Impacts of grips and re-wetting on Welsh blanket bog

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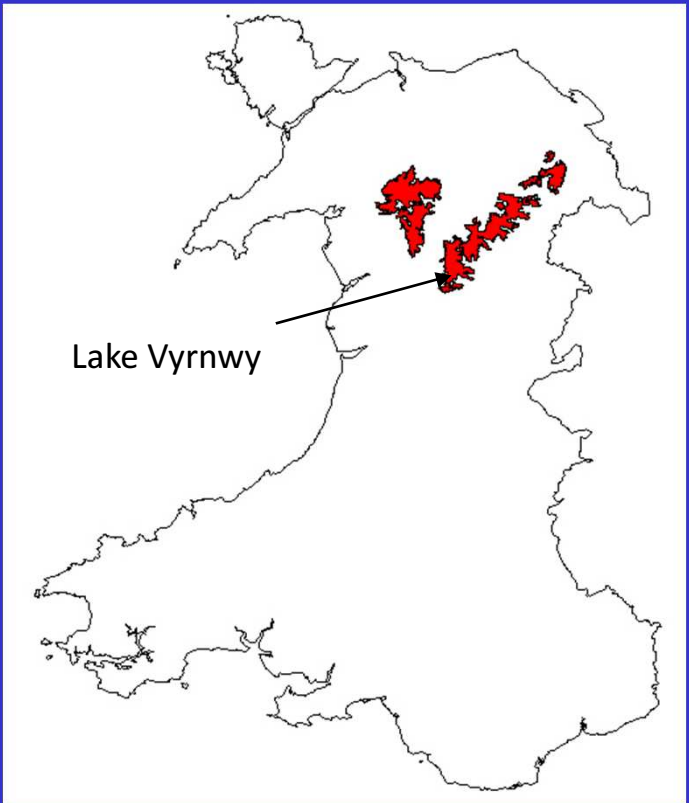
LIFE Moorland Project Manager

The study site



Lake Vyrnwy catchment:

- 10,000 ha
- approx. 4,800 ha blanket bog
- upland areas were drained in 1950-70s
- Special Area of Conservation (Habitats Directive)
- blanket bog in 'unfavourable' condition due to drainage & historic overgrazing & burning

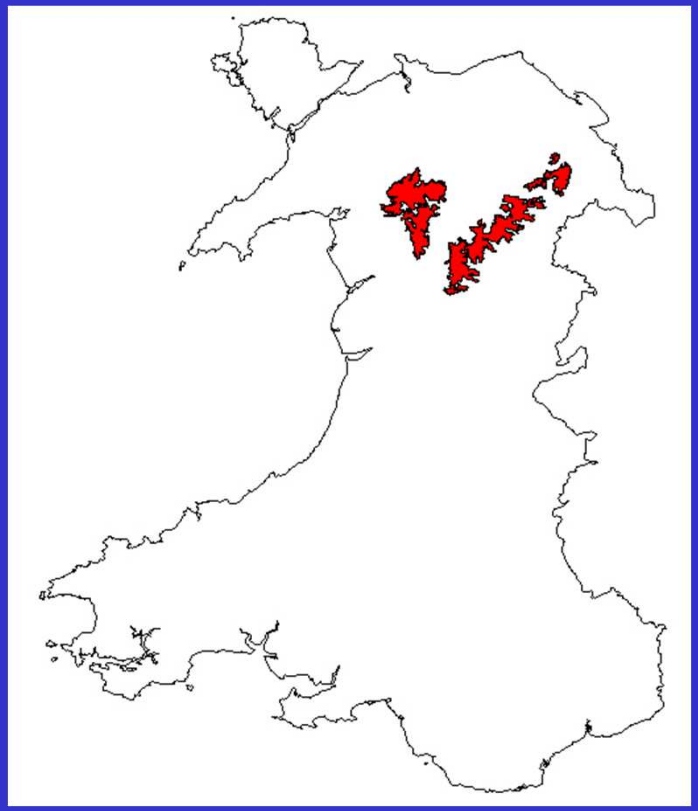
- Lake is water supply to Liverpool

-Upland areas are hill farmed by the Royal Society for the Protection of Birds (low levels, April-Oct only)

The project aims

- Restore damaged blanket bog to ‘favourable’ condition
  - Blocking drainage ditches across a large upland catchment
  - Removal of self-seeding non-native species
- Structure restoration to provide experimental conditions
  - 4 sub-catchments, blocked sequentially 1 per winter
  - Longitudinal (before/after) data per sub-catchment
  - Experiment/Control data between sub-catchments
- Research targeted to address stakeholder concerns & project priorities.
  - Recovery of vegetation?
  - Recovery of conditions for vegetation (higher, stable water tables)?
  - Effects on organic carbon release & discharge water colour?
  - Implications for flood risk management?

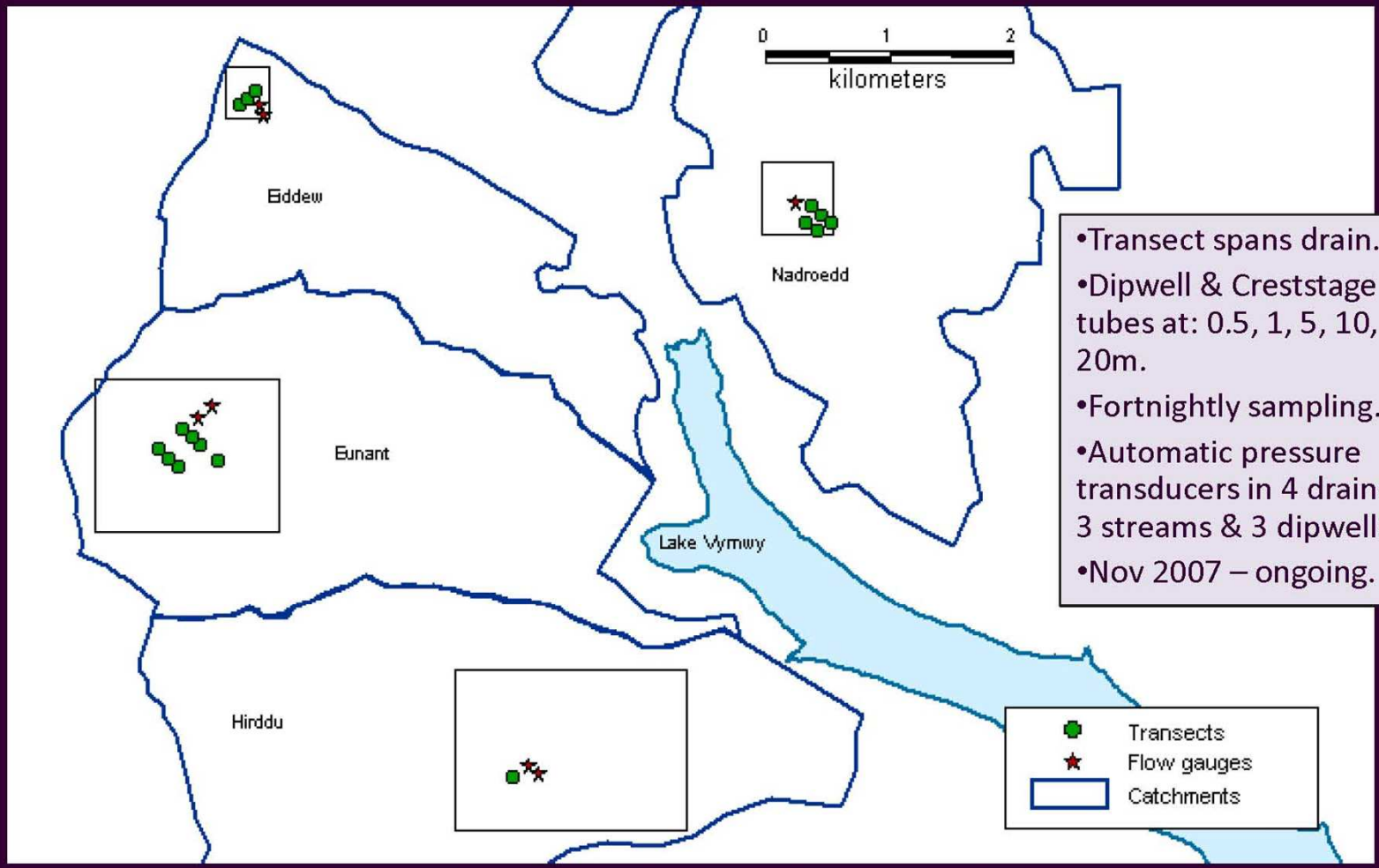
The study site



Local farming concerns

– Traditional farming methods
– Ground will become too wet
– Stock loss in wetter areas
– Increase in parasites

