



Recording the past:

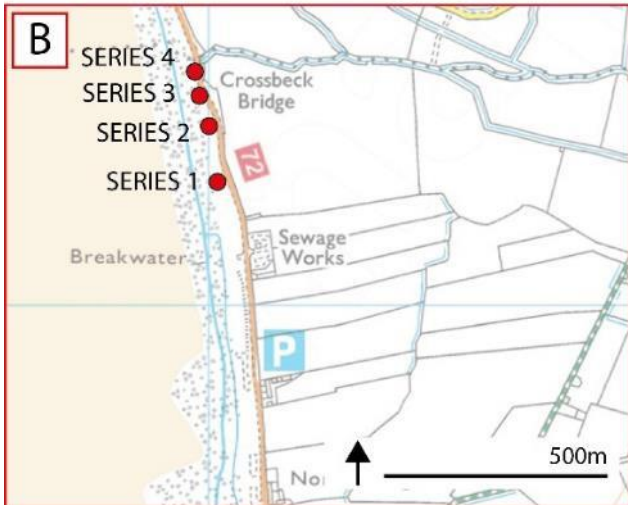
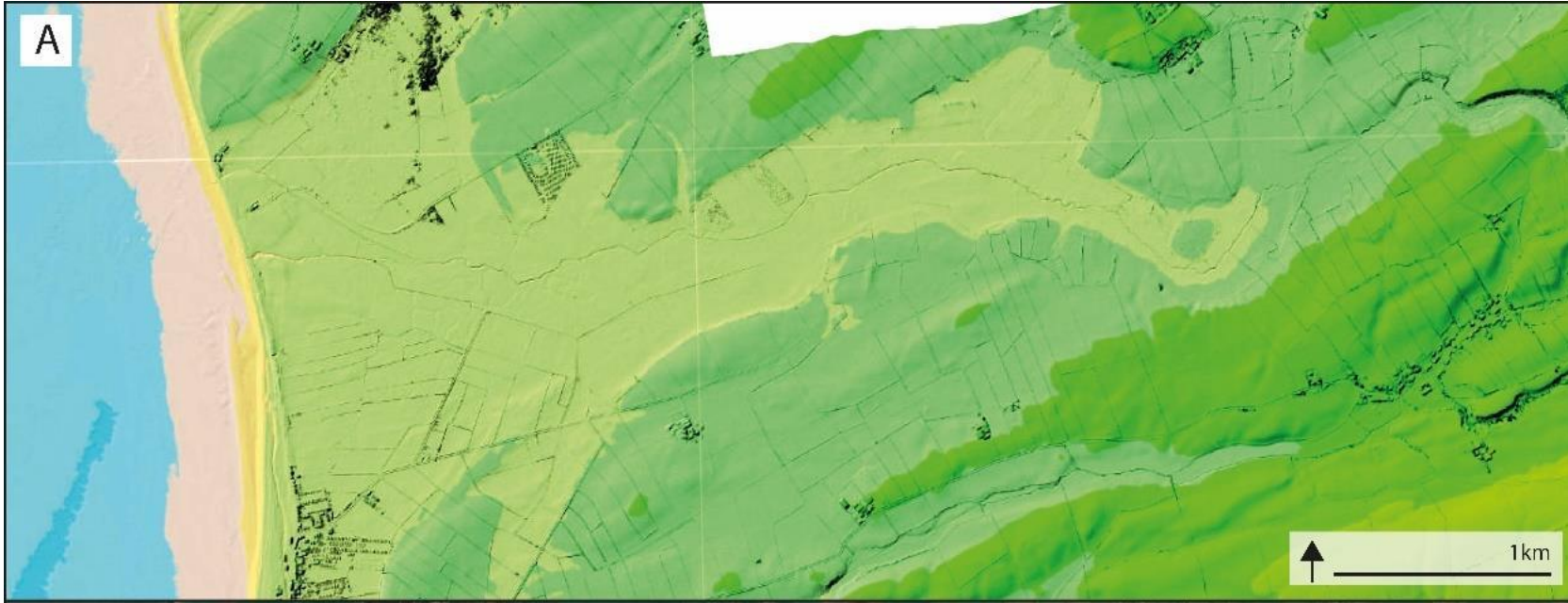
Insights into the palaeo-ecology of Black Dub, Allonby, during the early Romano-British period.

.... with a focus on: the recording methods and the taxa recorded.

Thomas Garner



Location and site description.



Map of the broader study area with series (log)/sampling locations (inset; B). Image adapted from Digimap (2021) (© Crown Copyright and Database Right (2021) Ordnance Survey (Digimap Licence))./ The broader study area: A. LIDAR (DSM 1m) of the study area with false colour elevation. Image adapted from lidarfinder.com (© Environment Agency Copyright and/or Database Right (2019)).



New exposures

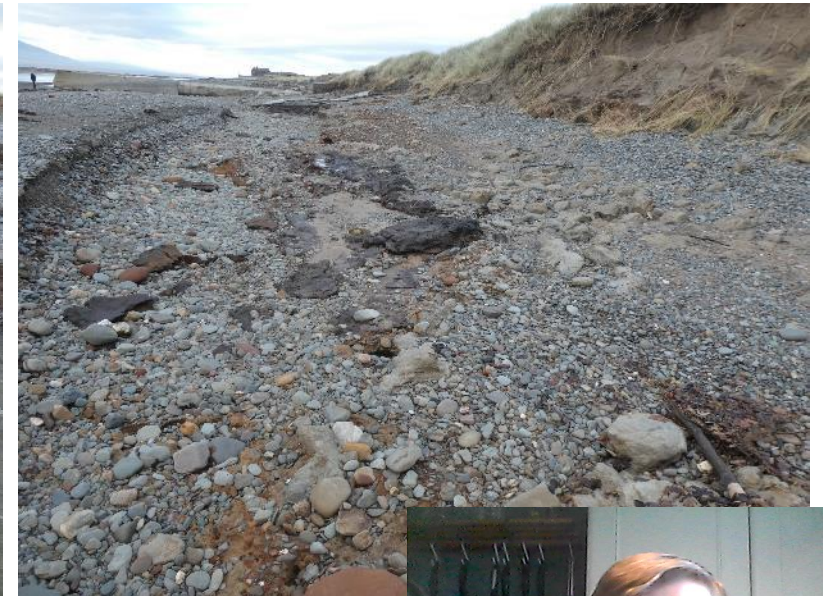
- The migration of a shingle bar northwards constrained the flow of Allonby Beck, parallel to the coastline.
- This resulted in the erosion of the backing beach and dunes, exacerbated by high tides, winter storms and high-water events.



