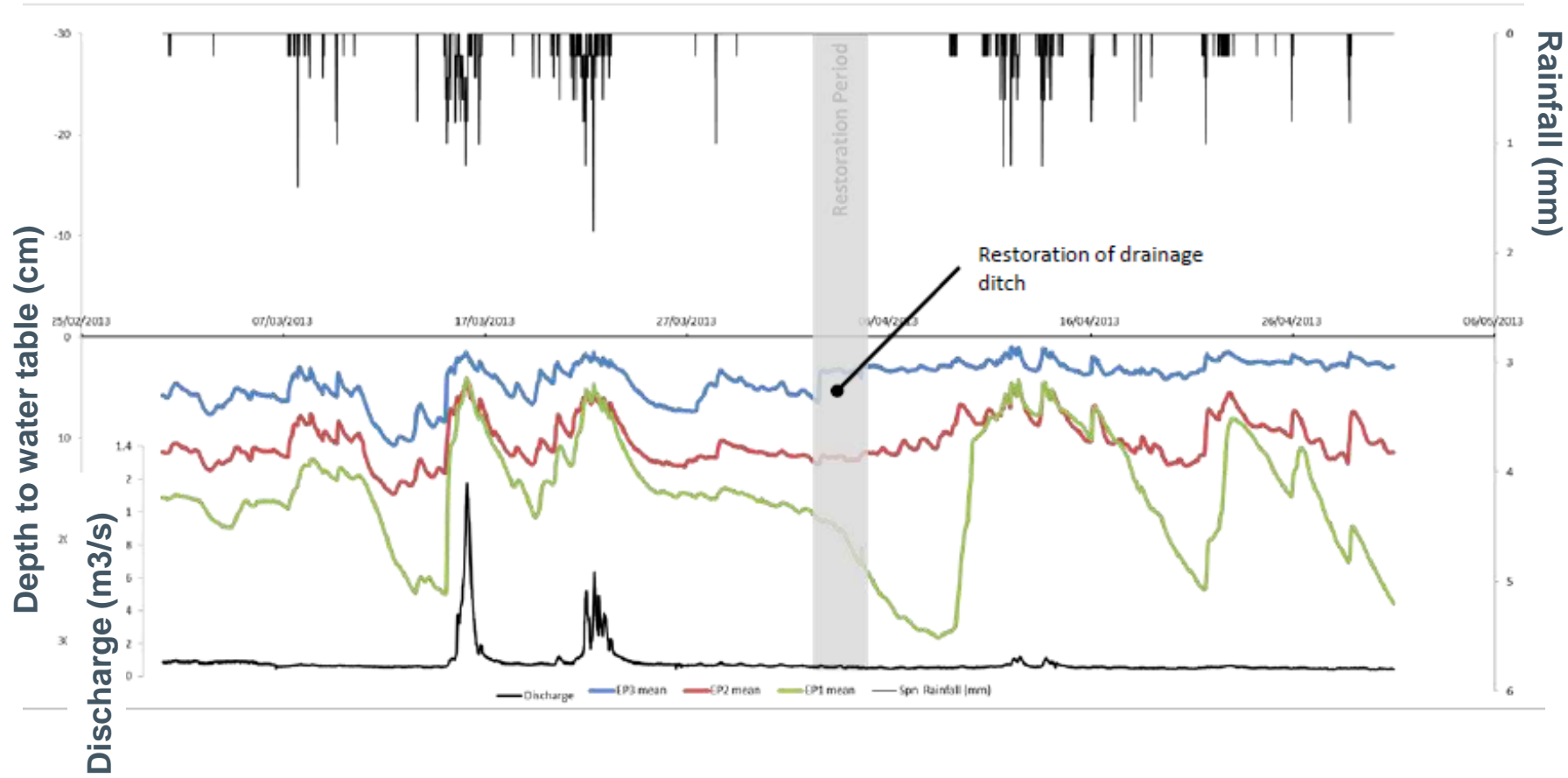
Abs 400 nm

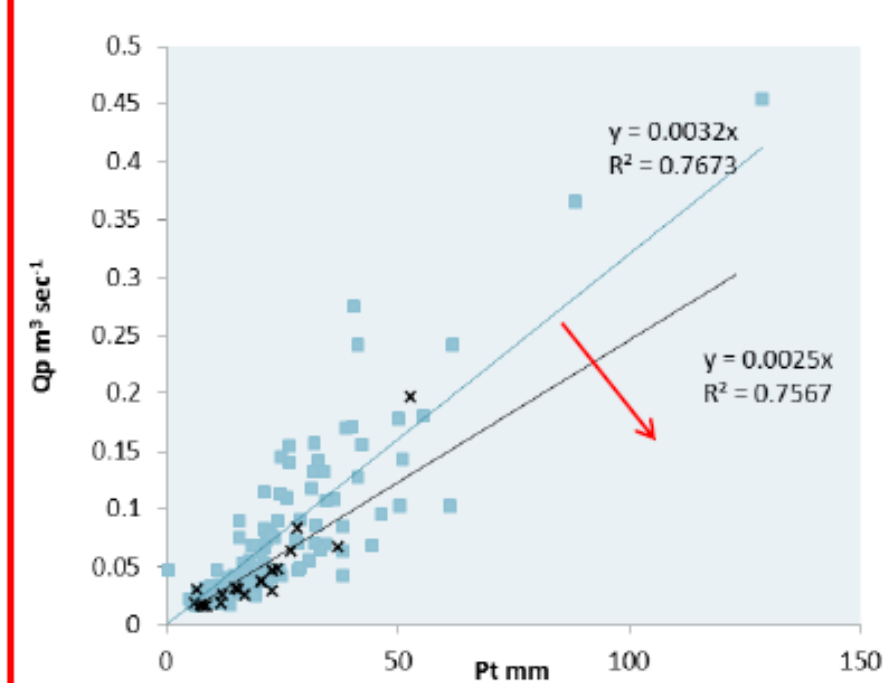
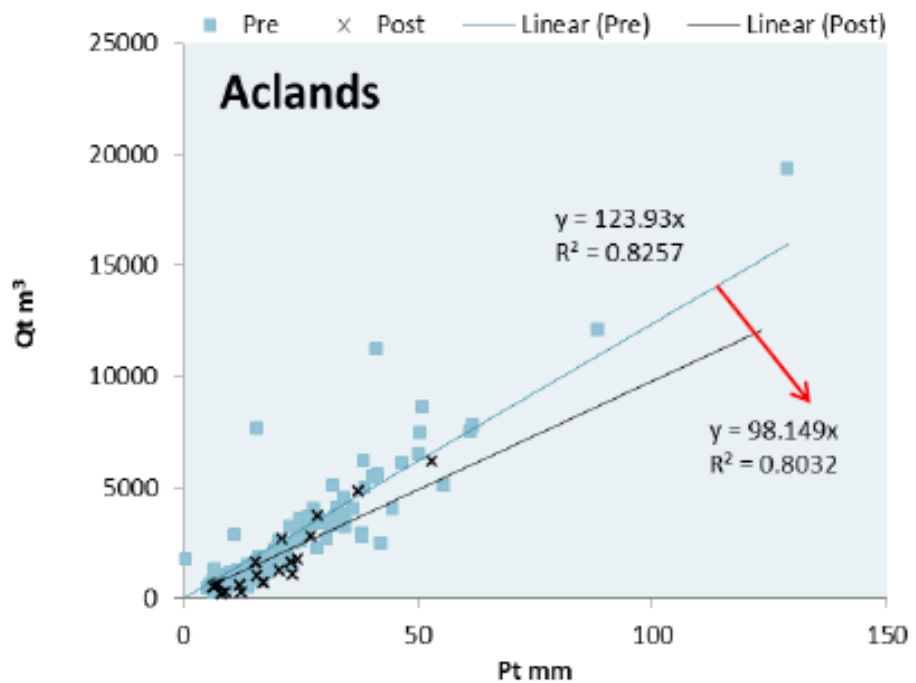
