Investigation of hydrology, vegetation and microtopography on Cors Fochno SAC

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Assistance

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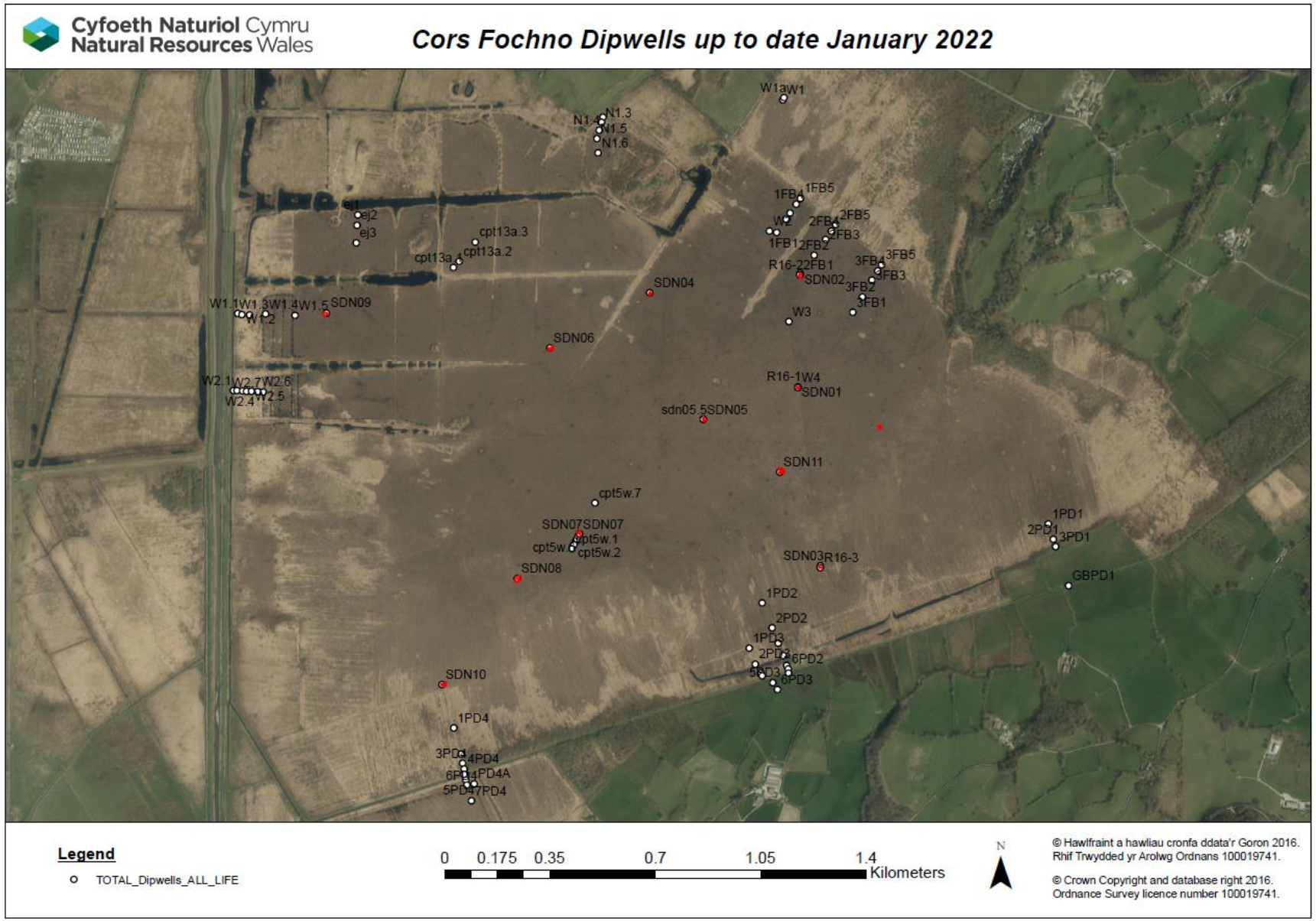
What we aspire/dream of