31st August 2020



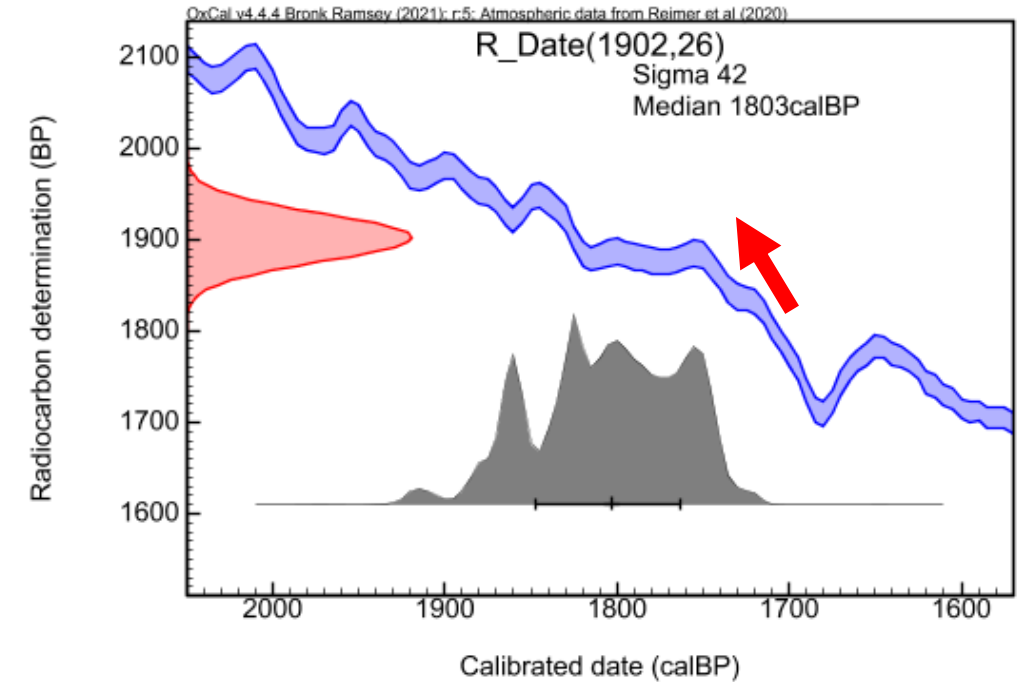
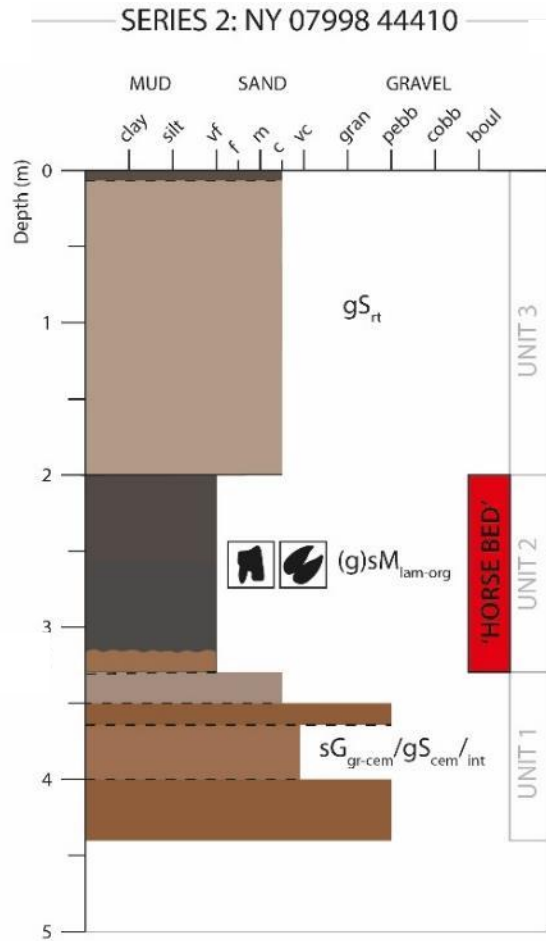
13th September 2020



16th December
2021

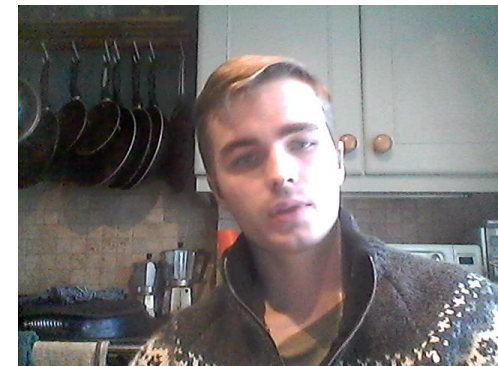


Sedimentology, stratigraphy and dating.

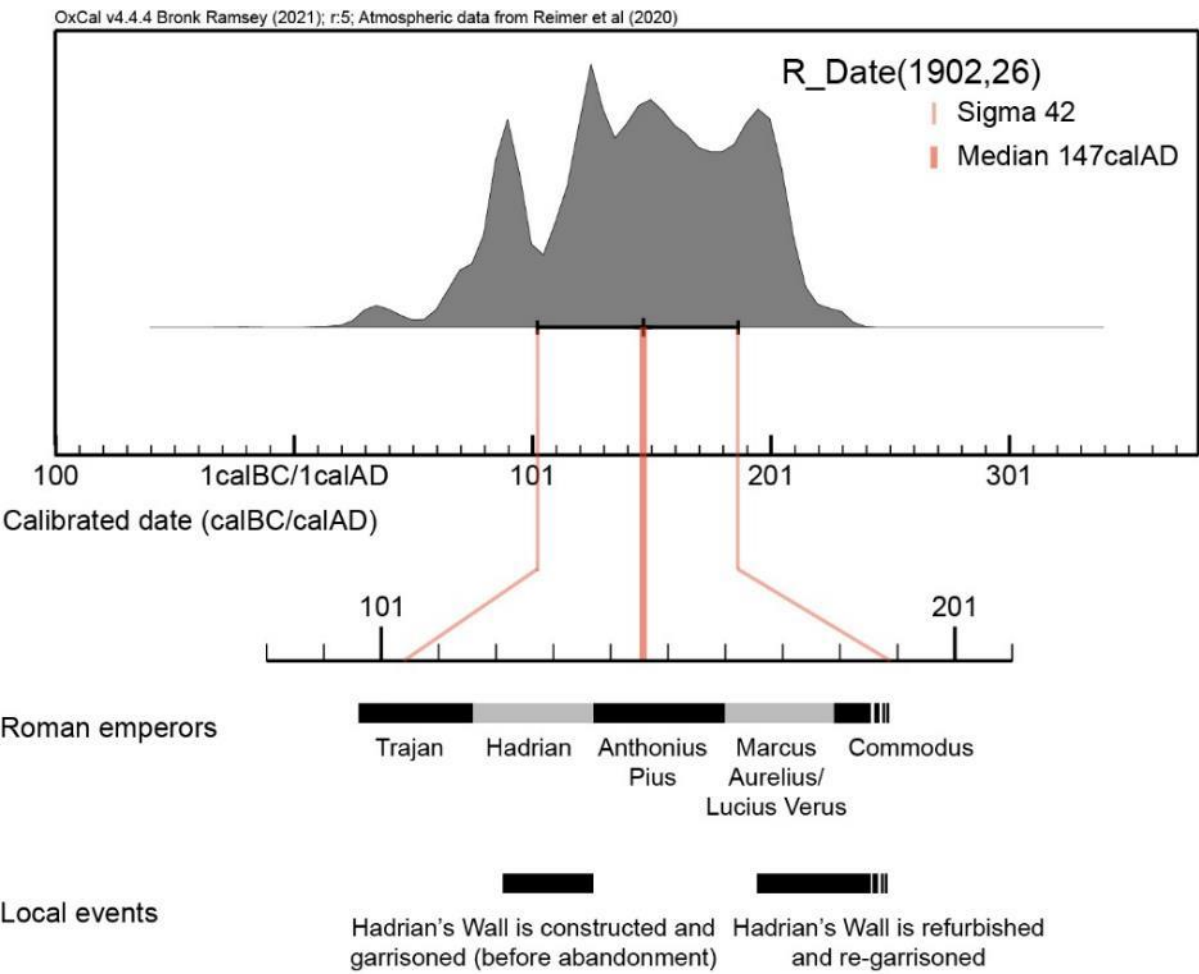


^ Sedimentary log from a representative sediment profile.