Field methods



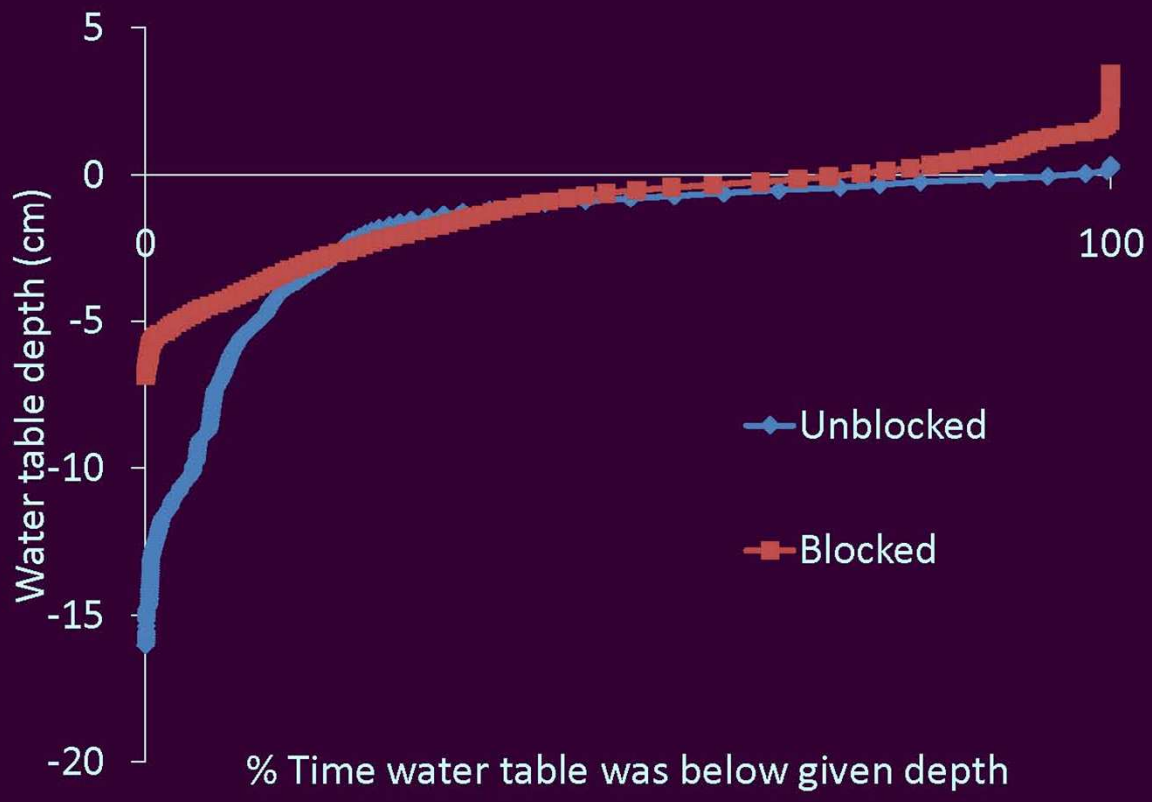
- Transect spans drain.
- Dipwell & Creststage tubes at: 0.5, 1, 5, 10, 20m.
- Fortnightly sampling.
- Automatic pressure transducers in 4 drains, 3 streams & 3 dipwells.
- Nov 2007 – ongoing.

Analyses

- Water tables and surface water
  - Full AICc-based model selection & model averaging (Burnham & Anderson 2004).
  - Testing for effect of drain blocking whilst controlling for other influences (rainfall, local topography etc).

- Discharge rates
  - Polynomial Distributed Lag Regressions
  - Testing for effect of blocking whilst controlling for lagged effects of rainfall & season & non-independence of timeseries data.

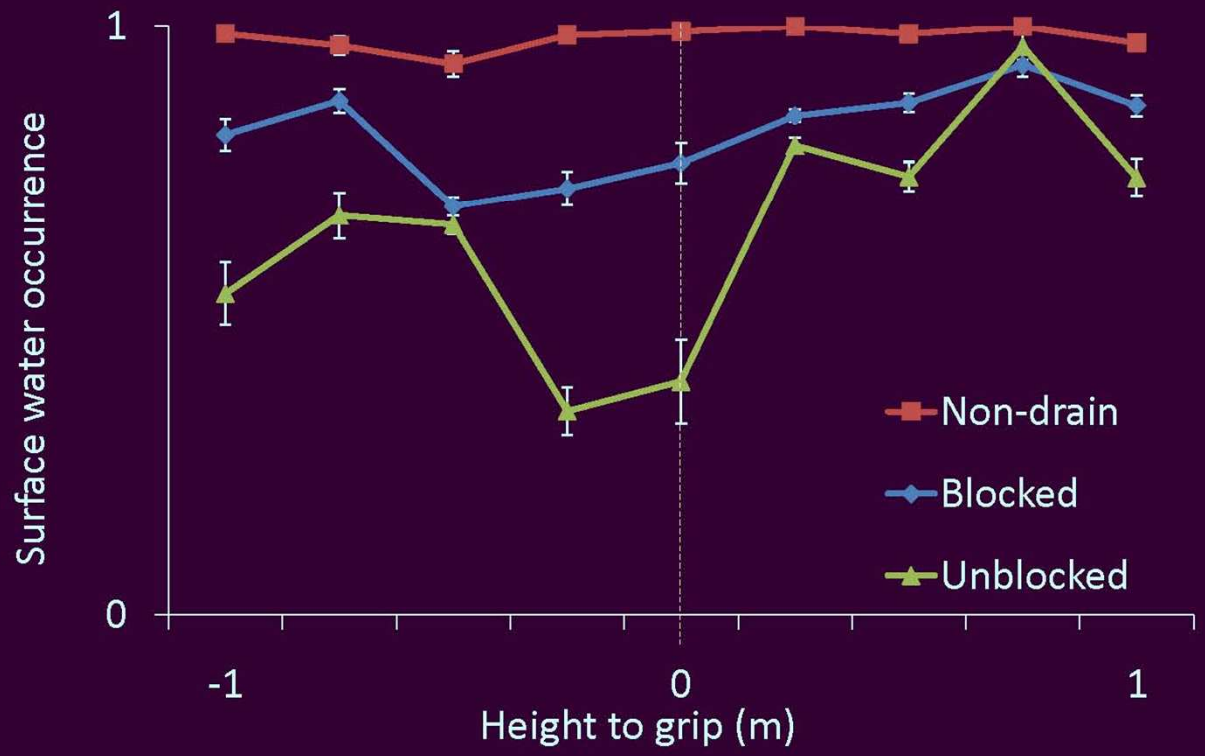
Water tables



Water tables slightly higher within 5m of drains, especially downslope.

Recovery is gradual, some catchments still recovering.

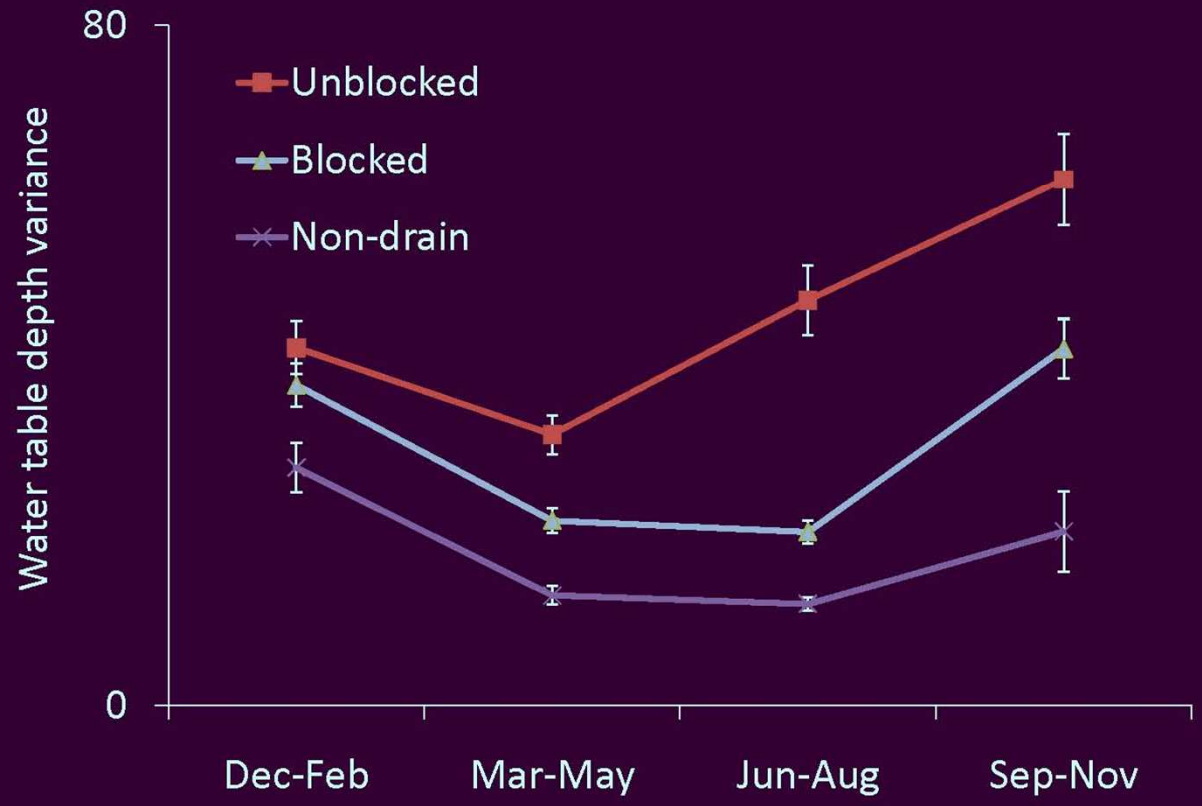
Water tables



Dry zone downhill of drains is removed by blocking.