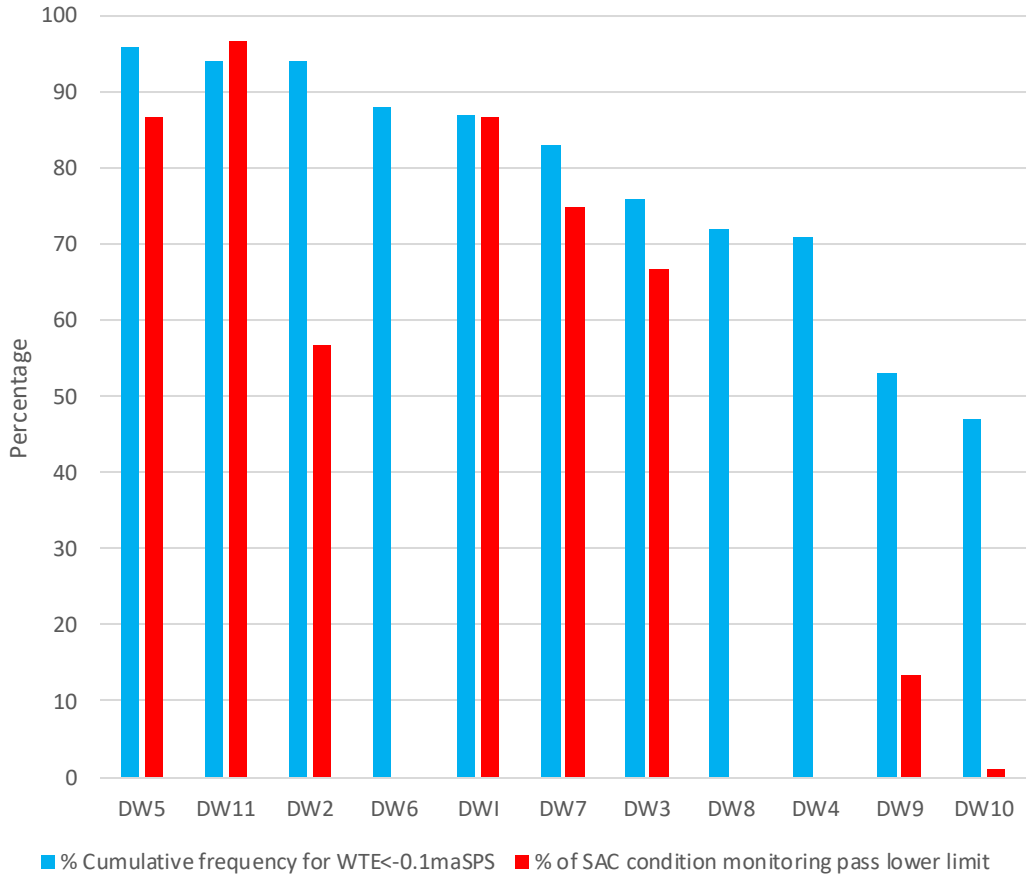
Aims of Investigation

- Assess any correlation between water table elevation measures at dipwells and SAC condition site monitoring.
- Explore microtopographic variations relative to water table elevation and species composition through the proposed Standardised Peatland Surface (SPS) metric on Cors Fochno.
- Contribute to the understanding of raised bog vegetation structure and water table elevation over time.
- Provide a detailed base line survey for further investigations into the impacts of restoration, climate and ecohydrology.

Cors Fochno Strategic Dipwell Network



Comparison of hydrology at dipwells (2010 - 2020) with SAC condition monitoring (2020)



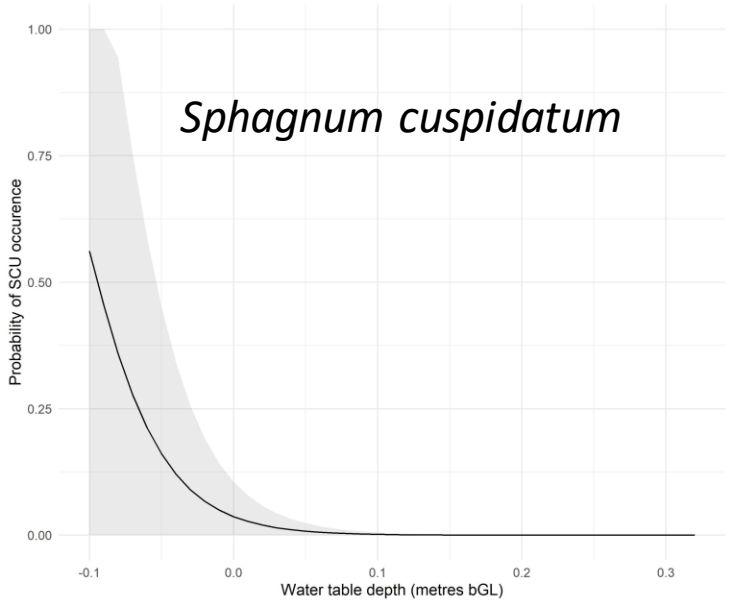
- Target cumulative frequency of water table elevation of 90% above 0.1m bSPS.
- SAC plot pass lower limit is 60 out of 100 sample points in 100m x 100m plots

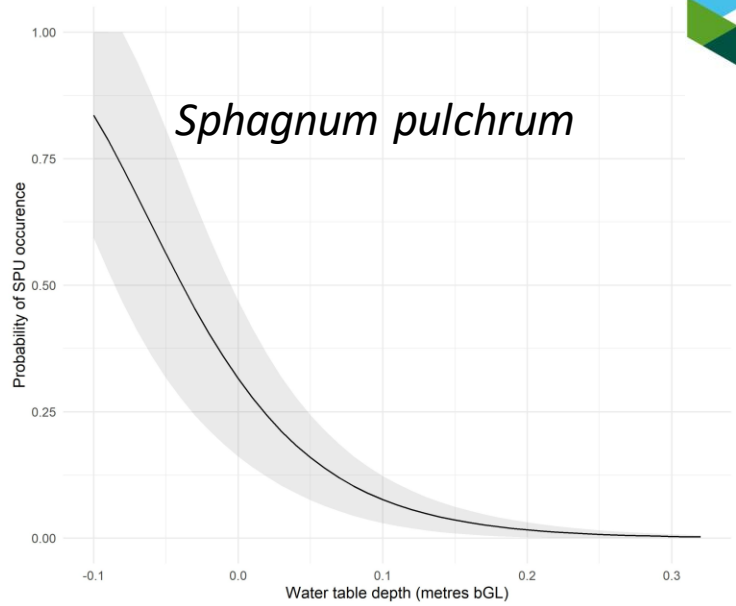
No SAC plots in the vicinity of DW6,8 or 4

Method

- At each well whilst levelling for the standardised peatland surface, plant species underneath base or touching the levelling staff were recorded. 11 dipwells each with 81 sampling points giving a total of 879 sample points.
- Using the standardised peatland surface metric and the 2010 – 2020 WTE data for sampling points a localised mean water table was calculated.
- Across all sample points probability of occurrence of each species relative to the localised mean water table was investigated.
- Surface microtopographic variations in species composition relative to mean water table elevation was investigated around each dipwell and comparisons made.