^ AMS radiocarbon date plot:
produced using OxCal (Reimer
et al., 2020).



Humans on the landscape



^ Calibrated AMS radiocarbon dates (IntCal20) in cal. BC/AD and reference to Roman emperors and local events (residence of Hadrian's wall and associated milefortlets).

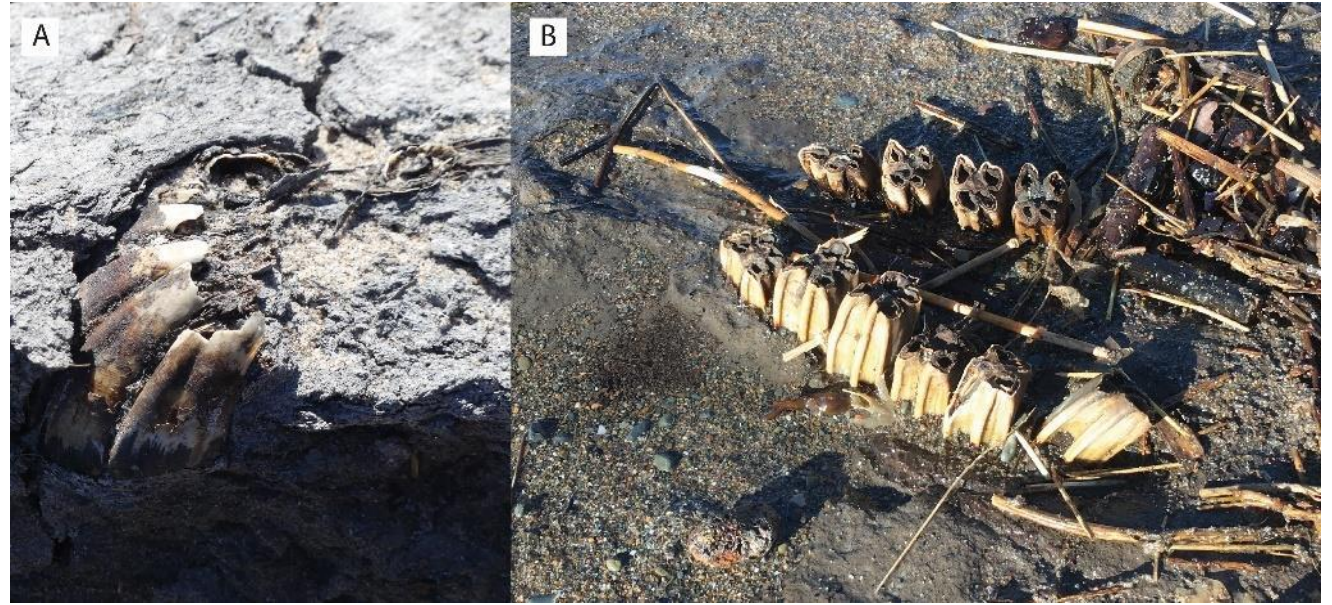


^ Milefortlet 21.



Horse (*Equus ferus*)

- The organic-rich sands yielded a set of Horse (*Equus ferus*) teeth found on the 22nd February/10th April 2021
- A near complete set of permanent upper teeth (missing all but an m³) were found *in situ*.
- Little skull remains were preserved with the surrounding the incisors (i¹⁻³).



^ Horse teeth *in situ*: A: incisors, B: molars and premolars imbedded in sediment surrounded by modern debris.

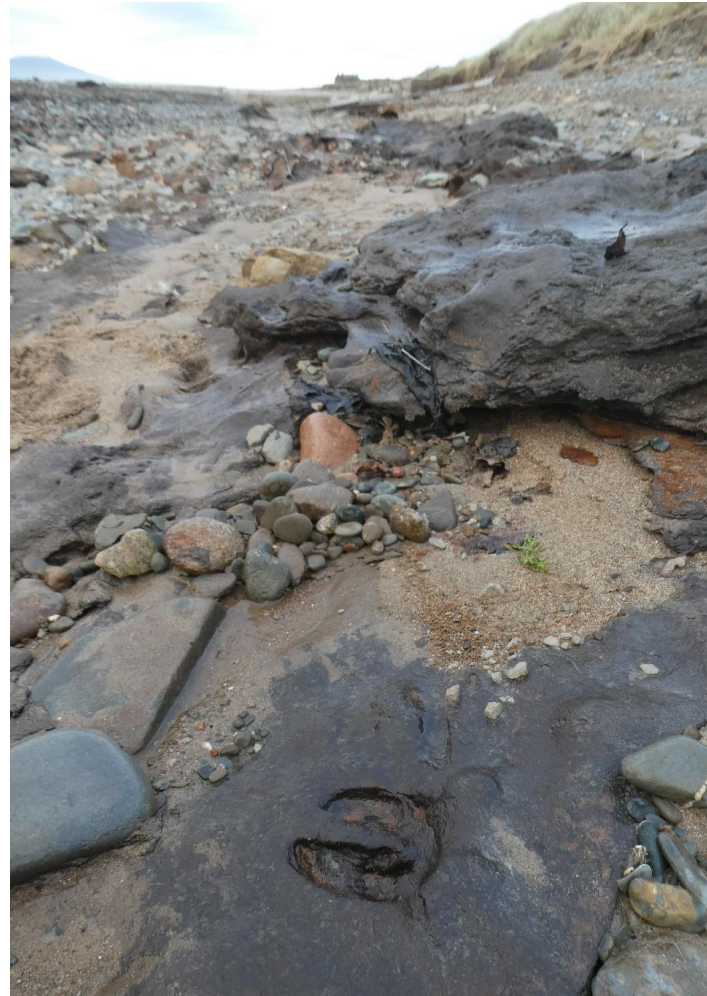


^ Horse teeth: detail of a cleaned molar/pre-molar (left) and incisor (right).



Vertebrate footprints.