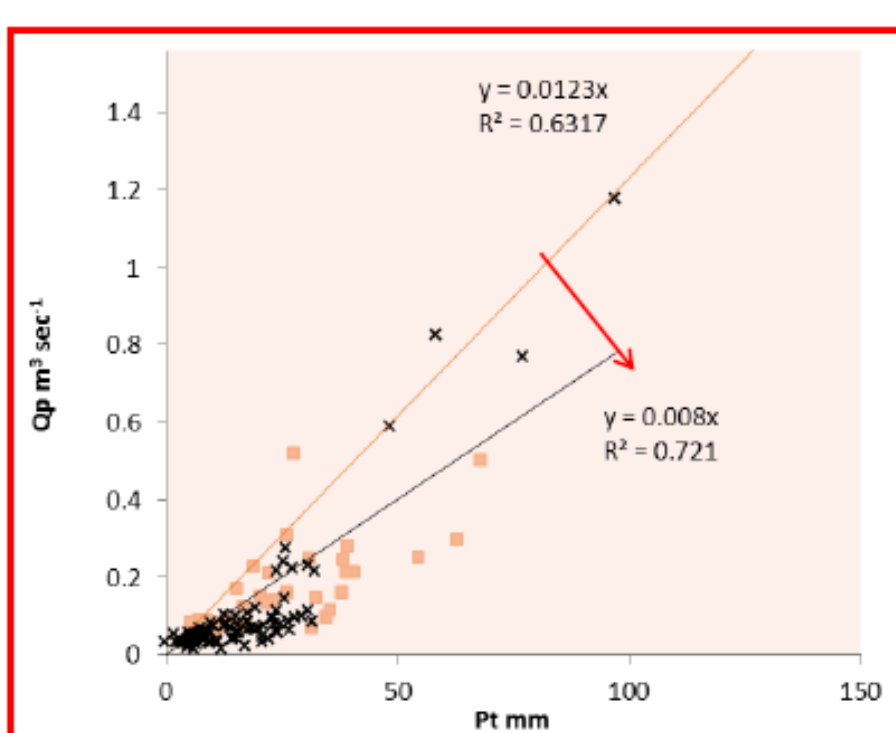
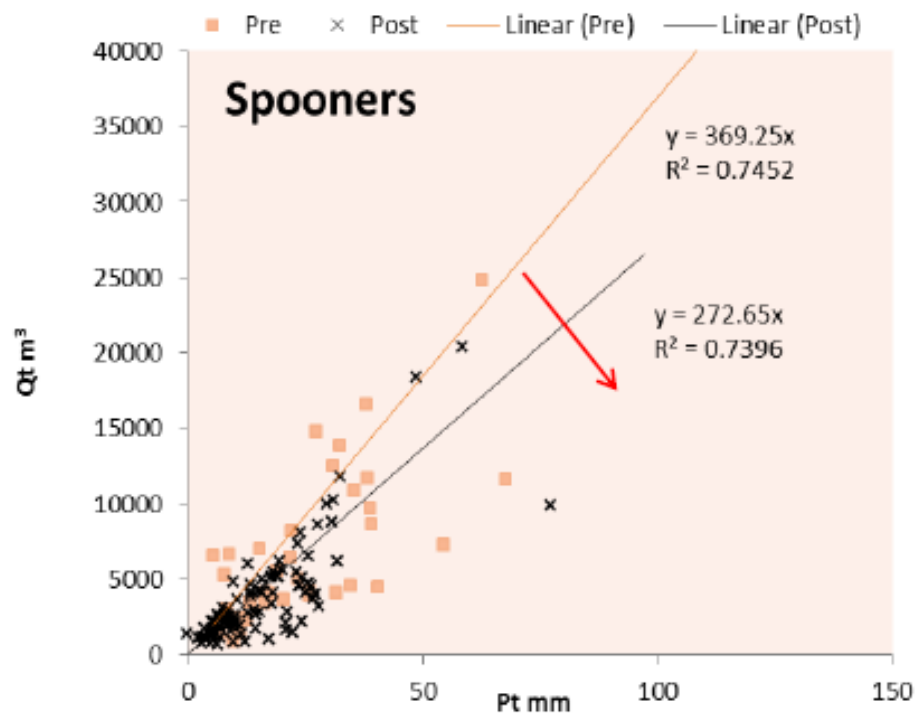
Fulvic / Humic ratio (E4/E6)

