

Waves of Colonization and the Sea of Moyle: Linking population history, resilience and landscape change of island communities.

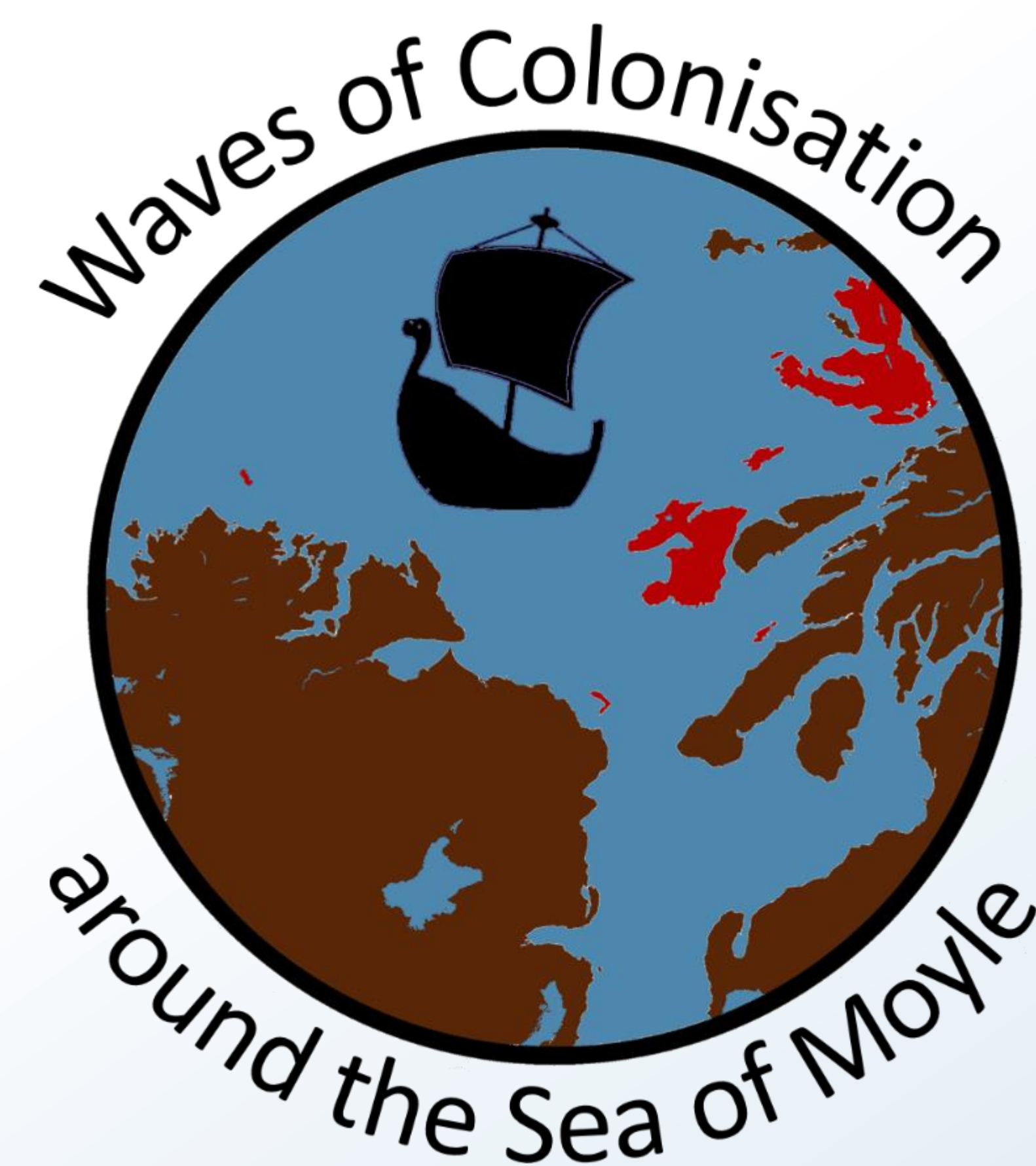
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Tory Island Fieldwork (Phase 1)
29th August-7th September 2019