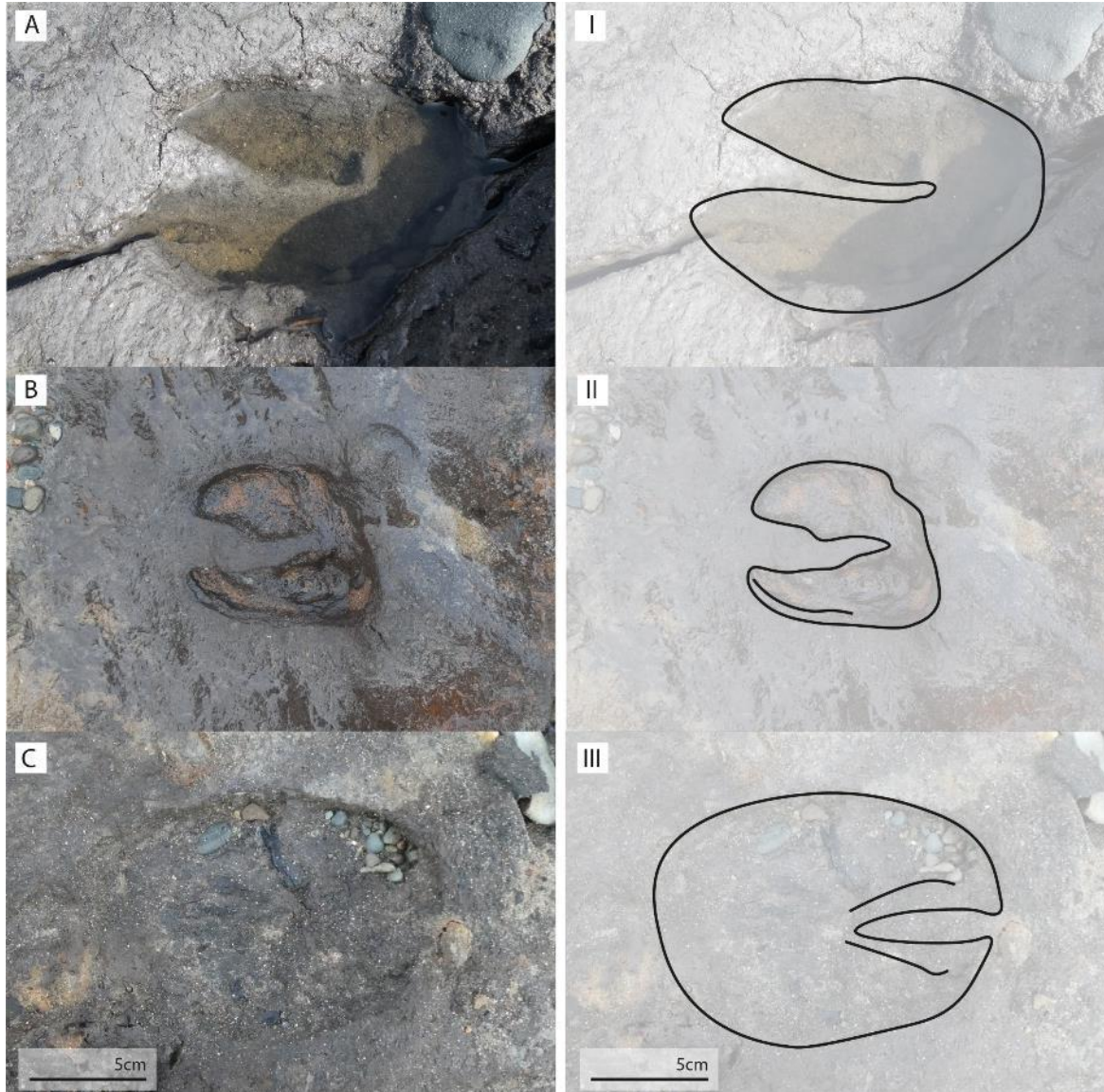
- On the interfaces between sediment beds, vertebrate footprints were found.
- Tracks were ephemeral, often only being newly exposed after high tides and heavy rainfall, and only individual tracks were found, opposed to full trackways, due to the small areas exposed.



< A footprint from a young bovid in laminated peat deposits at the Cross Beck outfall (NY 07961 44524) looking towards Dubmill Point.



Domestic Cattle (*Bos taurus*)



Plaster casting footprints/slots



^ Footprint B (plaster cast).

<. Footprints A-C, with interpretation (I-III),
from series 2, unit 2 (A) and series 4, unit 2
(B-C) respectively.