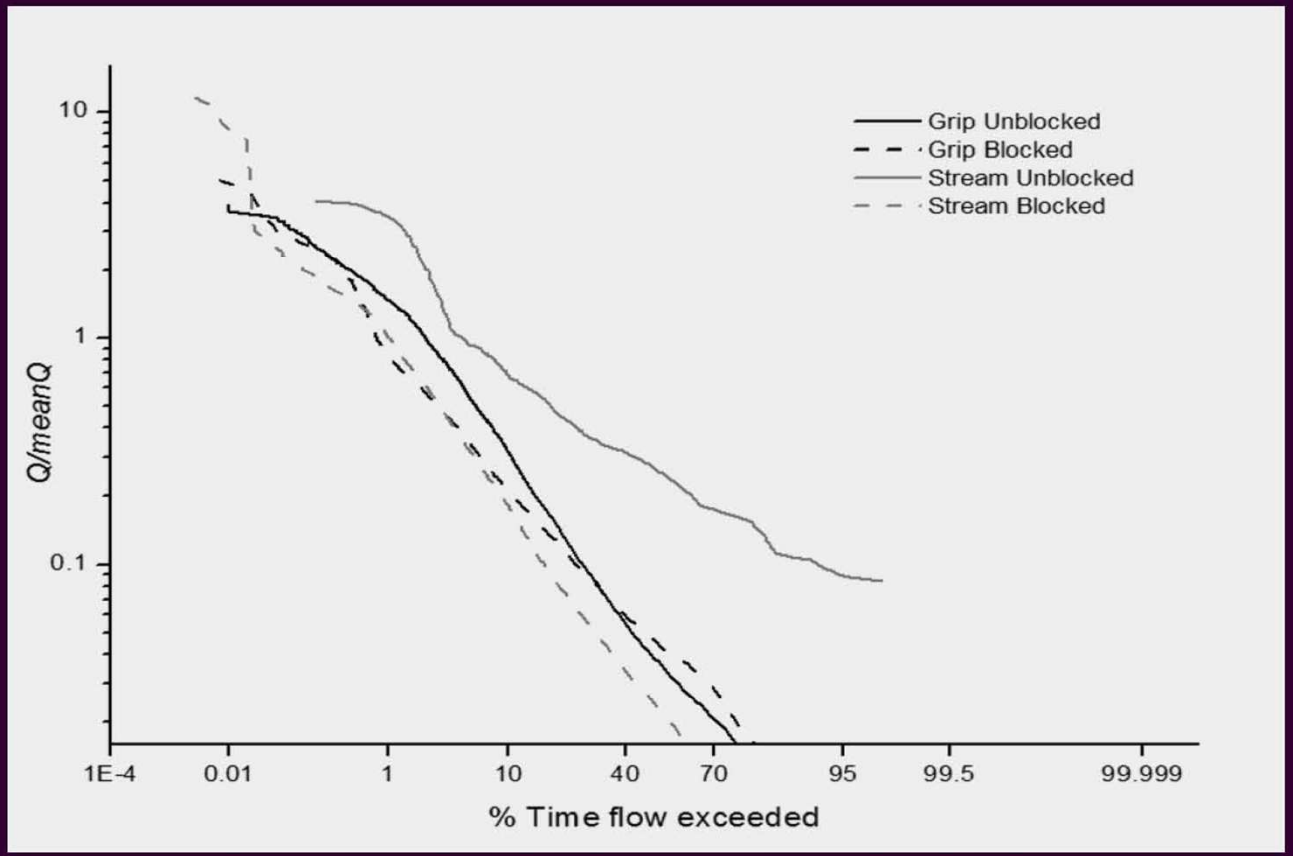
Surface water increases slightly overall

Water table stability



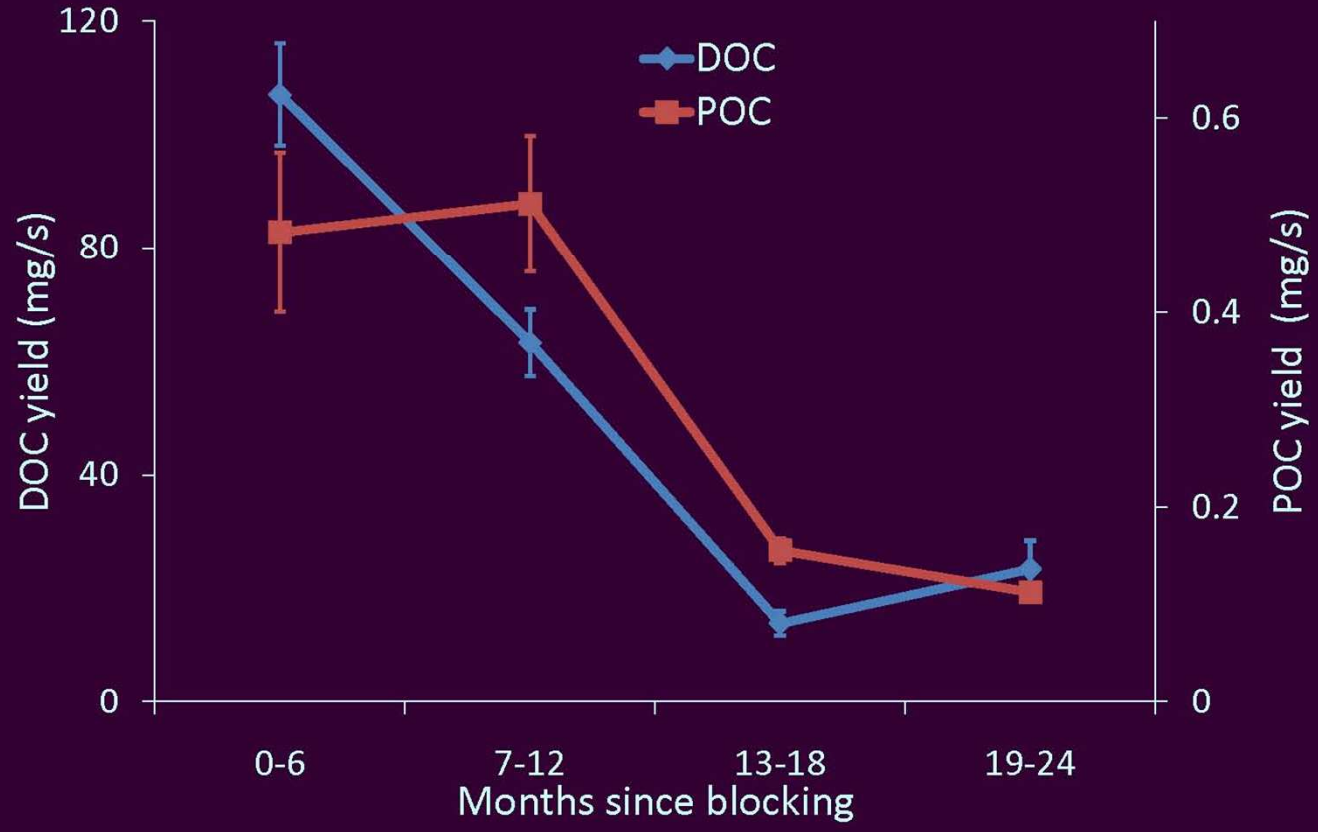
Water table stability increased after blocking.

Discharge rates



After blocking, mean discharge and time at peak flows declines in both drains and streams.

Organic Carbon Flux



Yield in streams of both DOC and POC declined over first year post-blocking.