Probability of Occurrence





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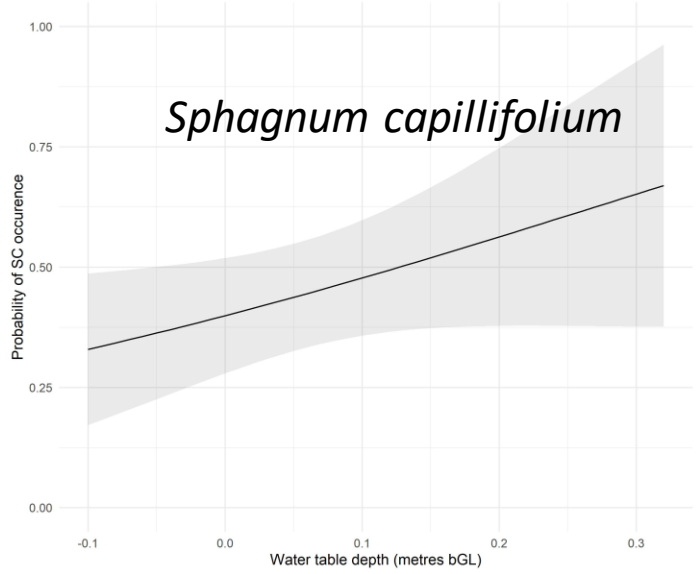
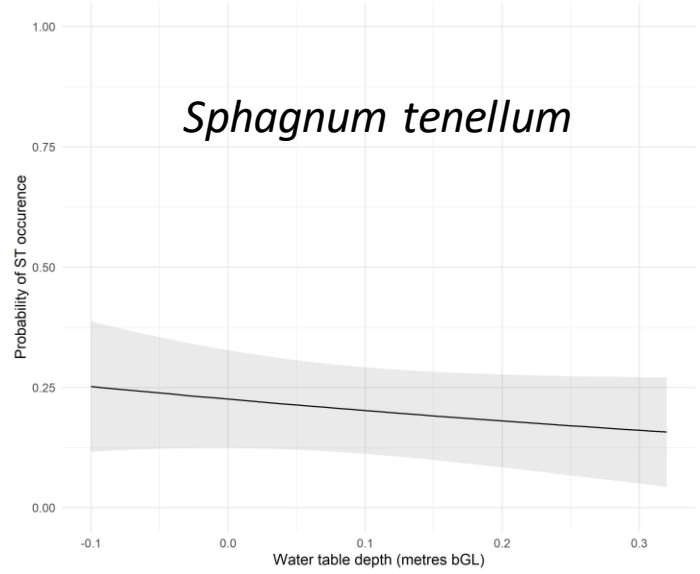
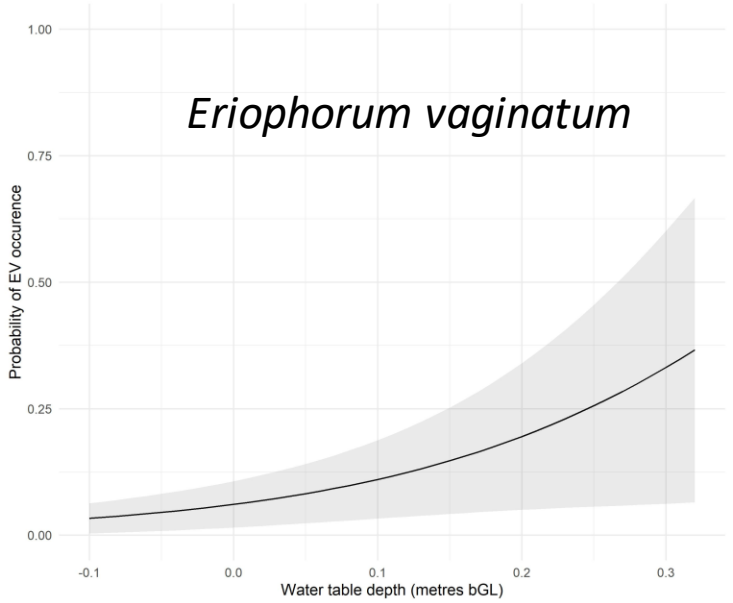
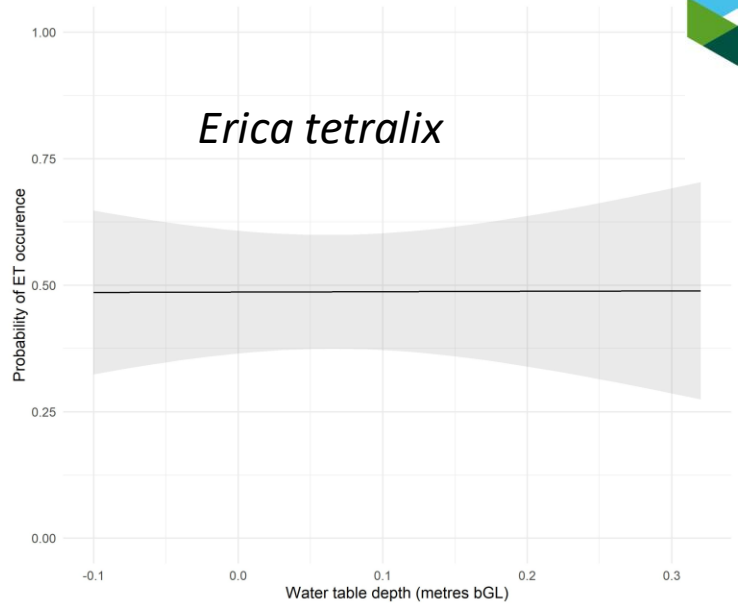