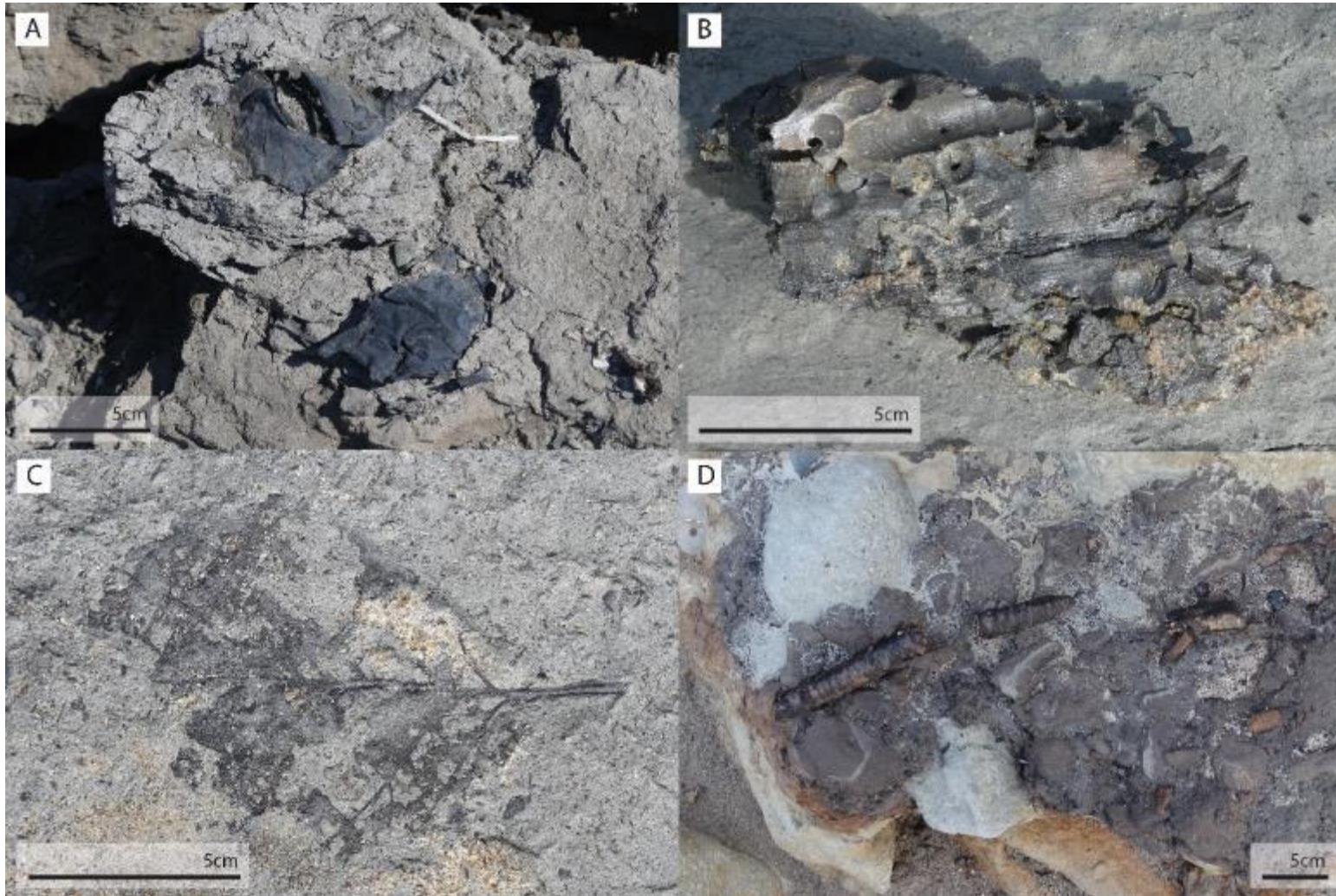
Red Deer (*Cervus elaphus*) and others



< Footprints A-D, with interpretation (I-IV), from the top interface of series 3, bed 2.



Large macrofossils/ megafossils



- Twigs with bark of tree birch (*Betula pendula/pubescens*)
- Fruits of Common Hazel (*Corylus avellana*)
- Leaves of Oak (*Quercus robur/petraea*)
- Leaves of Alder (*Alnus glutinosa*)
- Unidentified wood extensively bored by Common Piddock (*Pholas dactylus*).
- Egg-cases of Thornback Ray (*Raja clavata*)

^ Some *in situ* macrofossils, or megafossils: A: *Raja clavata* egg cases; B: fragment of wood with borings by *Pholas dactylus*; C: *Alnus glutinosa* leaf and D: *Betula pendula/pubescens* large twig with bark.



Macrofossil analysis



Collection >

wet sieving (125micron) > picking >



wet photography >

drying > mounting >

dry photography > identification



Preservation and identification.

Poor



Rolled *Potamogeton* sp.

High



Carex strigosa nut with
utricle (dissected)



Left: unknown.



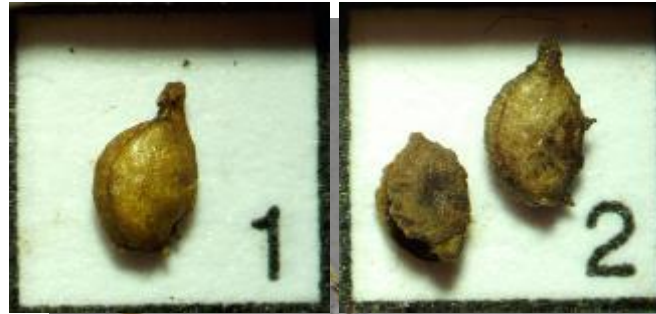
Persicaria hydropiper nut
with perianth remnant

Identification through:

- Online photo repositories (e.g., <https://dpa.web.rug.nl/repository>)
- Plant macrofossil academic literature (e.g., DOI: [10.1016/B978-0-444-53643-3.00203-X](https://doi.org/10.1016/B978-0-444-53643-3.00203-X))
- Modern botanical guides (e.g., BSBI Handbooks)
- Physical reference collections (e.g., Royal Holloway, UofL)
- Consultation with experts (e.g., Hilary Birks)



Pondweeds (*Potamogeton* undiff.) including **Hairlike Pondweed** (*Potamogeton trichoides*)



Bog Pondweed at the base of Carrock Fell.



White Water-Lily (*Nymphaea alba*)



White Water-Lily at Drumburgh Moss NNR.



Rush (*Juncus undiff.*)



Soft Rush at Caldbeck Common.



Sedges (*Carex* undiff.) including **Thin-Spiked Wood Sedge (*Carex strigosa*)**



White Beak-Sedge at Glasson Moss NNR.



Buttercups (*Ranunculus* undiff.) including **Water-Crowfoot** (*Ranunculus aquatilis/peltatus*) and **Meadow Buttercup** (*Ranunculus acris*)



Buttercup sp. near Wigton; Water-Crowfoot sp. at Smardale.



Pinks (*Caryophyllaceae* undiff.) including **Ragged Robin** (*Lychnis flos-cuculi*)



Ragged Robin at Eycott Hill.



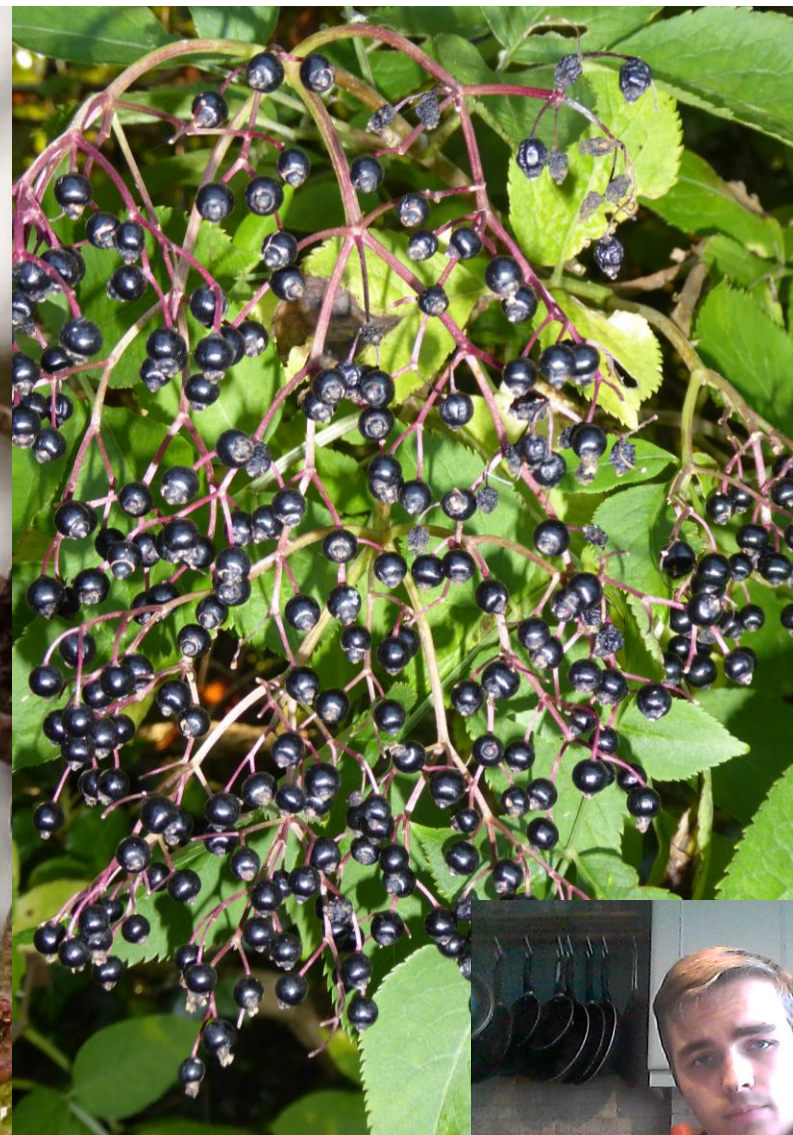
Bramble (*Rubus fruticosus* agg.)