Overall estimated OC flux:	Before	=	741 t/km^2/yr
	After	=	29.7 t/km^2/yr

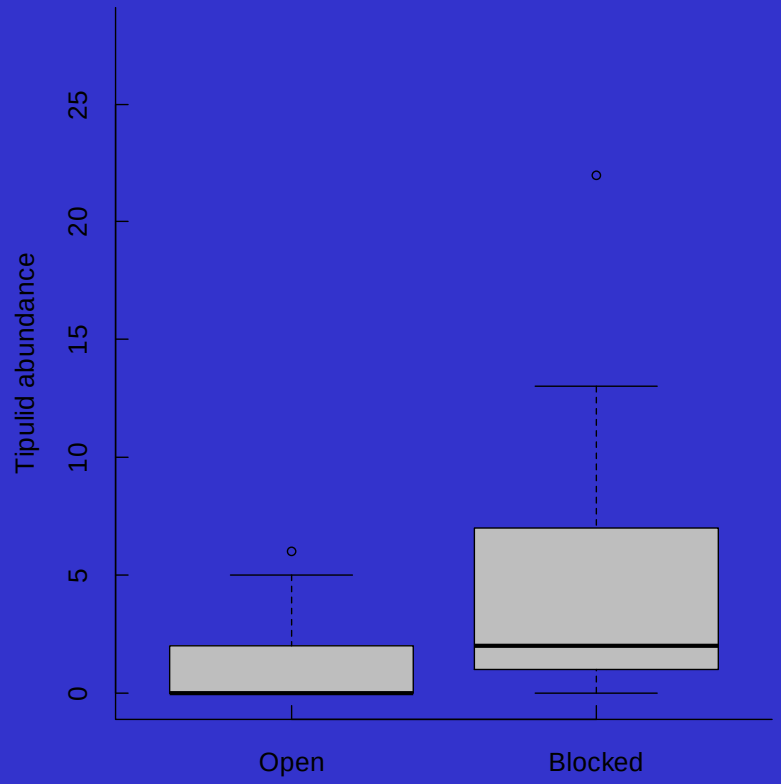
Summary

- Reduction/removal of dry zone adjacent to drains.
- Increased stability of water tables.
- Decreased discharge rates and flashiness, even in streams.
- Recovery is gradual.

→ Increased retention of rainwater.
→ Increase in overland flow & therefore slower release.

→ Improved conditions for vegetation?
→ Reduction in organic carbon release/water colour?
→ Implications for downstream flood risk management.

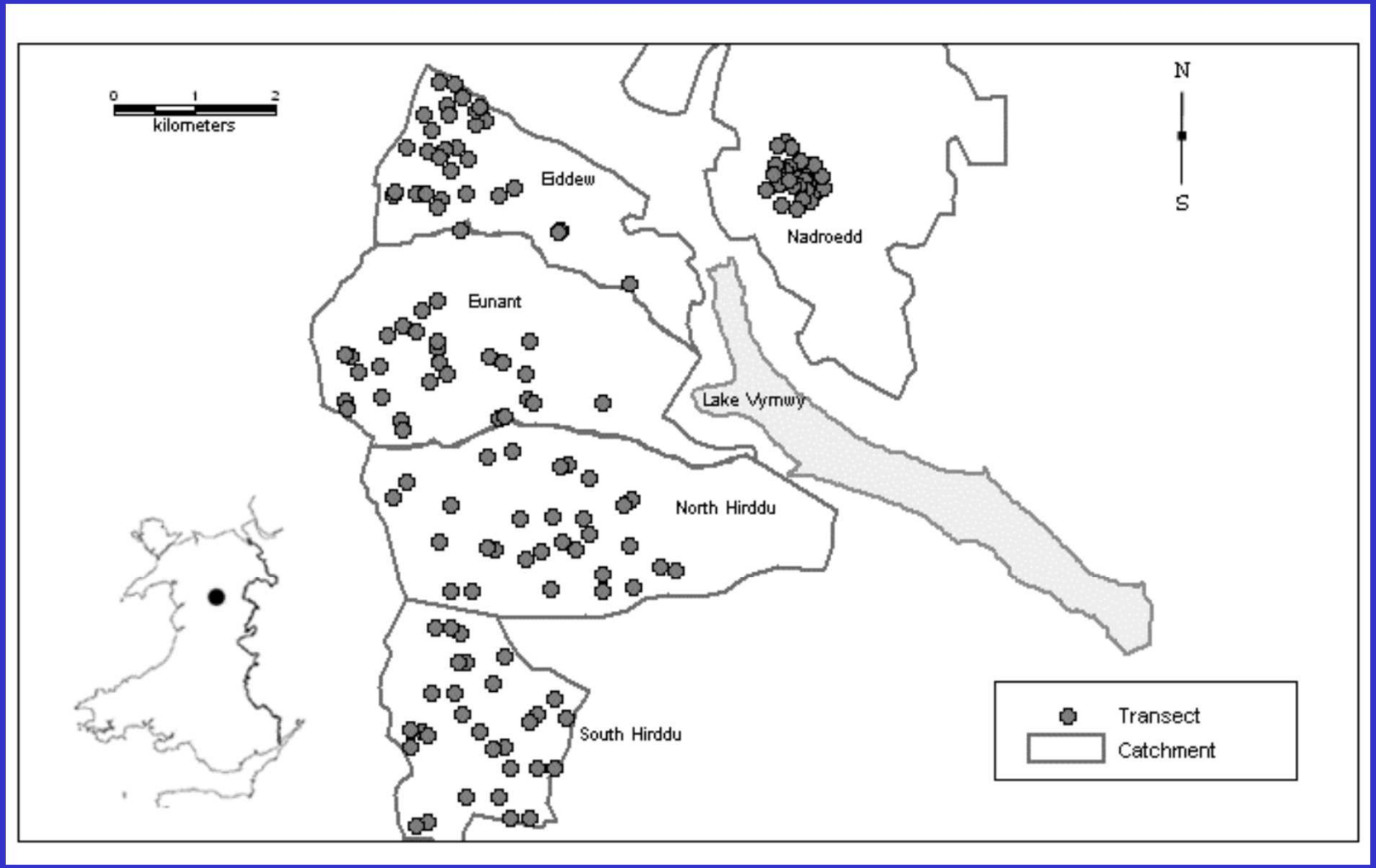
Invertebrate surveys



	Value	Std.Error	DF	t-value	p-value
(Intercept)	-0.1545802	0.2345055	84	-0.659175	0.5116
blocked1	**1.3077334**	**0.3209386**	**26**	**4.074715**	**0.0004**

i.e. in simple blocked vs open comparison, blocked has significantly more tipulids

Vegetation field methods



LIFE Vegetation Monitoring

- 30 fixed transects with 10 1m^2 quadrats each
- Quadrats were 50:50 on grip/non-grip areas

Within each quadrat the following was recorded:

- Species composition, abundance, height and structure measures
- Evidence of grazing/sheep presence
- Depth of peat
- Location, altitude, aspect
- Area of heather mowing
- Area of ditch blocking waste material