SUVA

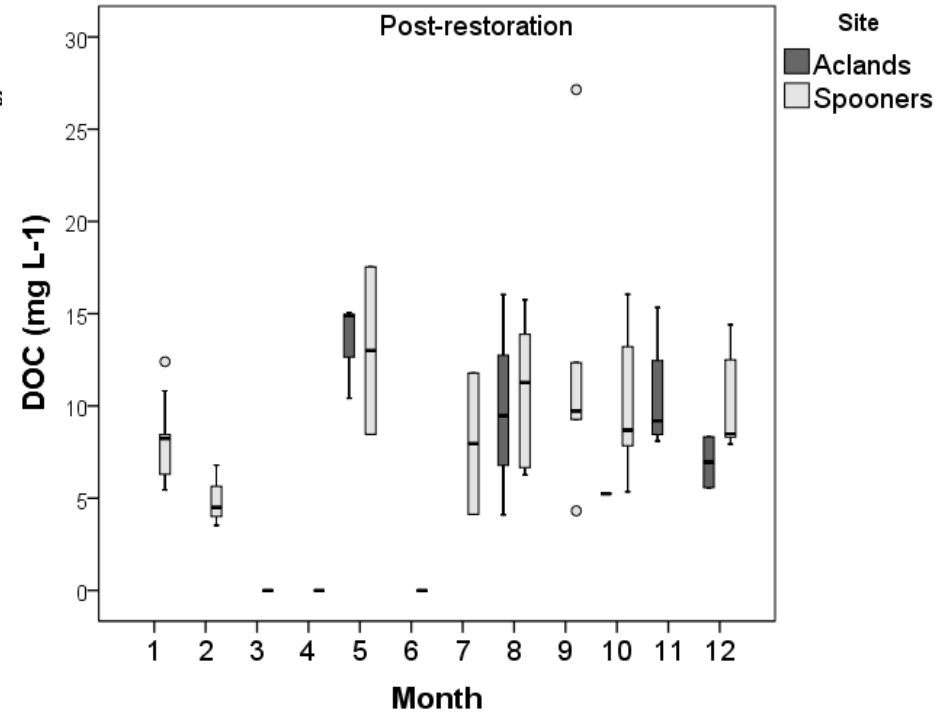
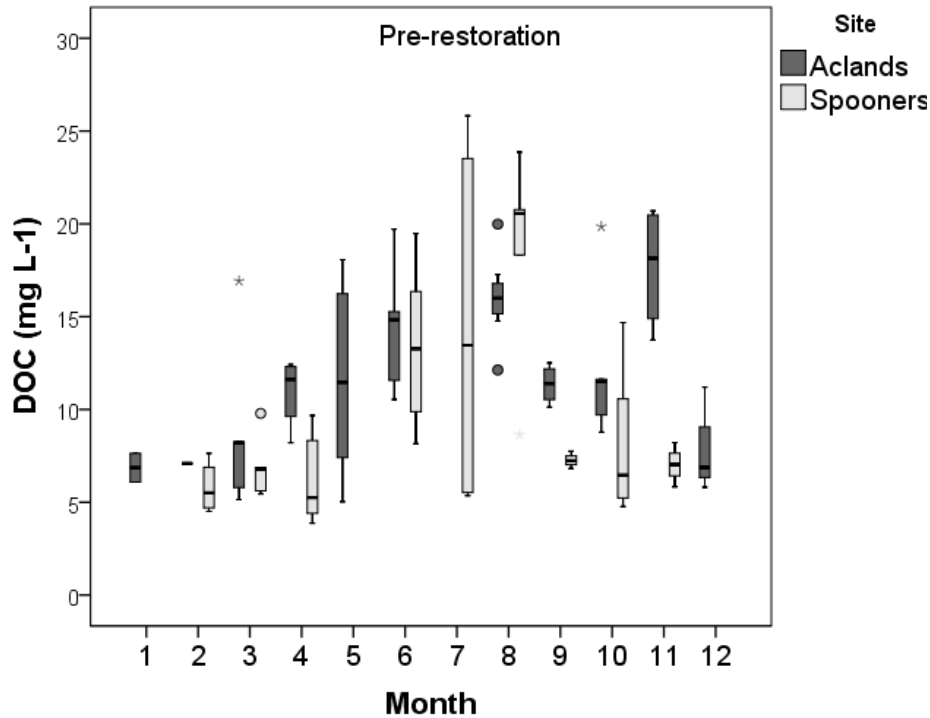