Bramble at Drumburgh Moss NNR.



Common Alder (*Alnus glutinosa*) and Common Elder (*Sambucus nigra*)



Common Alder at Chobham Common, Surrey; Common Elder nr Wigton



Macrofossil analysis: further plant seeds.



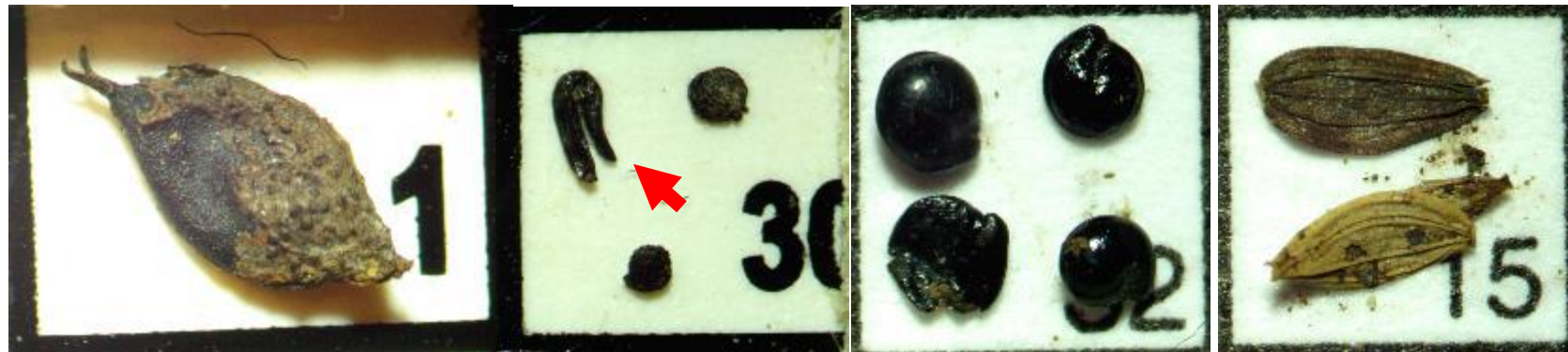
Lesser Marshwort
(*Apium inundatum*)

Red/Sheep Sorrel
(*Rumex acetosella*)

Orache sp.
(*Atriplex* sp.)

Hedgeparsely sp.
(*Torilis*)

Water-Milfoil sp.
(*Myriophyllum*)



Common Water-Pepper
(*Persicaria hydropiper*)

Water Plantain
(*Alismataceae*)

Fat Hen
(*Chenopodium*
cf. *album*)

Prickly Sow-
Thistle (*Sonchus*
asper)

Stonewort
(*Charaphyta*)



Charcoal and charred **Heather** (*Calluna vulgaris*)



Heather on Foulshaw Moss; 2020 fire damage on Chobham Common, Surrey.

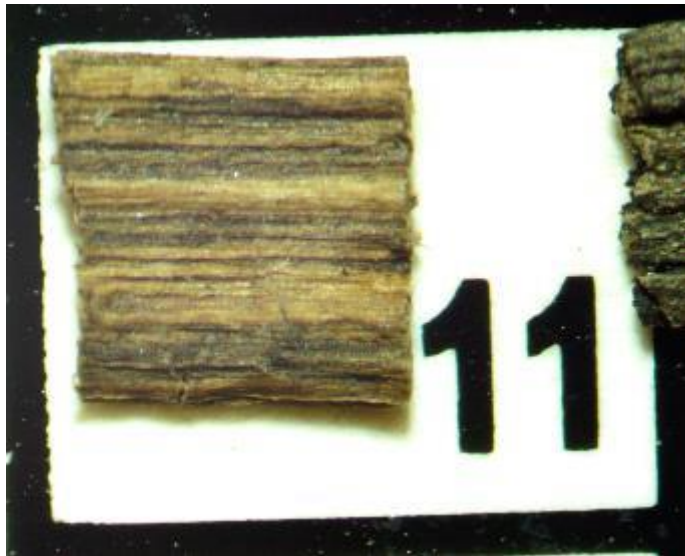
Mosses (*Bryophyta*) including Broom Fork-Moss (*Dicranum scoparium*) & Haircap Moss (*Polytrichum*)



An attractive assemblage of bryophytes below Crinkle Crag.



Stem fragments and **Common Reed** (*Phragmites australis*)



Common Reed at Crymlyn Burrows, Glamorgan.



Macrofossil analysis: non-marine invertebrates.



Caddisfly (*Leptoceridae*
or *Lepidostoma*)



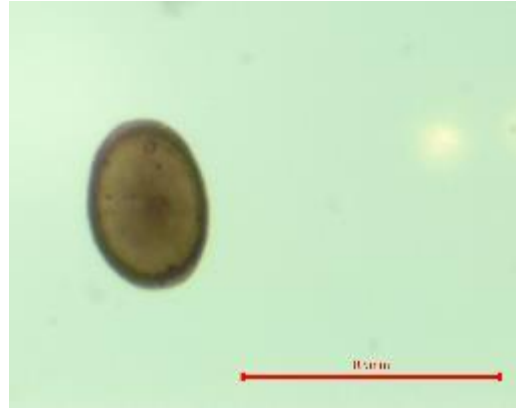
Coleoptera (undiff.)



A reed beetle
(*Plateumaris discolor*)



Non-biting midge
(*Chironomidae*)



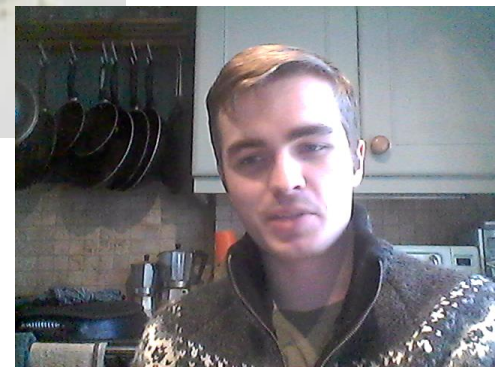
Freshwater bryozoan
(*Plumatella*)



Soil mite (*Oribatitda*)



Water flea
(*Daphnia*)



Macrofossil analysis: dung beetle focus



Spring Dor Beetle (*Trypocopris vernalis*)