Probability of Occurrence





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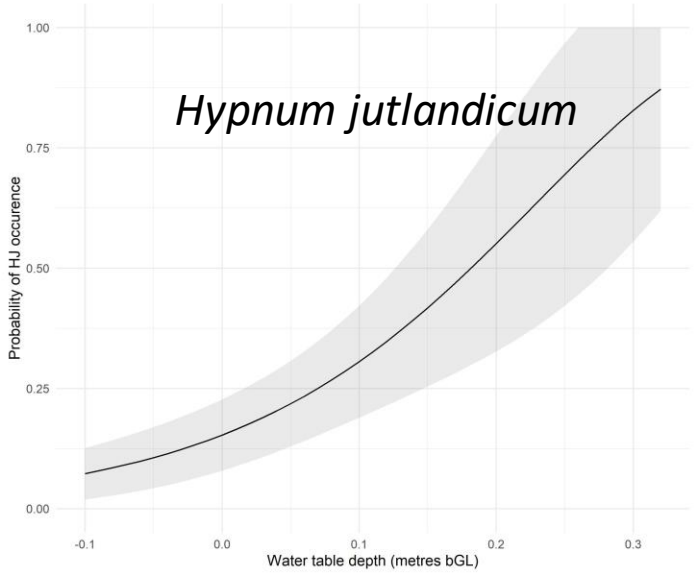
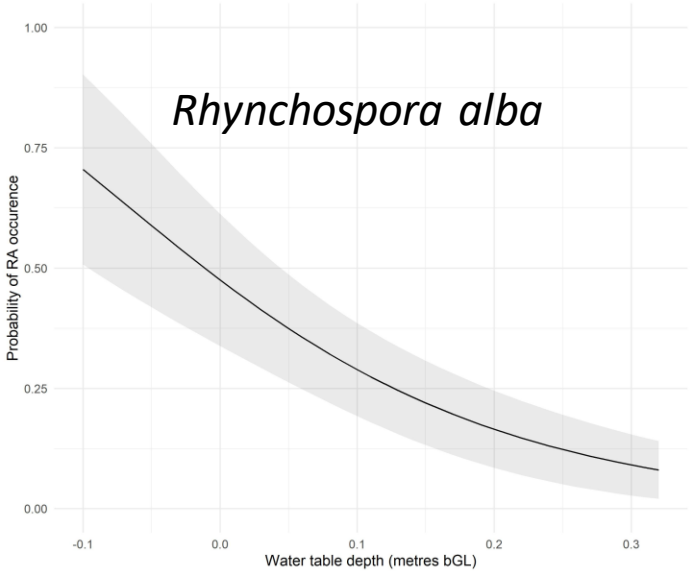


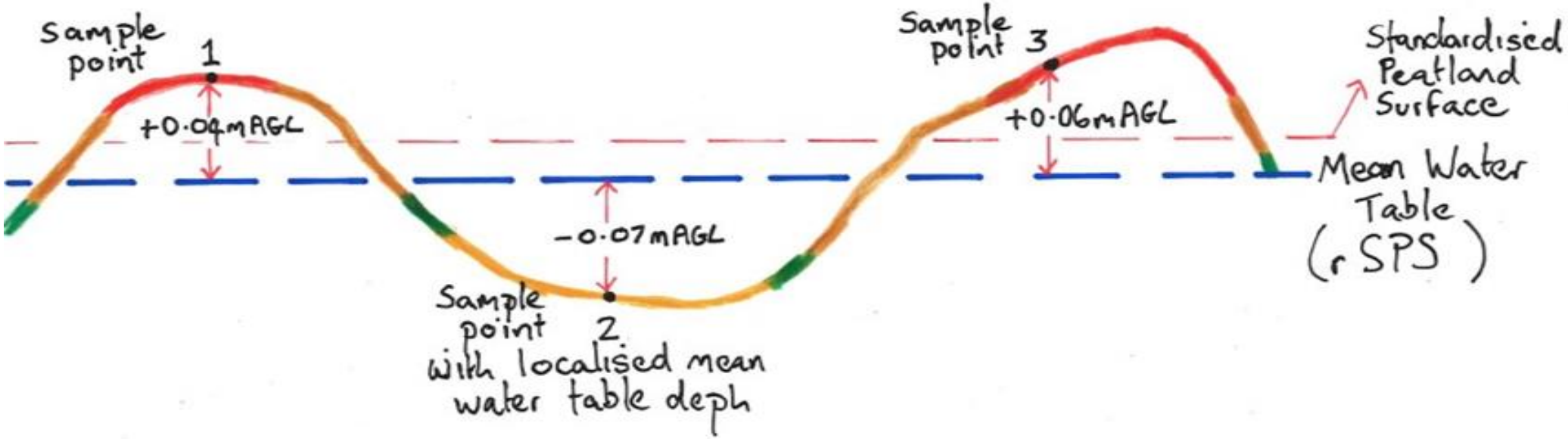


Comparison of ecohydrology zones of common Sphagna with other studies

- For Sphagna species on Cors Fochno there were similarities in the ecohydrological range, compared to other studies. One difference was that the range on Cors Fochno for most species extended below mean water table.
- *S. cuspidatum* and *S. pulchrum* had the narrowest ecohydrological range. Higher relative frequency of these two species generally provided a good predictor of healthier raised bog vegetation condition.