Monitoring results: water storage

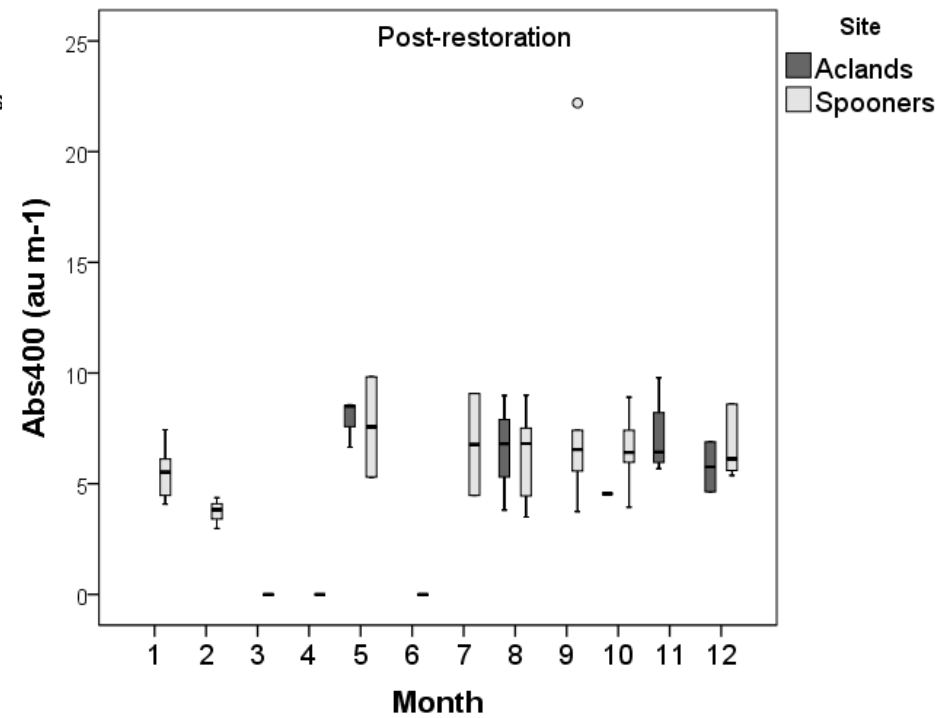
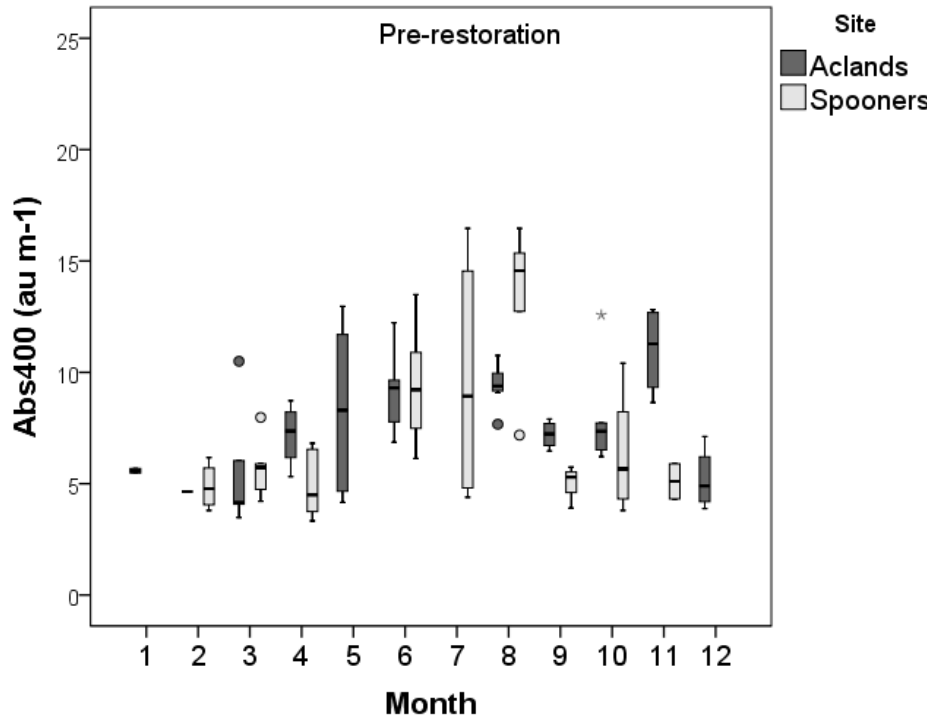