Summary

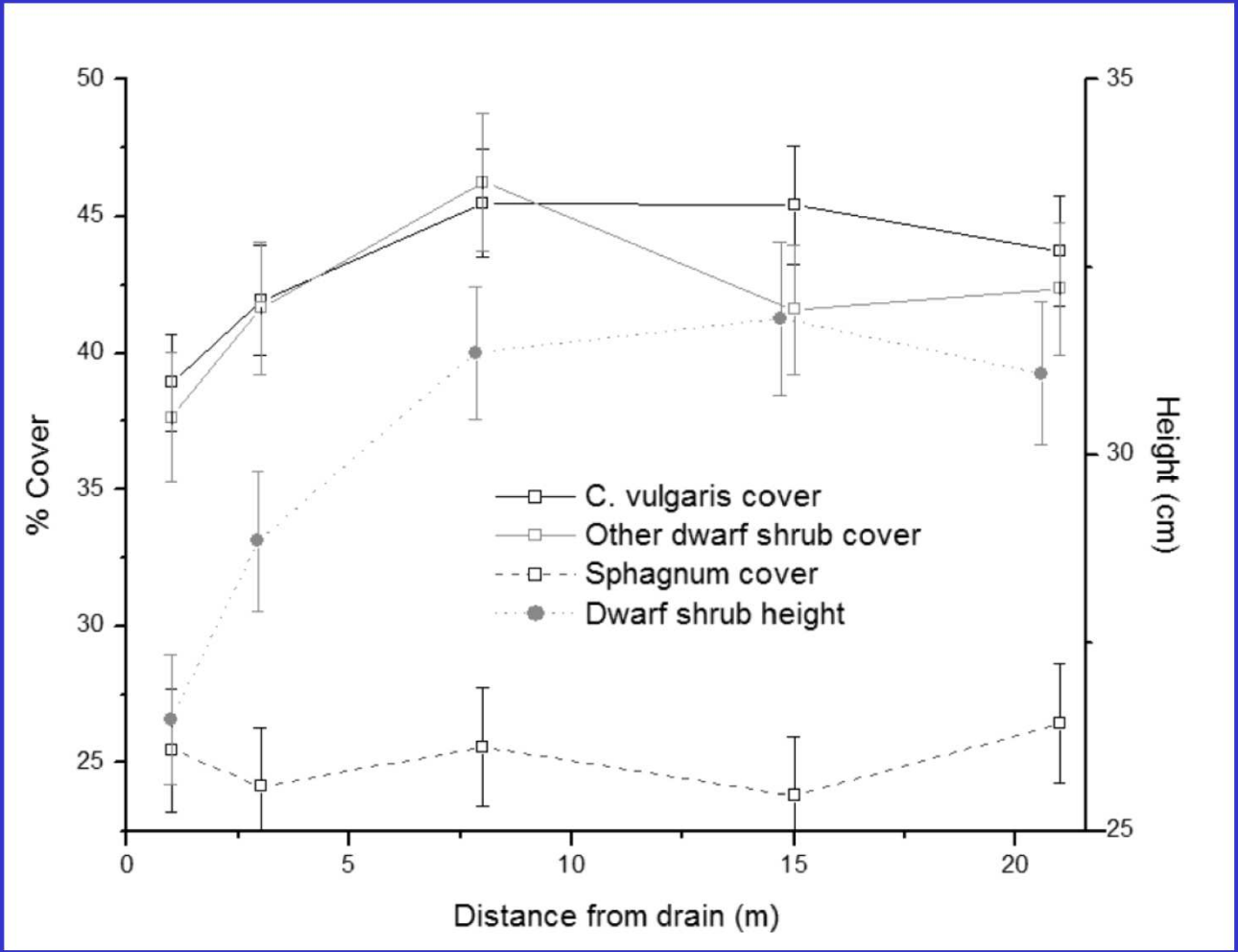
- Vegetation
  - Grips have not, overall, been successful in drying areas to match surrounding habitats
  - At individual grip scales, there is evidence of a ‘drying zone’ (key blanket bog species lower abundance within 15m of grip)

- Sheep
  - Sheep presence was strongly linked to drier areas
  - Sheep largely avoid areas of drained bog
  - Greater grazing pressure directly adjacent to grips.

Local farming concerns

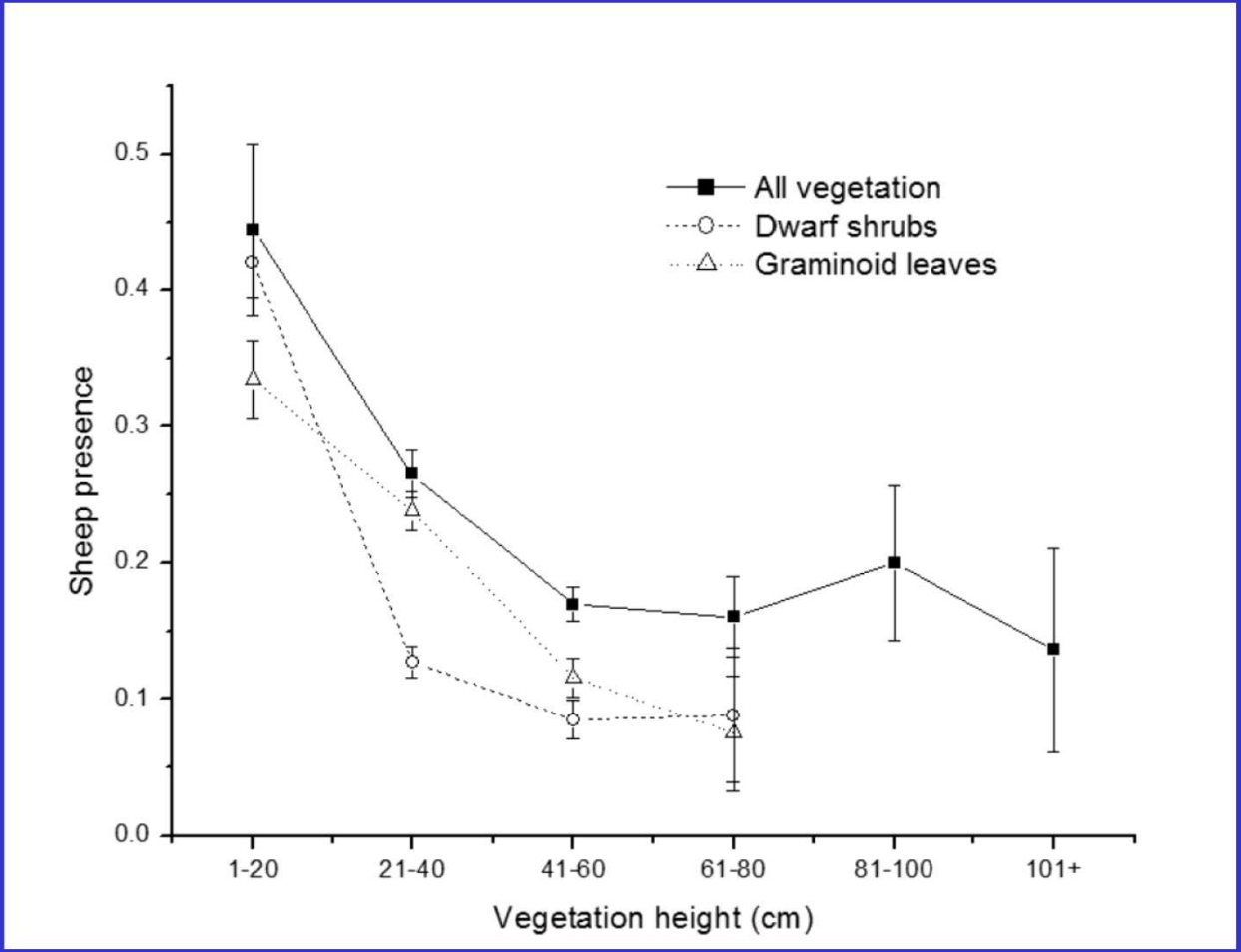
- Traditional farming methods
  - Upland draining
  - High stocking rates
  - Liming
  - Removal of cattle/ponies

Drain impacts



Graminoid species height lower close to drain
Weak decline in Sphagnum species nearer drains

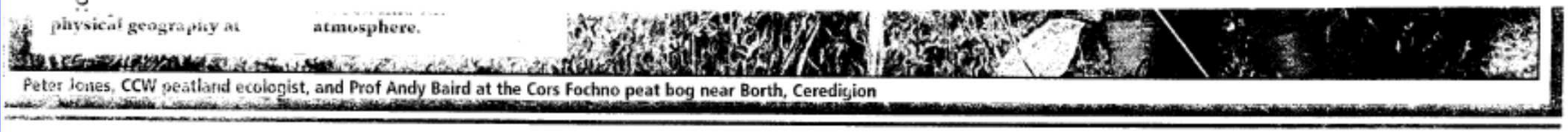
Sheep presence



Sheep presence associated with shorter vegetation and Graminoid abundance
Lower C. vulgaris and other dwarf shrubs cover with sheep presence

Local farming concerns

- Ground will become too wet
  - Stock loss
  - Reduction in grazing levels
  - Loss of income



Peter Jones, CCW peatland ecologist, and Prof Andy Baird at the Cors Fochno peat bog near Borth, Ceredigion

Maybe they want us to start growing rice

Flooded mountains will become paddyfields fear

/ ANDREW FORGRAVE
ural Affairs Editor

MAJOR project to reverse decades of
olands drainage will get under way in
orth Wales this spring.
Reflooding the vast Migneint range,
blocking drainage ditches, is aimed
preventing downstream deluges in
e Conwy valley.
It is also part of landowner the
ational Trust's contribution towards
itigating the effects of climate
ange by increasing carbon storage in
e Welsh uplands.
The Migneint – the second largest
ea of blanket bog in North Wales
ter Berwyn – is the main source of
ter for the Conwy valley, which in
cent years has been beset by winter
ods.
Land managers hope to trap more water in the Migneint by scaling up drainage ditches, or "grips", dug by post-war sheep farmers to improve grazing.

Trystan Edwards, the trust's farm and countryside adviser, said: "We'll be using brash bales from conifer clearance sites on the Ysbyty estate to seal the drains and encourage their silting up.

"It's too early to say what the overall impact will be but it is likely to have a significant effect on down-stream flooding problems in the Conwy valley."

Initial trials will assess the project's impact on wildlife and vegetation – the Migneint is an important site for hen harrier breeding and Sphagnum mosses.

If positive, reflooding work will be extended to neighbouring areas and to other parts of Wales.