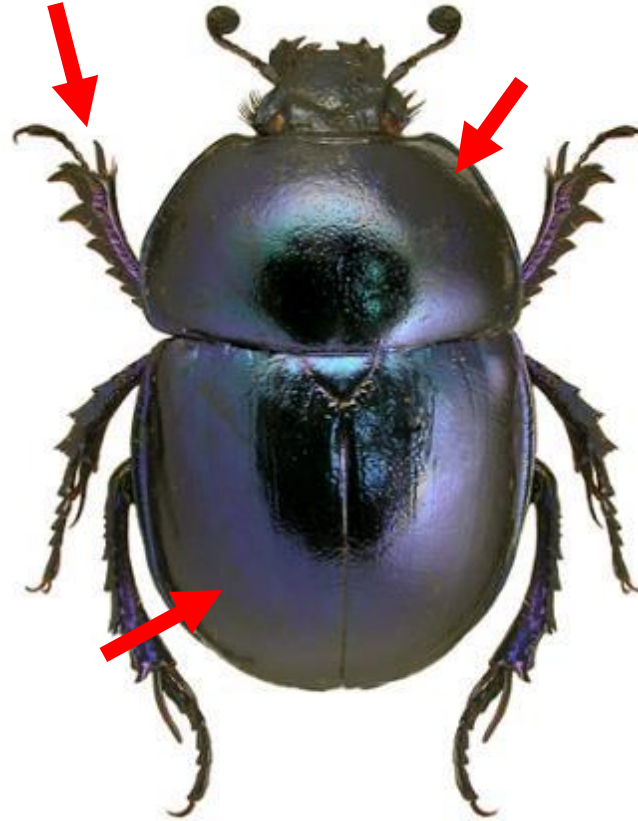
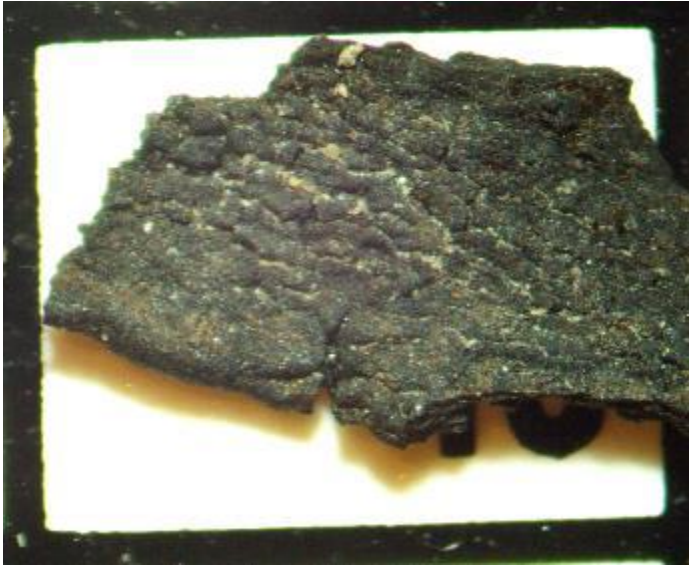


Photo from UK beetle recording
(<https://www.coleoptera.org.uk/species/trypocopris-vernalis>)



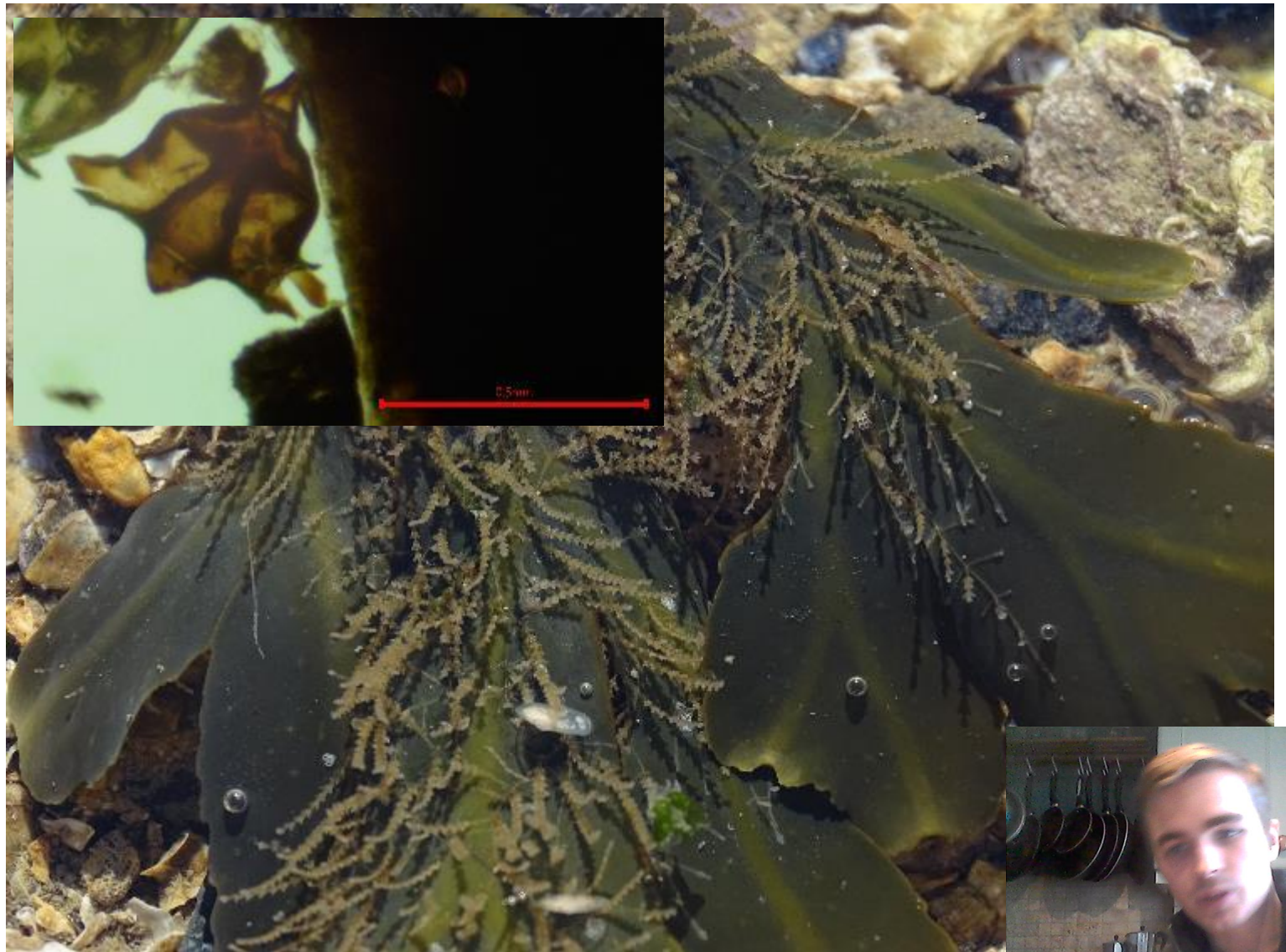
A marine influence: brown seaweed (*Phaeophyceae*) and Sea Oak (*Halidrys siliquosa*)



Sea oak stranded at Dubmill Point.



Sea Oak (*Dynamena pumila*) and Air Fern (*Sertularia argentea/cupressinia*)



Sea oak at Bracelet Bay, Glamorgan.