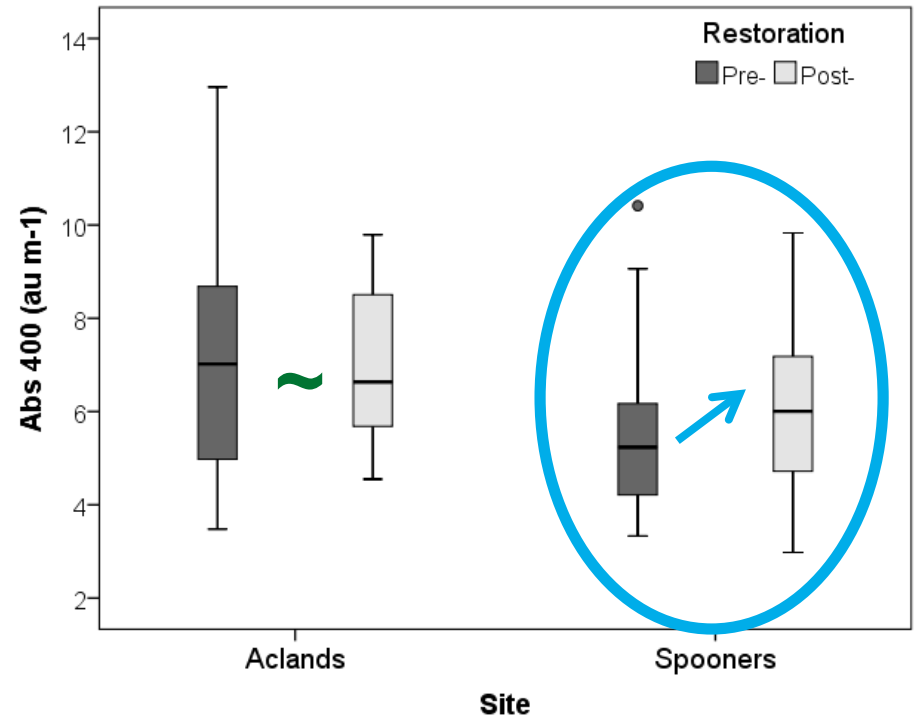
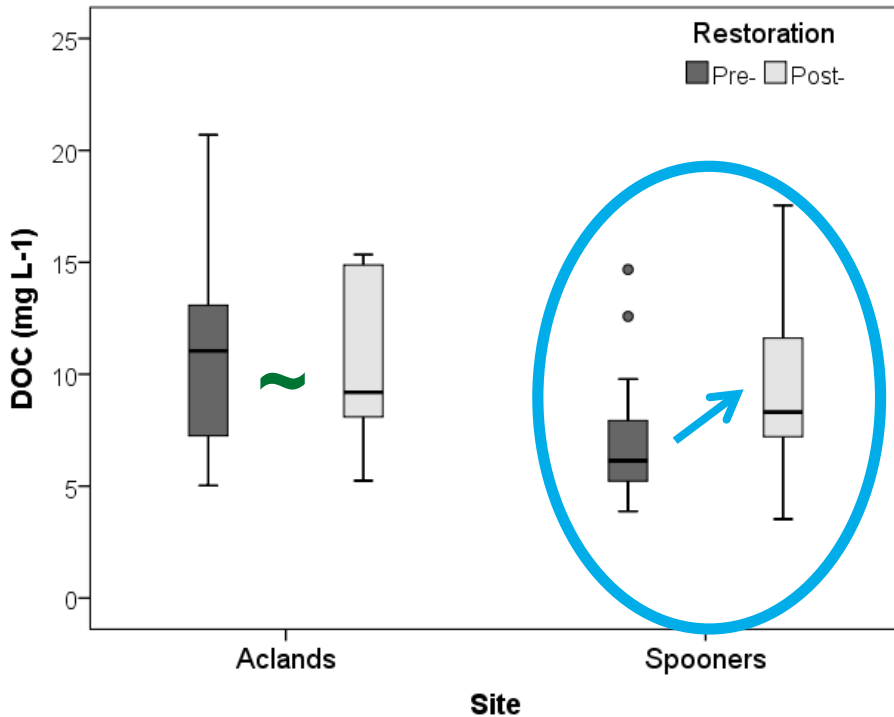
Monitoring results: seasonal variation