	Height above water table cms			
	Cors Fochno 2020	R.Lindsay et al 2014	Gignac 1992	Rydin et al. 1999
	Wales	Northern UK	Canada (West)	Sweden
S. capillifolium/	-10 to 40	T2 : 15 to 25	0 to 90	Hum Lawn Carp
Sphagnum cuspidatum	-10 to 0	A1: -10 to 0		Lawn Carp Mud
Sphagnum papillosum	-10 to 30	T1: 1 to 15	0 to 40	Hum Lawn Carp Mud
Sphagnum pulchrum	-10 to 10	T1/A1: 0 to 5		Lawn Carp
Sphagnum tenellum	-10 to 30	T1/A1: 0 to 15	0 to 30	Lawn Carp Mud

Localised mean water table depth (mAGL)



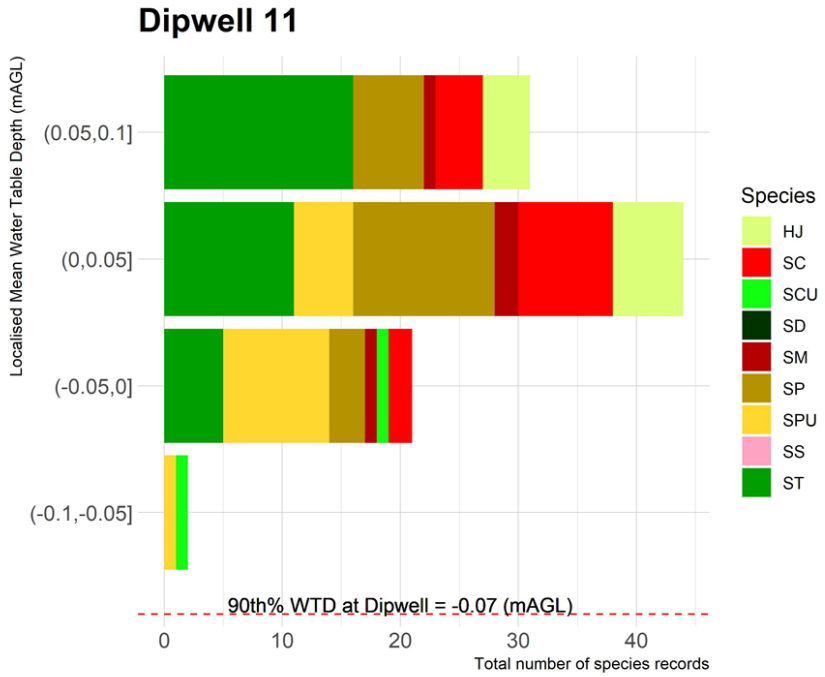
Comparison of species zonation around 2 wells with very similar ecohydrology.

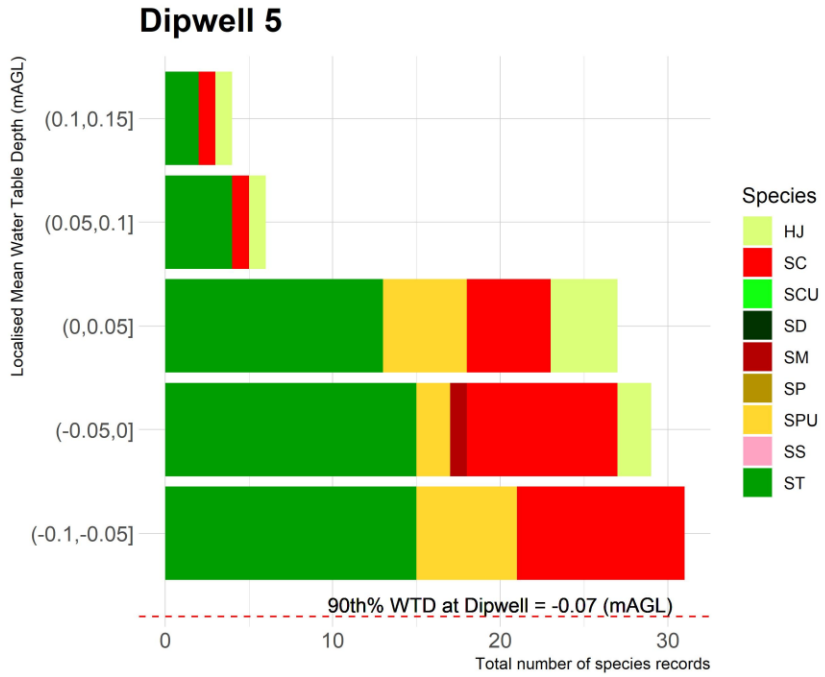
Dipwell 11: Primary surface 4.85 (mAOD), gradient 0.1%.

Cumulative Frequency WTE at 0.1 mBGL:	94%
Sphagnum at sampling sites:	79%
Range WTE:	0.41m
% pass rate of nearest SAC plot (target 60%):	58%

Dipwell 5: Primary surface 5.16 (mAOD), gradient 0.1%.

	96%
	79%
	0.41m
	52%





Comparison of species zonation around 2 wells with different ecohydrology.