Reconstructing the past: taphonomy and biases

Taphonomic biases



< Modern rafted material from Allonby Beck:
suspended rafted material;
rafted material deposited
during a high-water event
onto a sediment surface

Preservation biases: **Where are all the snails?**



< Modern Ram's Horn snail (*Planorbis planorbis*)
from Allonby Beck and hermit crab within a whelk
shell off Dubmill Point.



1803 cal. BP/147 cal. AD ± 42 (1 σ)

< An artistic rendering of the reconstructed environment and ecology, derived from macrofossil analysis.

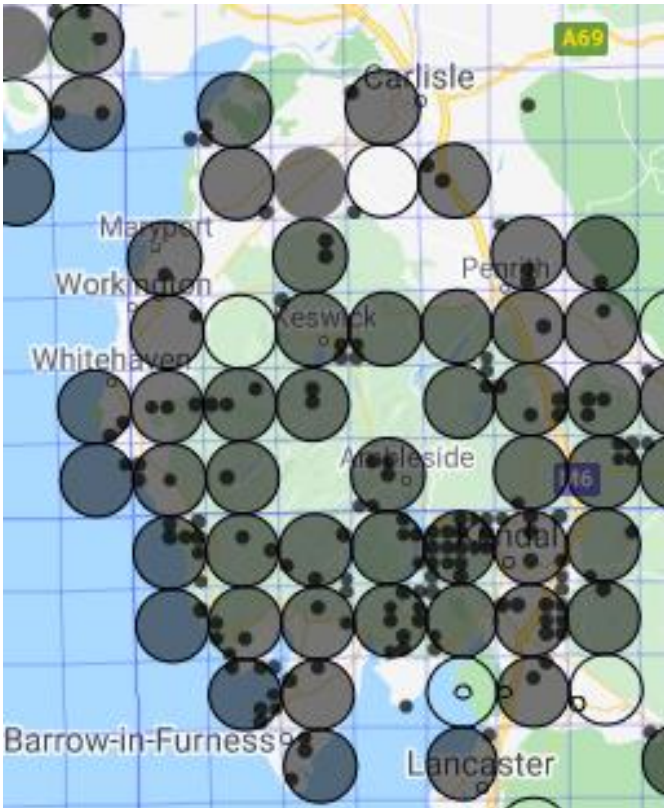


Distribution changes I

White Waterlily
(Nymphaea alba)



Lesser Marshwort
(Apium inundatum)



Ragged Robin
(Lychnis flos-cuculi)



- 2020 onwar
- 2010 - 2019
- 2000 - 2009
- 1987 - 1999
- 1970 - 1986
- 1950 - 1969
- 1930 - 1949
- pre-1930

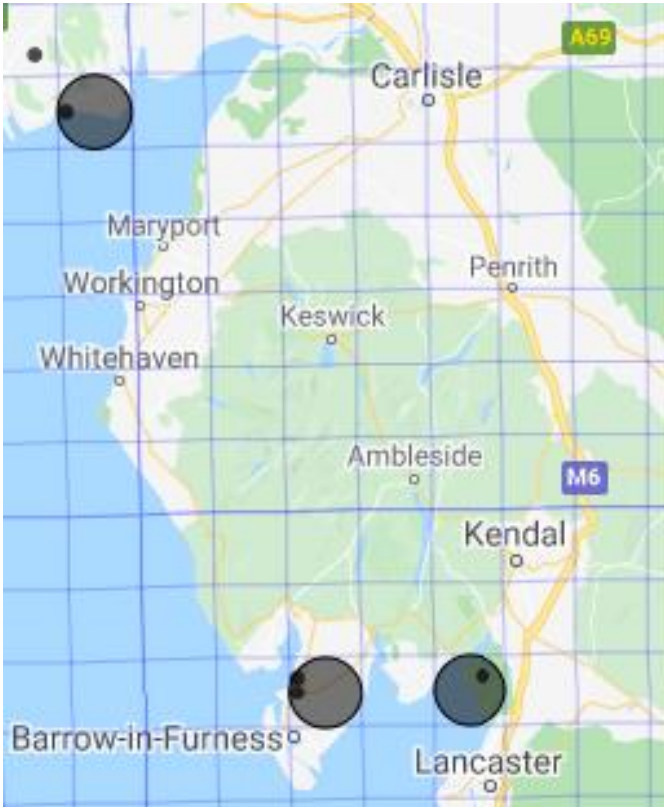


Distribution changes II

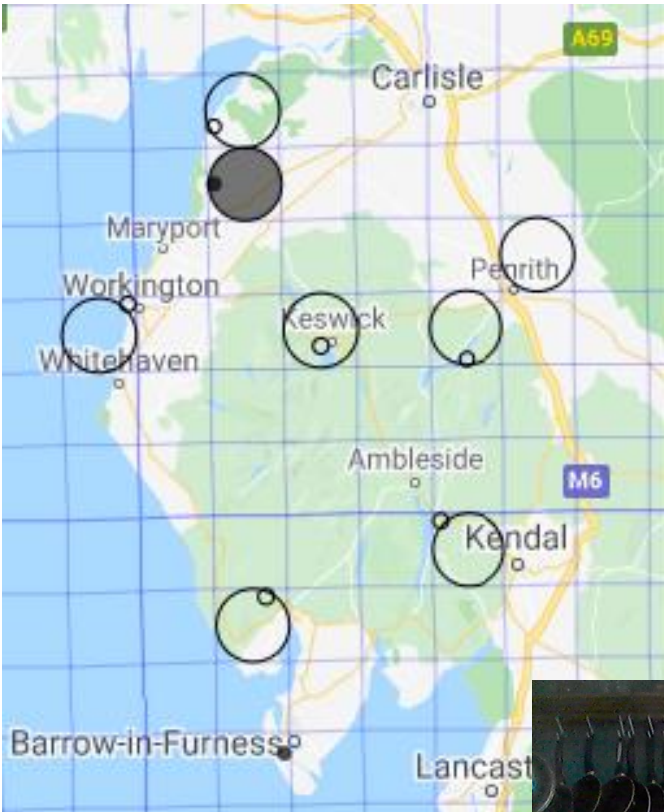
Hairlike Pondweed
(Potamogeton trichoides)



Thin-Spiked Wood Sedge
(Carex strigosa)



Small-Flowered Catchfly
(Silene gallica)



- 2020 onwar
- 2010 - 2019
- 2000 - 2009
- 1987 - 1999
- 1970 - 1986
- 1950 - 1969
- 1930 - 1949
- pre-1930



Summary



Plant and invertebrate macrofossils

Vertebrate footprints

Vertebrate remains



Vegetation and wider ecological change

Restoration aims

Future work.



30th October 2021



Redirection of Allonby Beck:
December 2021



22nd January 2022

- Further identification and refinement of taxonomic precision.
- Further sieving of previously collected sediment for macrofossil analysis.
- Continue to write up the project with potential for publication.



Thank you for listening.

Academic acknowledgements

- Dr Danielle Schreve: *for assisting in the identification of vertebrate remains/footprints and advising on radiocarbon dating.*
- Dr Carl Sayer, Dr Richard Walton, Dr Hilary Birks: *for assisting in the identification of plant macrofossil remains.*