It is being backed by the Rhaglen Tir Eryri management scheme. The Trust will also be seeking support from the 51 tenant farmers on its 20,000-acre Ysbyty estate.

Mr Edwards added: "It's not all bad news for them. Some grips are a real menace to livestock: over time they have deepened and, when covered by a thin layer of heath, sheep can easily fall to their deaths."

But not all sheep graziers are happy at the prospect of seeing 60 years of land reclamation reversed.

Last year North Wales Police investigated reports from the Countryside Council for Wales that drainage work was being carried out on the Migneint-Arenig-Ddualit SSSI without consent.

Bryn Williams, vice-chairman of the Migneint Graziers Association, said he was unaware of the plans.

He said: "I imagine many of our members would be against such a scheme.

"I'm all in favour of efforts to prevent flooding in the Conwy and other valleys, but this sounds a bit extreme.

"Even if just few ditches are blocked, it will make the whole area wetter, making it more difficult for livestock and increasing fluke problems.

"Maybe they want us to start growing rice."

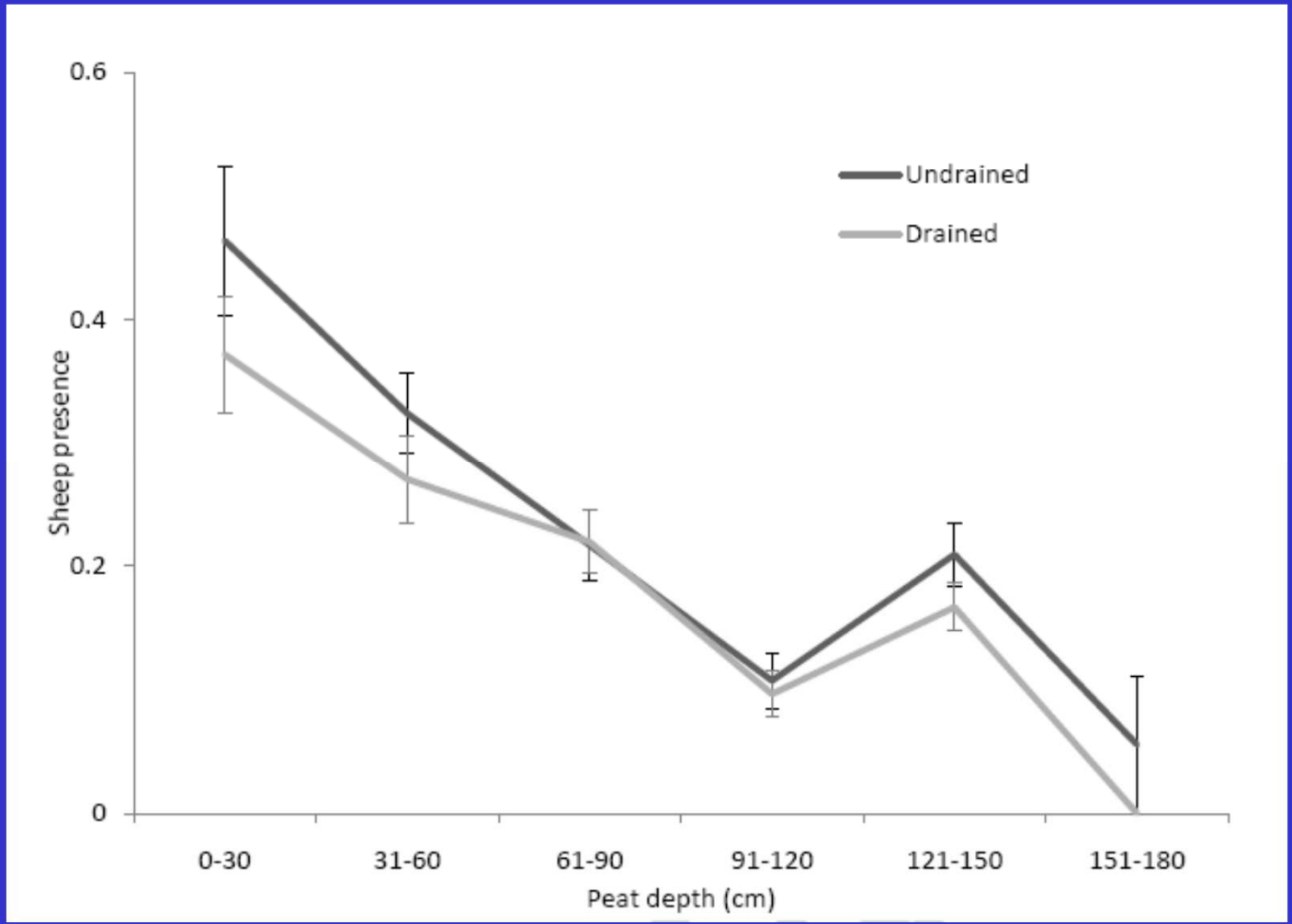
The Migneint project comes on the heels of a related scheme on common land between Conwy and Capel Curig.

In late 2004, 22 members of the Abergwyngregyn & Llanfairfechan Grazing Association signed an agreement to stop grazing 2,800ha of the mountain during the winter months.

It is hoped the scheme will improve upland habitats and reduce valley flooding.

farming@dailypost.co.uk

Sheep presence

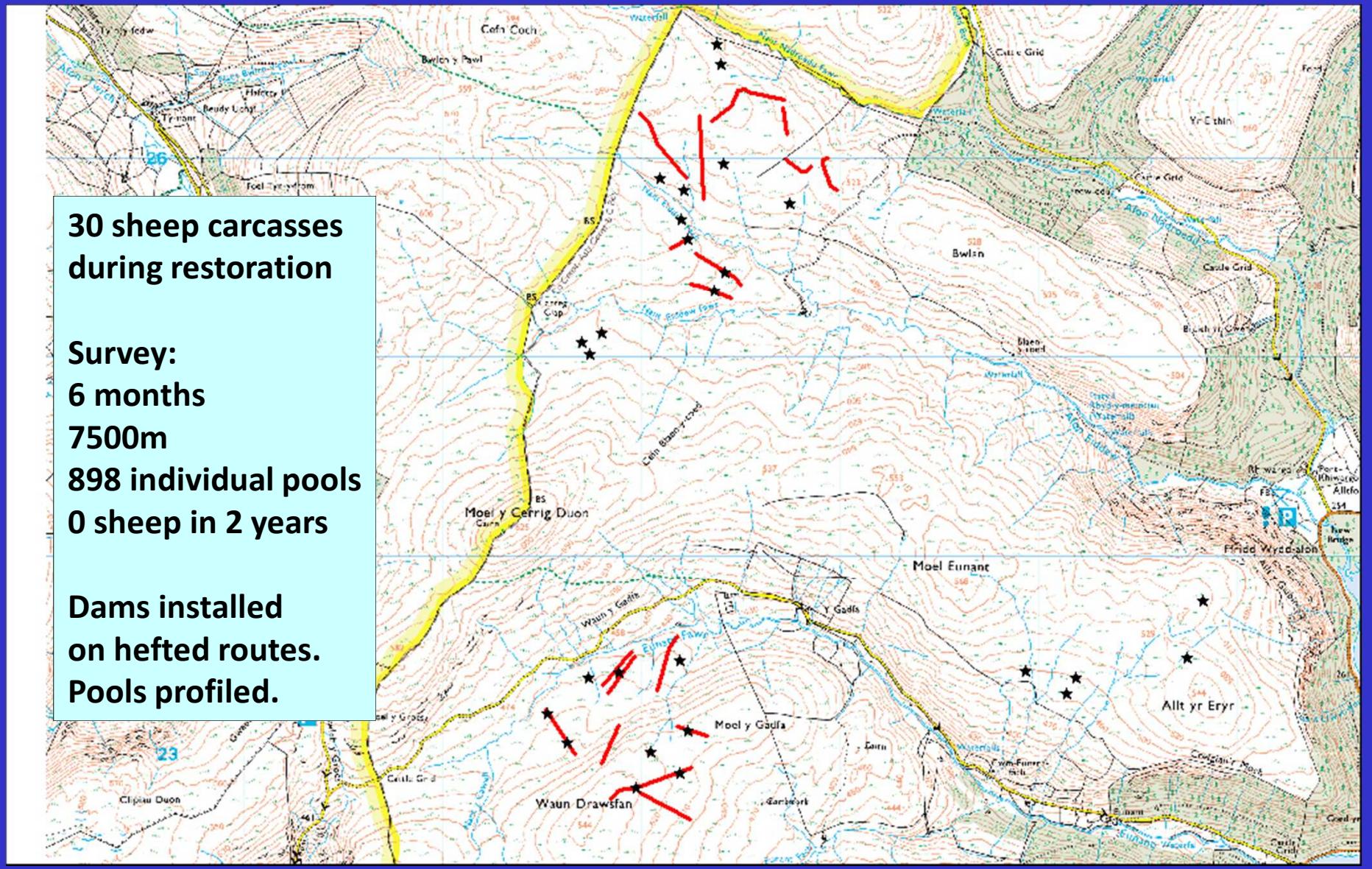


Drained areas have 5-33cm deeper peat

Sheep presence lower in drained areas

Local farming concerns

- Stock loss in wetter areas
  - Stock becoming stuck
  - Stock loss in grips vs newly created wetter areas