Monitoring results: seasonal variation

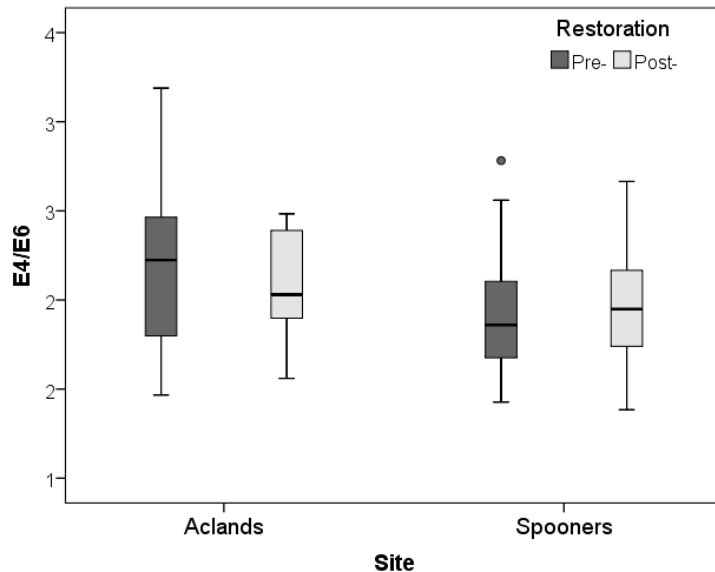
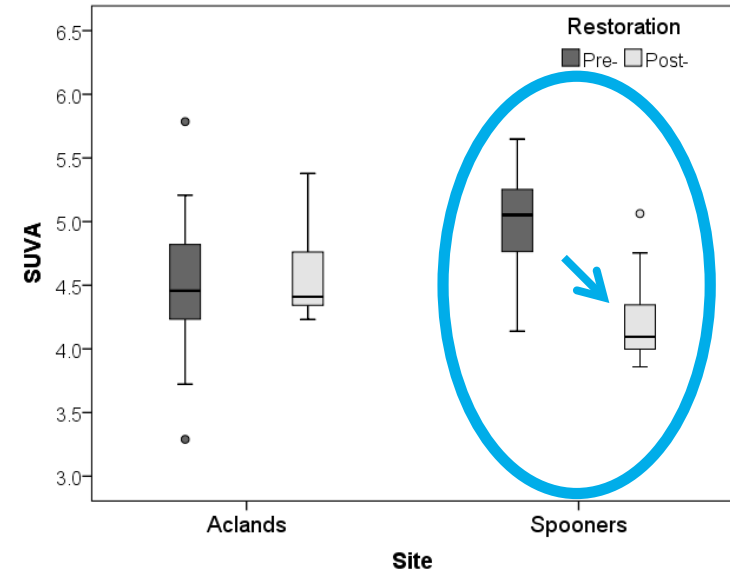
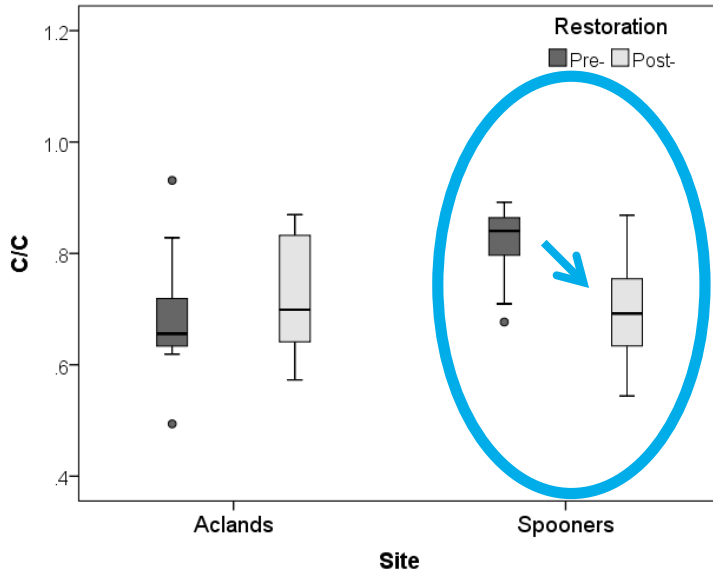