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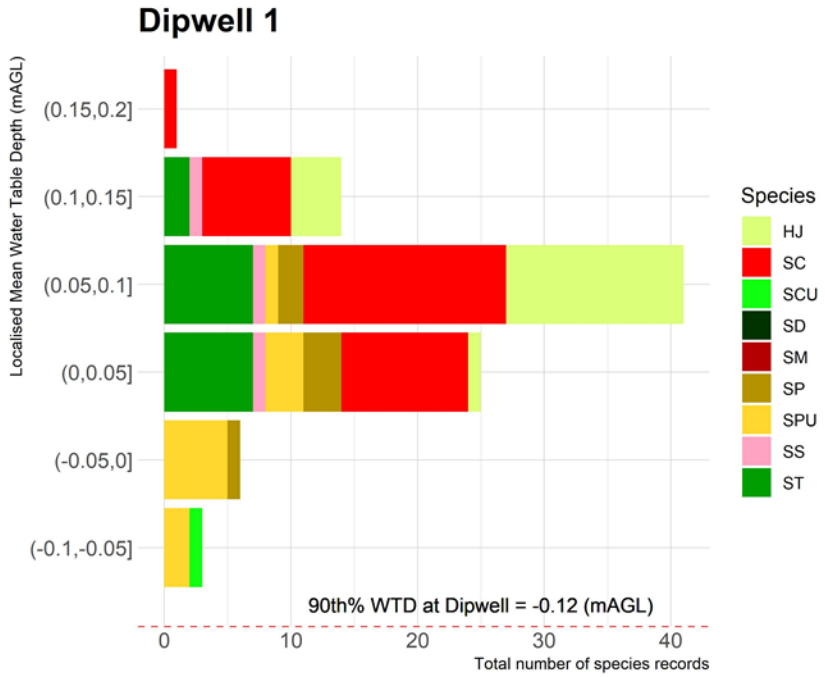
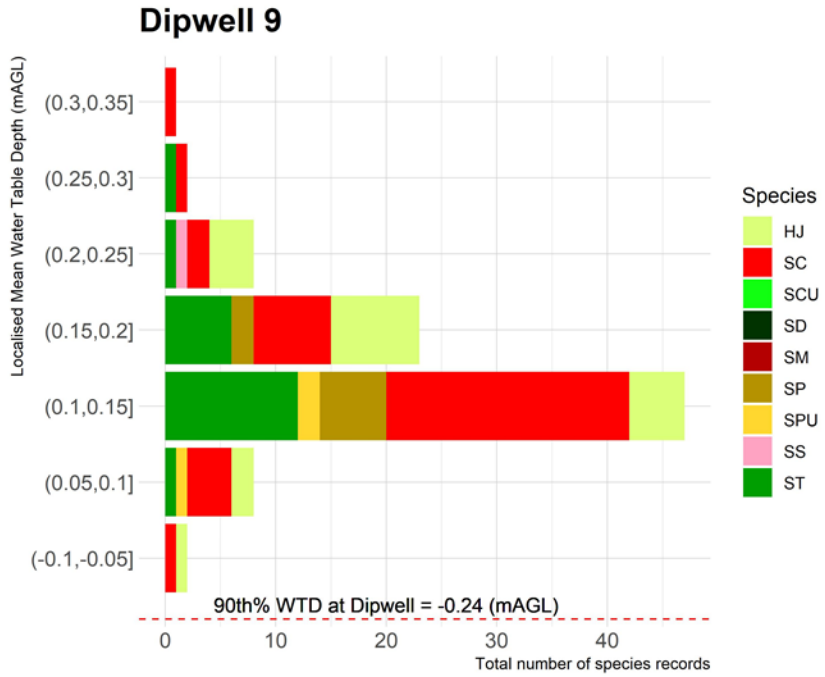
Dipwell 1: Primary surface 5.13 (mAOD), gradient 0.05%.

Cumulative Frequency WTE at 0.1 mBGL:	87%
Sphagnum at sampling sites:	69%
Range WTE:	0.33m
% pass rate of nearest SAC plot (target 60%):	52%

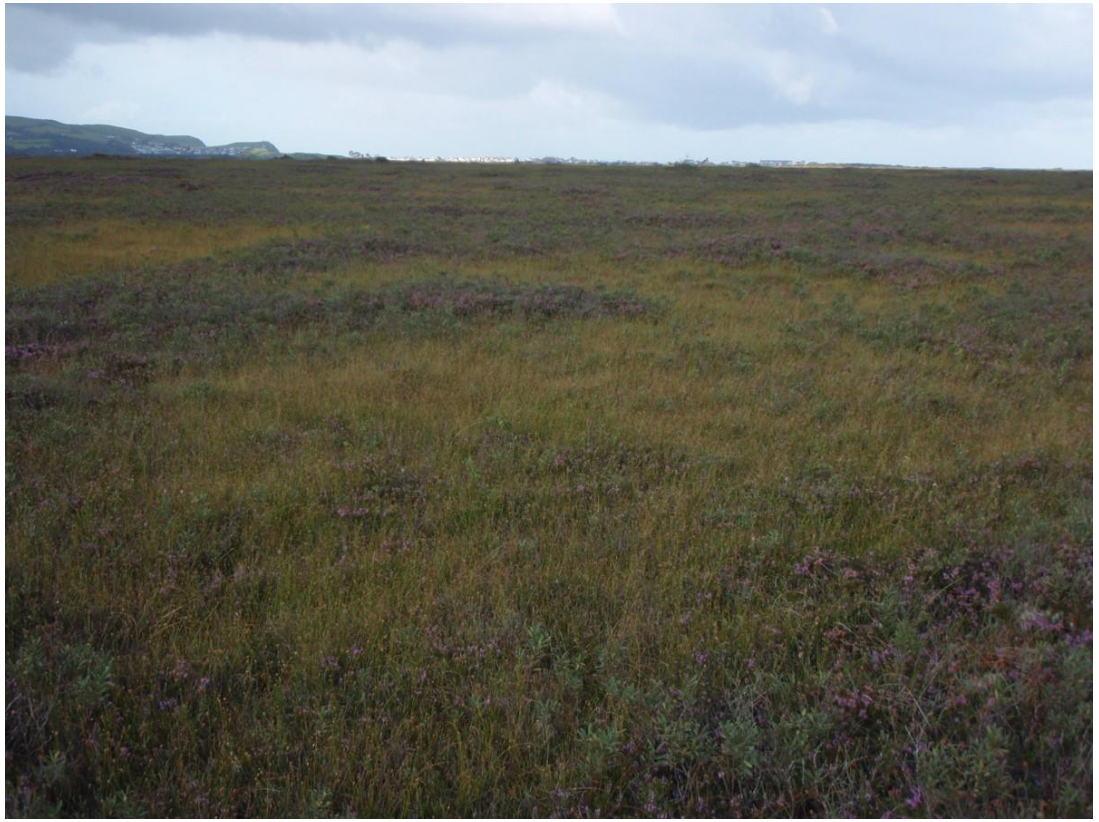
Dipwell 9: Primary surface 3.66 (mAOD), gradient -0.2%.