30 sheep carcasses
during restoration
Survey:
6 months
7500m
898 individual pools
0 sheep in 2 years
Dams installed
on hefted routes.
Pools profiled.
Moel y Cerrig Duon
Moel Eunant
Moel y Gadfa
Waun Drawsfan
Allt yr Eryr
Bwlan
Cefn Coch
Clipiau Duon

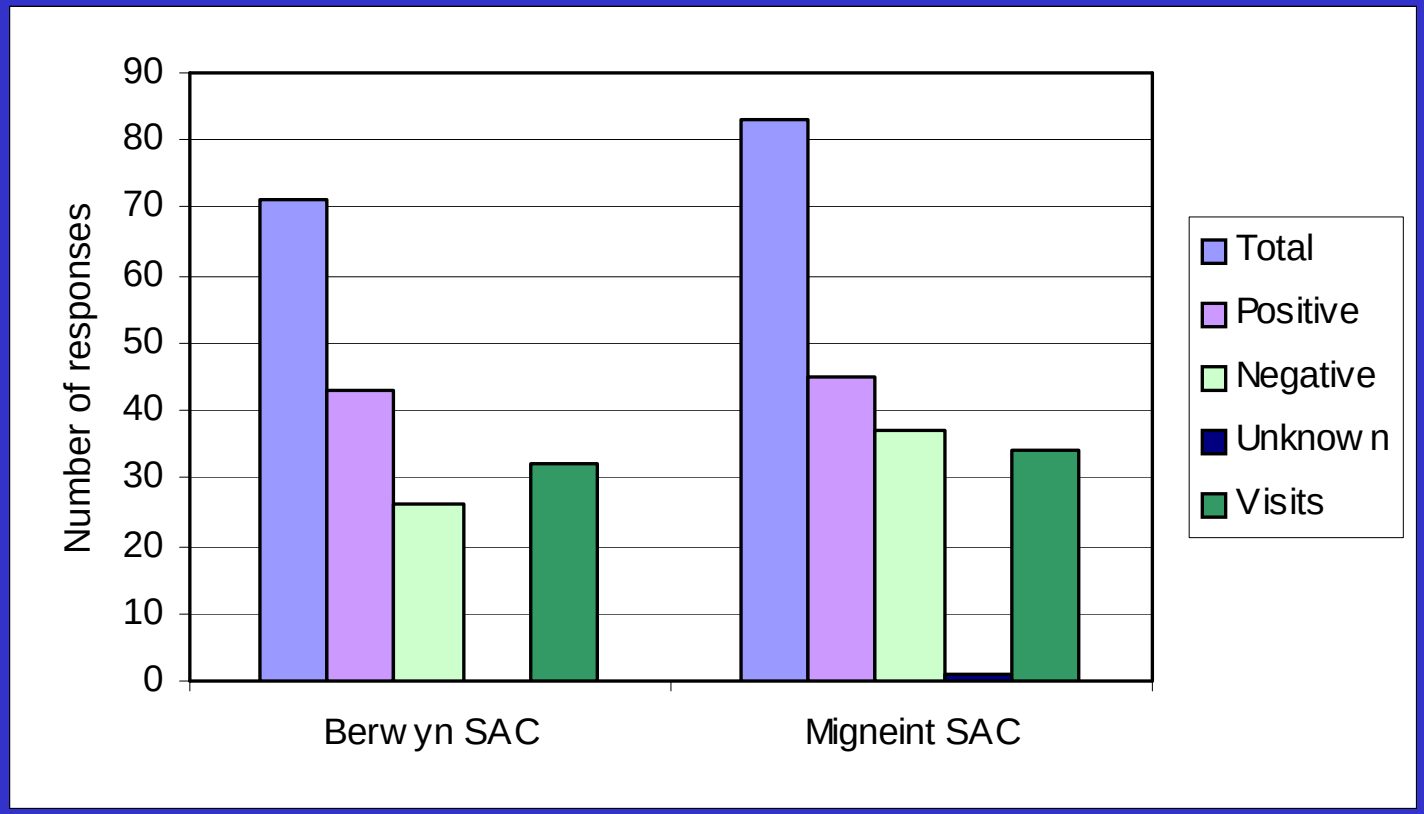
April 2007

May 2010

Local farming concerns

- Increase in parasites
  - Tick (*Ixodes ricinus*)
    i. April & August surveying
    ii. Two catchments
  - Liver fluke (*Fasciola hepatica*)
    i. Random surveying of bog pools