Monitoring results: pre/post change



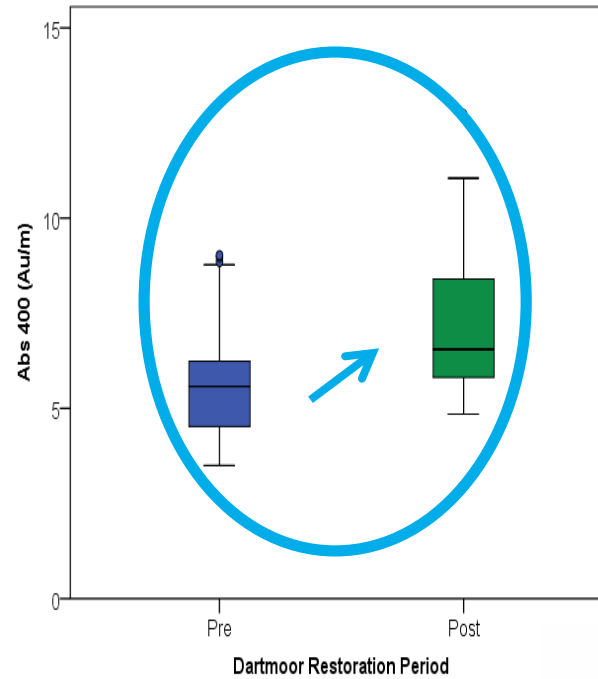
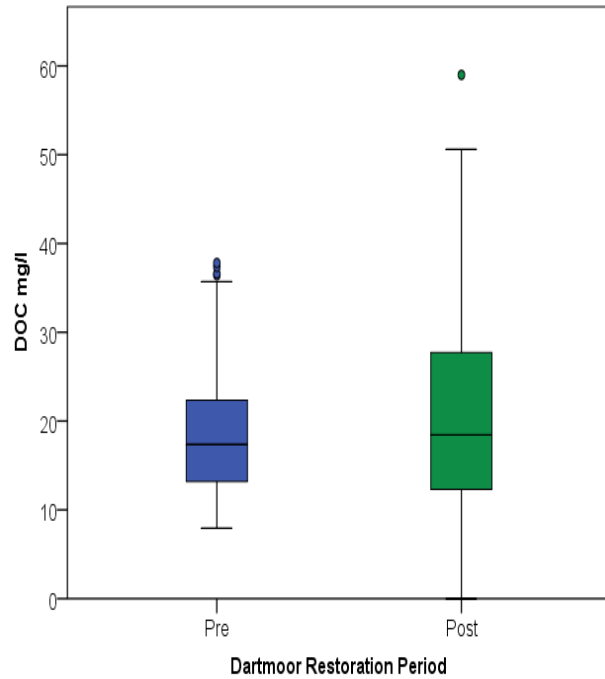
- No significant effect of restoration at Aclands
- DOC/colour increase at Spooners