:	53%
	63%
	0.53m
	8%





Dipwell 1



Dipwell 9

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Comparison of species zonation around 2 wells both in areas of peat cuttings, one with extensive and one with limited restoration

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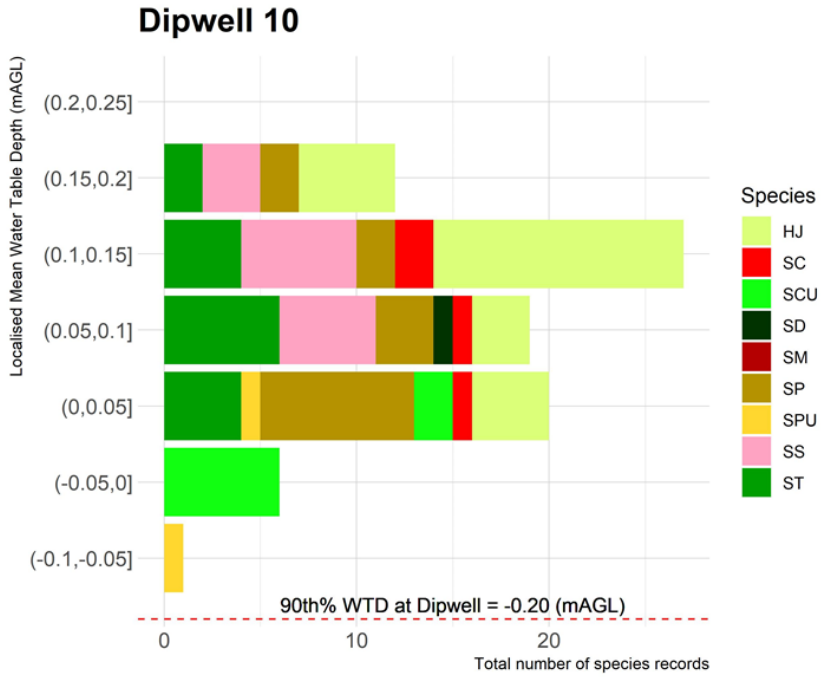
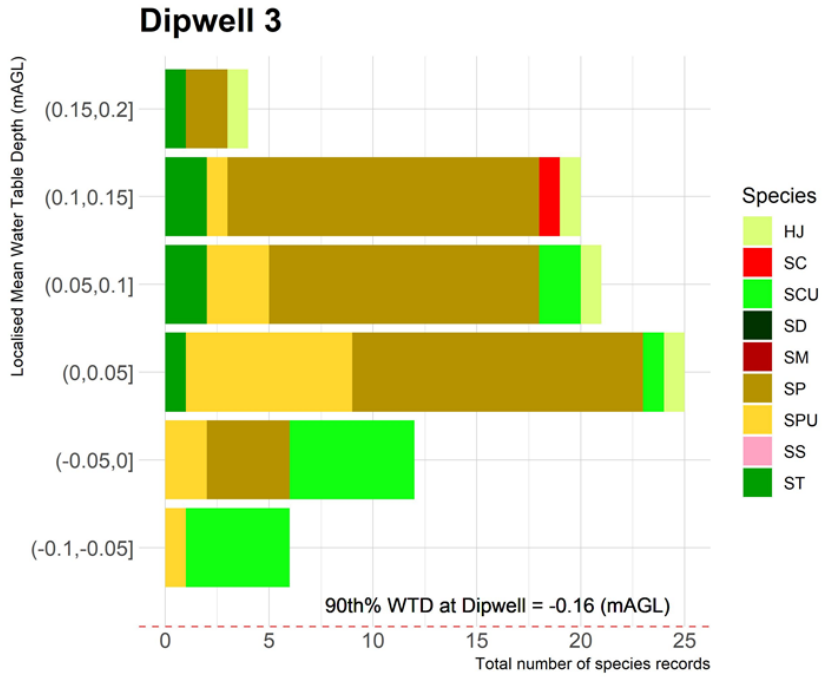
Dipwell 10: On baulk next to cutting 2.51 (mAOD), gradient 0.05%.

Cumulative Frequency WTE at 0.1 mBGL:	47%
Sphagnum at sampling sites:	58%
Range WTE:	0.55m
% pass rate of nearest SAC plot (target 60%):	0%

Dipwell 3: On baulk next to cuttin 3.85 (mAOD), gradient -0.2%.