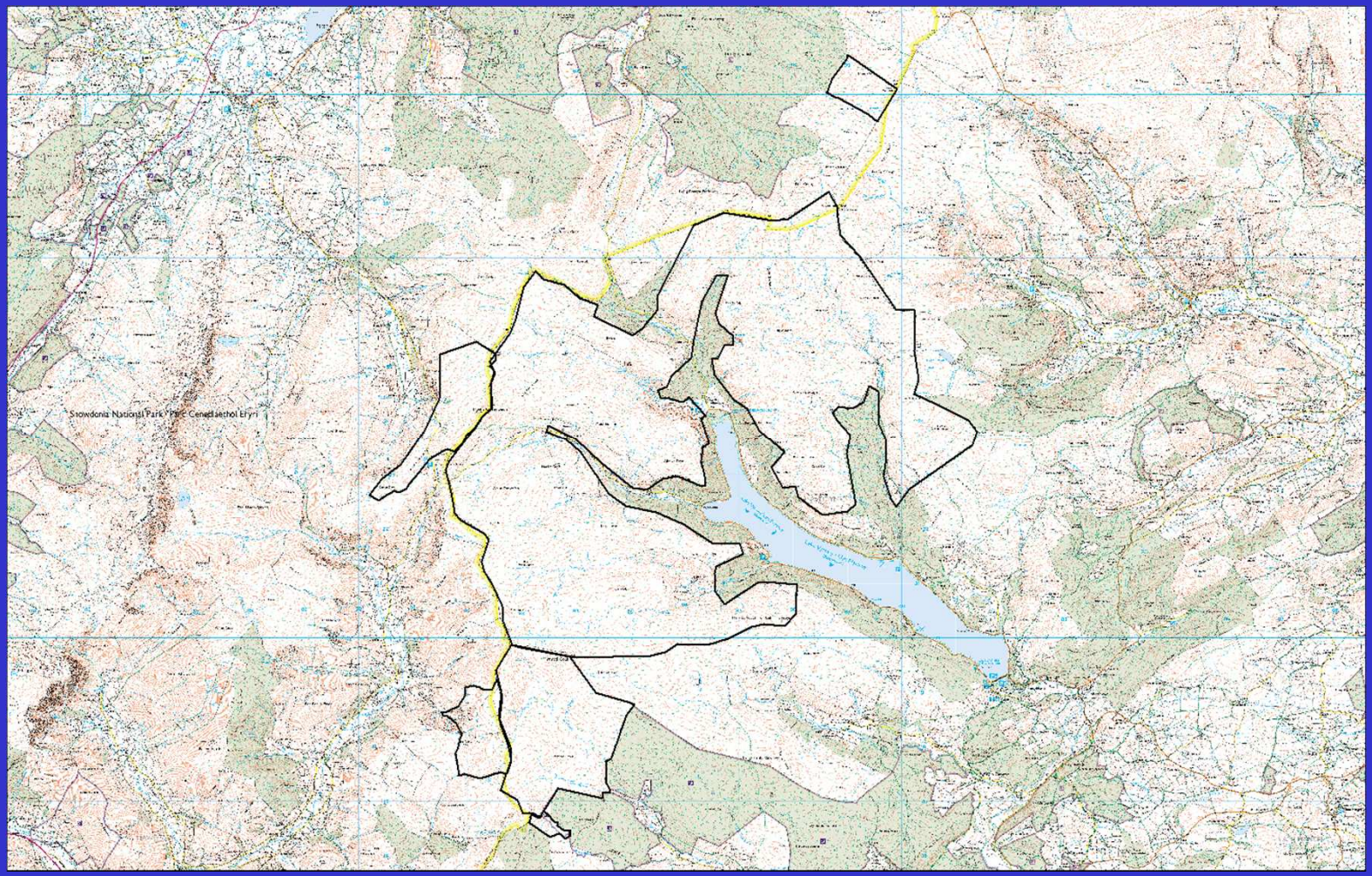
Farming response

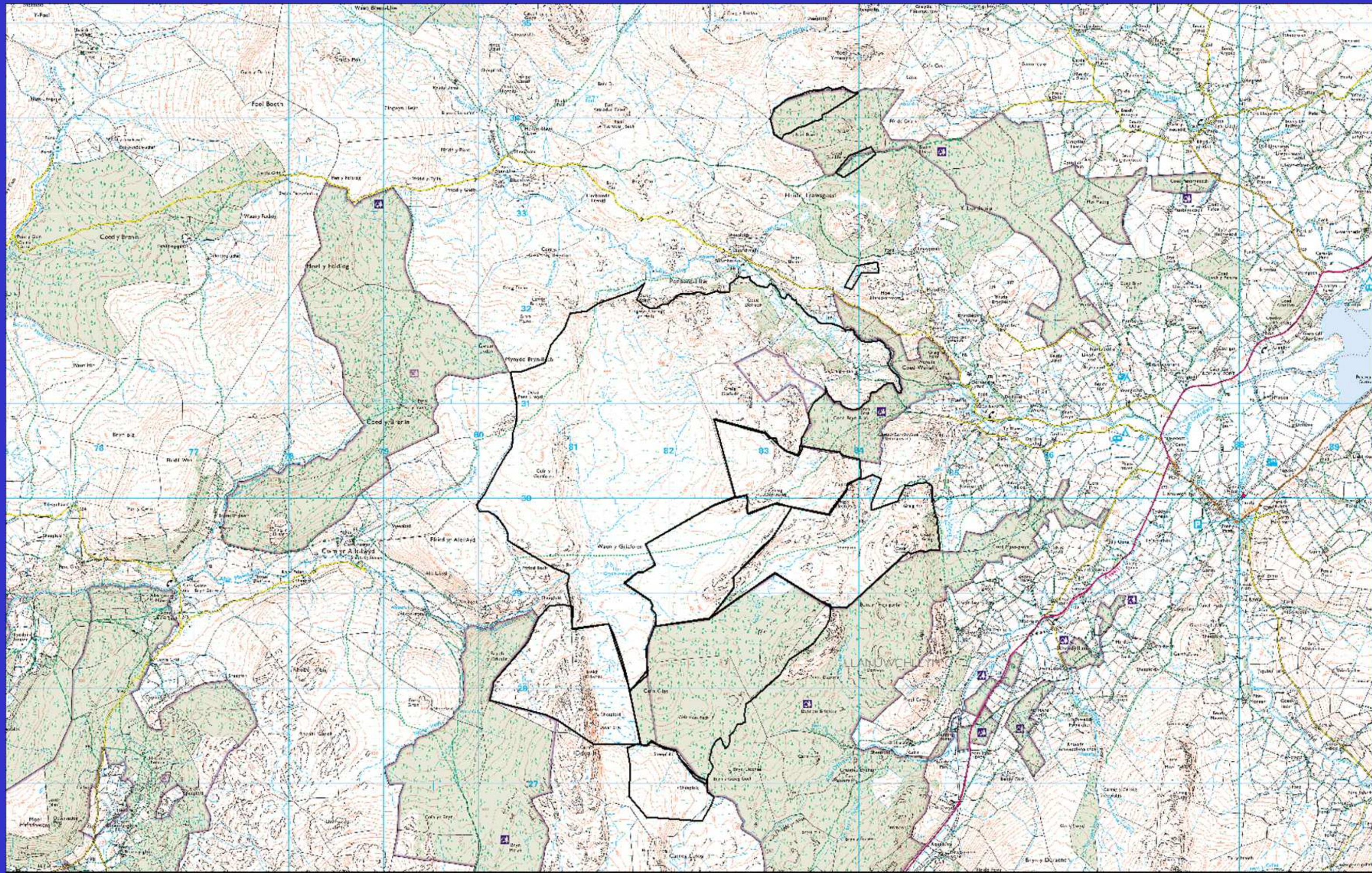


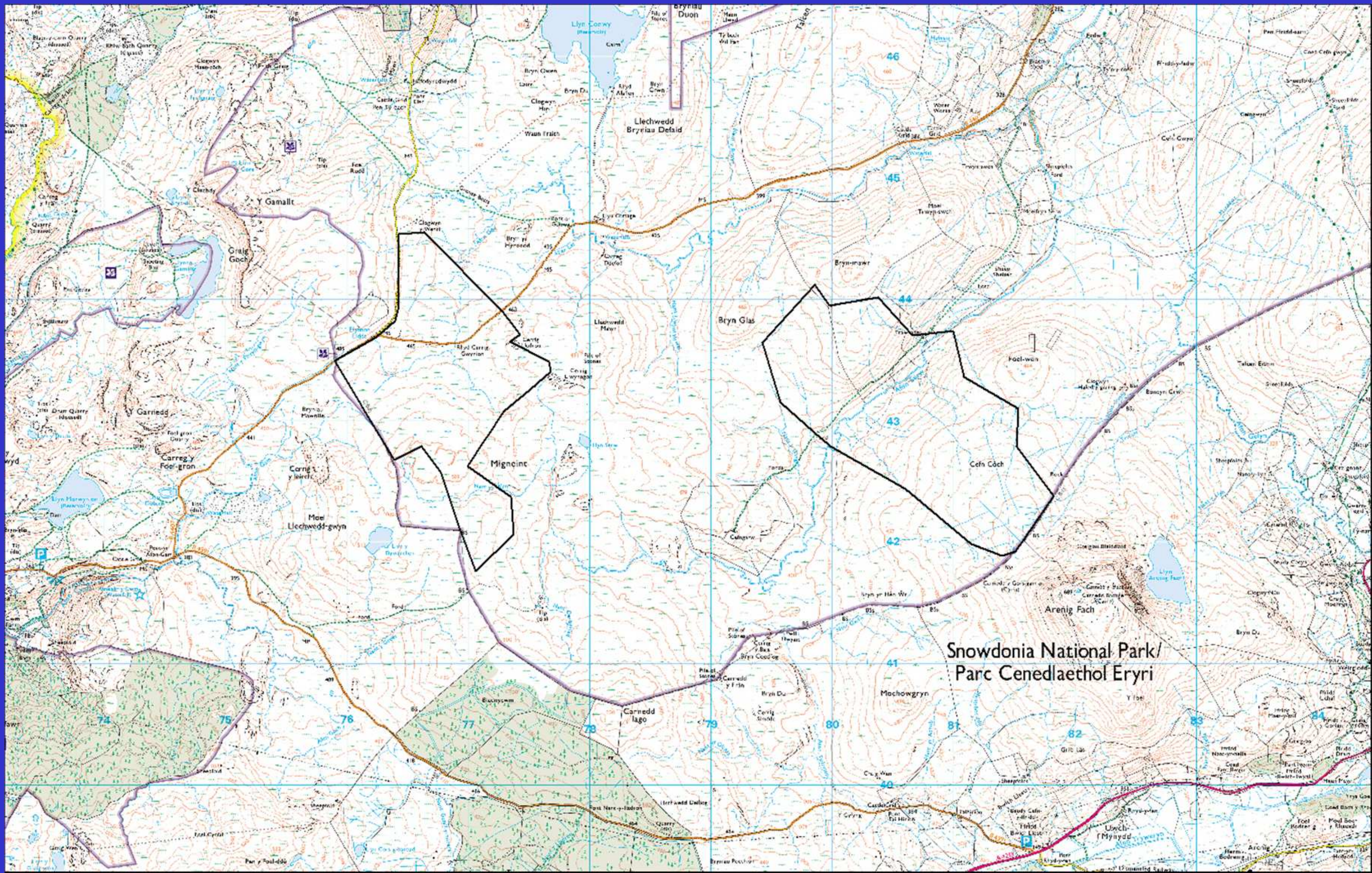
Impacts on farming

- True impacts of drains
- Stock loss
- Parasites

  - ➢ Nine private landowner agreements
  - ➢ Extra 1000 ha blanket bog restoration


Snowdonia National Park / Parc Cenedlaethol Eryri





Snowdonia National Park/
Parc Cenedlaethol Eryri
Migneint
Arenig Fach
Y Gamallt
Carnedd Iago
Mochowgryn
Bryn Glas
Carreg y Foel-gron
Moel Llechwedd-gwyn
Llechwedd Bryniau Defaid
Cefn Côch

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EU LIFE-Nature Fund and project partners
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www.blanketbogswales.org

“If your ankles get wet, that’s a bog”, said Eeyore.
“I see”, said Pooh.
“Whereas”, continued Eeyore, “if you sink
in up to your neck, that’s a swamp”.
AA Milne