Monitoring results: DOC characteristics

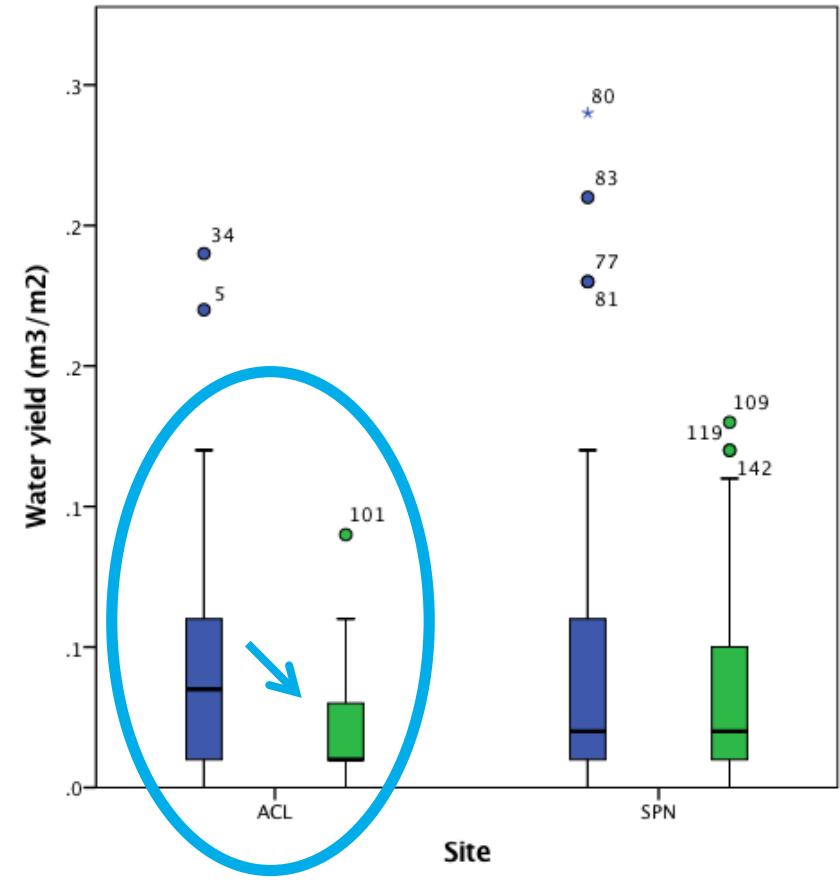
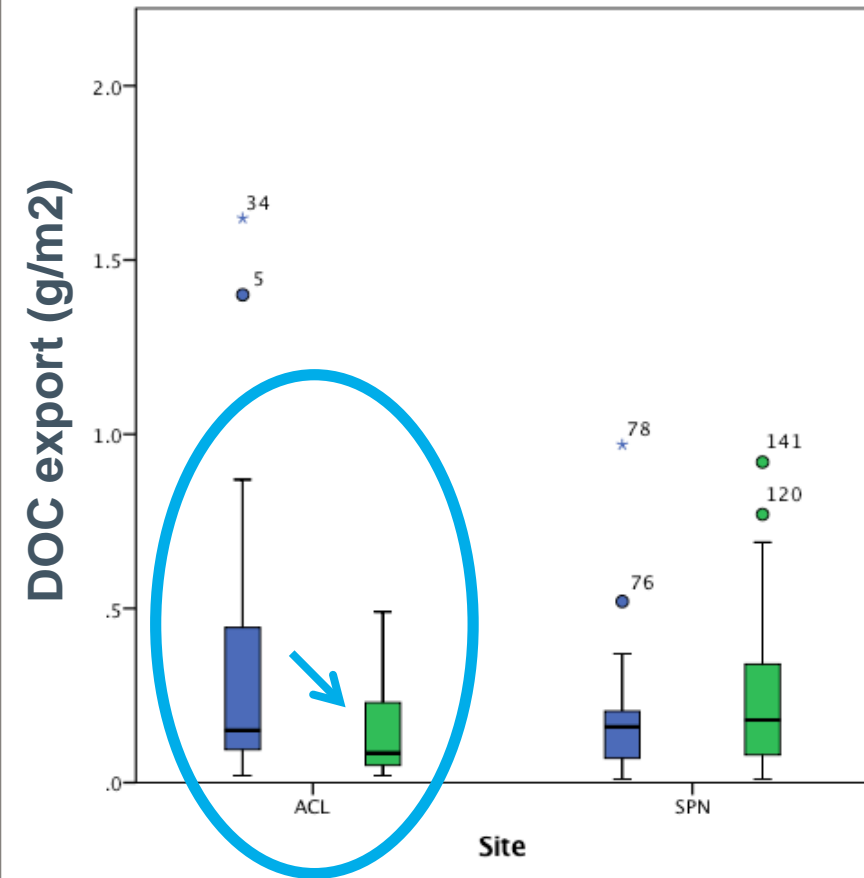


- DOC becoming less discoloured after restoration
- No change in humification index
- DOC becoming more hydrophilic

Monitoring results: Dartmoor



Monitoring results: Fluxes



Load (kg) = [DOC] x Q

- Decreased export at Aclands during events monitored

Conclusion



- Significant increase in DOC and colour concentrations following restoration;
- C lost is more hydrophilic post-restoration;
- Reducing DOC export requires successful water storage.



Thank you!

The Mires Partnership: Morag Angus,
Maddy Davey, James Field

UoE: Richard Brazier, Karen
Anderson, David Luscombe,
Naomi Gatis, Pia Benaud, Josie
Ashe, Alan Puttock

And all the water carriers...



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