:	76%
	90%
	0.38m
	40%





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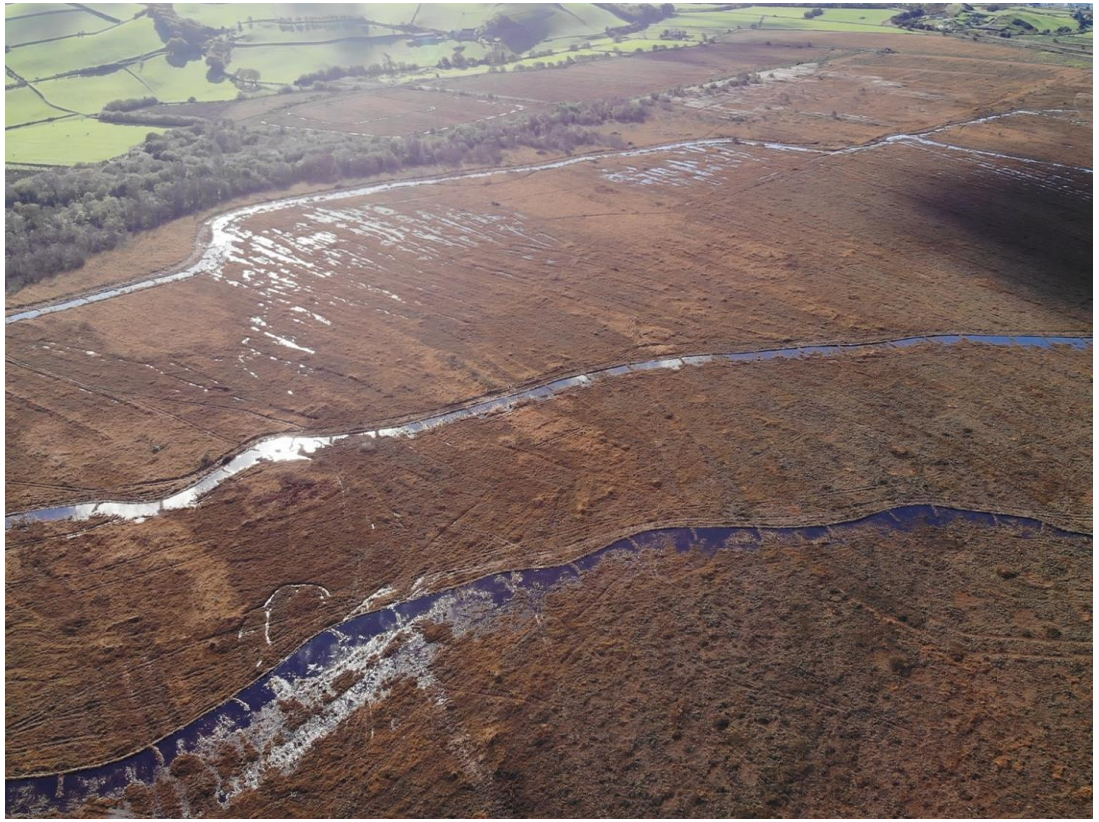
Dipwell 10



Dipwell 3

What might we expect at DW10

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Conclusion and discussion

- On completion of the report the study will provide insight into ecohydrological supporting conditions, vegetation structure and zonation on Cors Fochno.
- For Cors Fochno the report will inform future assessments of WTErSPS, SAC condition monitoring, honing of targets and assessments of management techniques.
- Contribute to understanding of geographical variations in raised bog vegetation structure and water table elevation in the UK.
- Encourage discussion and feedback.

SAC Condition Monitoring 2020

Table 3. Performance Indicators for the active raised bog feature at Cors Fochno SAC (2020)

Performance indicators		**To maintain the active raised bog feature of Cors Fochno SAC in favourable condition the following criteria should be met:**
Extent	**Upper limit**	100% of primary bog surface
	Lower limit	402 ha (*Figure 2*; extent mapped in 2016)
Quality	**Lower limit**	In plots P1-P16 • At least 60% of sample points in each plot are referable to good condition active raised bog **AND** In plots P1, P2, P5 & P6: • At least 15% of sample points in each plot are referable to good condition *Rhynchosporion* (see *Table 3* below).
Site-specific definitions		
Good condition active raised bog		Within each 1m radius sample point, there is: • 25% or more ground cover of characteristic raised bog *Sphagnum* species • Presence of one or more hummock-forming *Sphagnum* species and/or one or both of *Sphagnum cuspidatum* / *S pulchrum* form >20% cover. • *Molinia caerulea* is absent
Characteristic raised bog Sphagnum species		*Sphagnum cuspidatum, S. pulchrum S. tenellum, S. capillifolium, S. papillosum S. medium (magellanicum), S. subnitens, S. austinii, S. beothuk (fuscum), S. molle*
Hummock-forming Sphagnum species		*S. capillifolium, S. papillosum, S. medium (magellanicum), S. austinii, S. beothuk (fuscum).*

Table 5. Attributes recorded at each sample point (active raised bog and *Rhynchosporion*)

Attribute	**Included in PIs or extra information**	**How attribute was recorded**
Cover of raised bog *Sphagna (Sphagnum cuspidatum, S. pulchrum S. tenellum, S. capillifolium, S. papillosum S. medium, S. subnitens, S. austinii, S. beothuk, S. molle)*	Included in PIs	Pass: >25% Fail: <25%
Presence of one or more hummock-forming *Sphagna: S. capillifolium, S. papillosum, S. medium, S. austinii, S. beothuk.*	Included in PIs	Pass: dominant species noted Fail: None of the required species present
Presence of *Molinia caerulea*	Included in PIs	Pass: absent Fail: present
Cover of *S. pulchrum* and/or *S. cuspidatum*	Included in PIs	Pass: >20% Fail: <20% Species respsonsible for pass noted. Presence of either species recorded.
Presence of *Rhynchospora alba*	Included in PIs	Pass: abundant (see *Table 2* for an explanation of abundance) Fail: less abundant Fail: absent
Presence of *Drosera anglica*	Included in PIs	Pass: present Fail: absent
Presence of *Tricophorum cespitosum*	Included in PIs	Pass: absent Fail: present
Presence of pool *Sphagna*	Extra information	Pass: *S. pulchrum* Pass: *S. cuspidatum* Fail: Neither of the above species present
Note	Extra information	Presence of *Hypnum jutlandicum*. Any other prominent species, height of vegetation, presence of other features (e.g. ditches), and any other information considered relevant.

* If any *S. beothuk* was found, this was recorded as 'Pass: *S. beothuk*'; likewise *S. austinii*