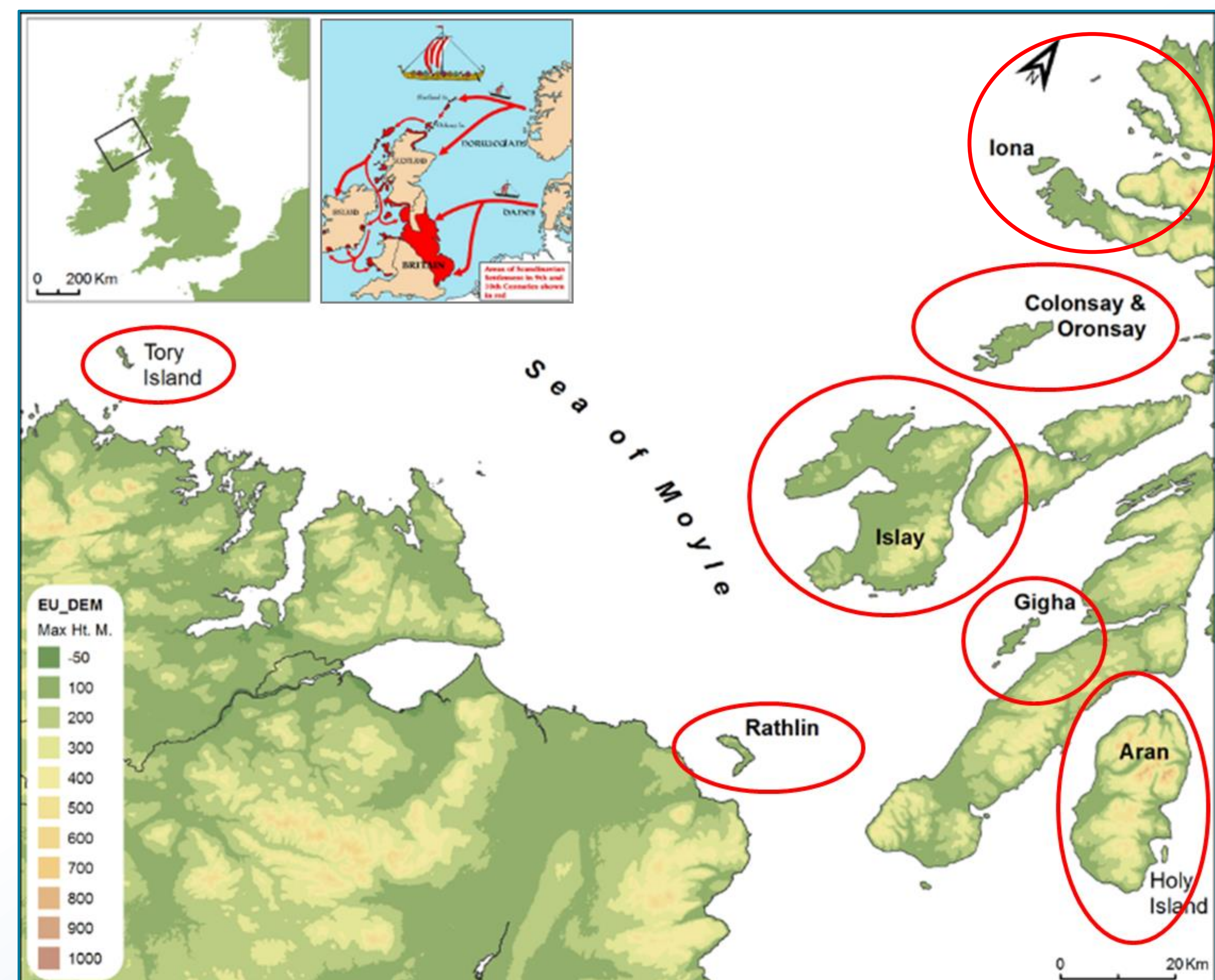


Dixon 1887-1970

STUDY AIMS

- Small islands present the opportunity to study the **sustainability and resilience of complex socioecological systems over time**. This project is investigating the changing landscapes, environment and population of 6-7 islands around the Sea of Moyle over the last 3,000 years.
- Today area is seen as a remote border zone between Scotland and Ireland. In the past this was not the case, and the Sea of Moyle was at times a **coherent and central geographic region** crossed by sea voyagers and linked by culture and kinship. The islands (Rathlin, Tory, Arran, Islay, Gigha & Colonsay) all saw the establishment of **early Christian communities**, were within the **Dál Riata** over-Kingdom in the 6th to early 7thC, were subject to early **Viking Raids** and then formed part of the Scandinavian Suðreyjar, or "Southern Isles".
- The later Medieval and post Medieval history of the islands is more complex and **divergent** but all six islands saw major, if not remarkable changes in population over the last 300 years.
- The project will be the first to explicitly compare archaeological proxies from islands in the same region with archaeological and historical data using new techniques (**sedaDNA and lipid biomarkers**) in a controlled archaeological setting.

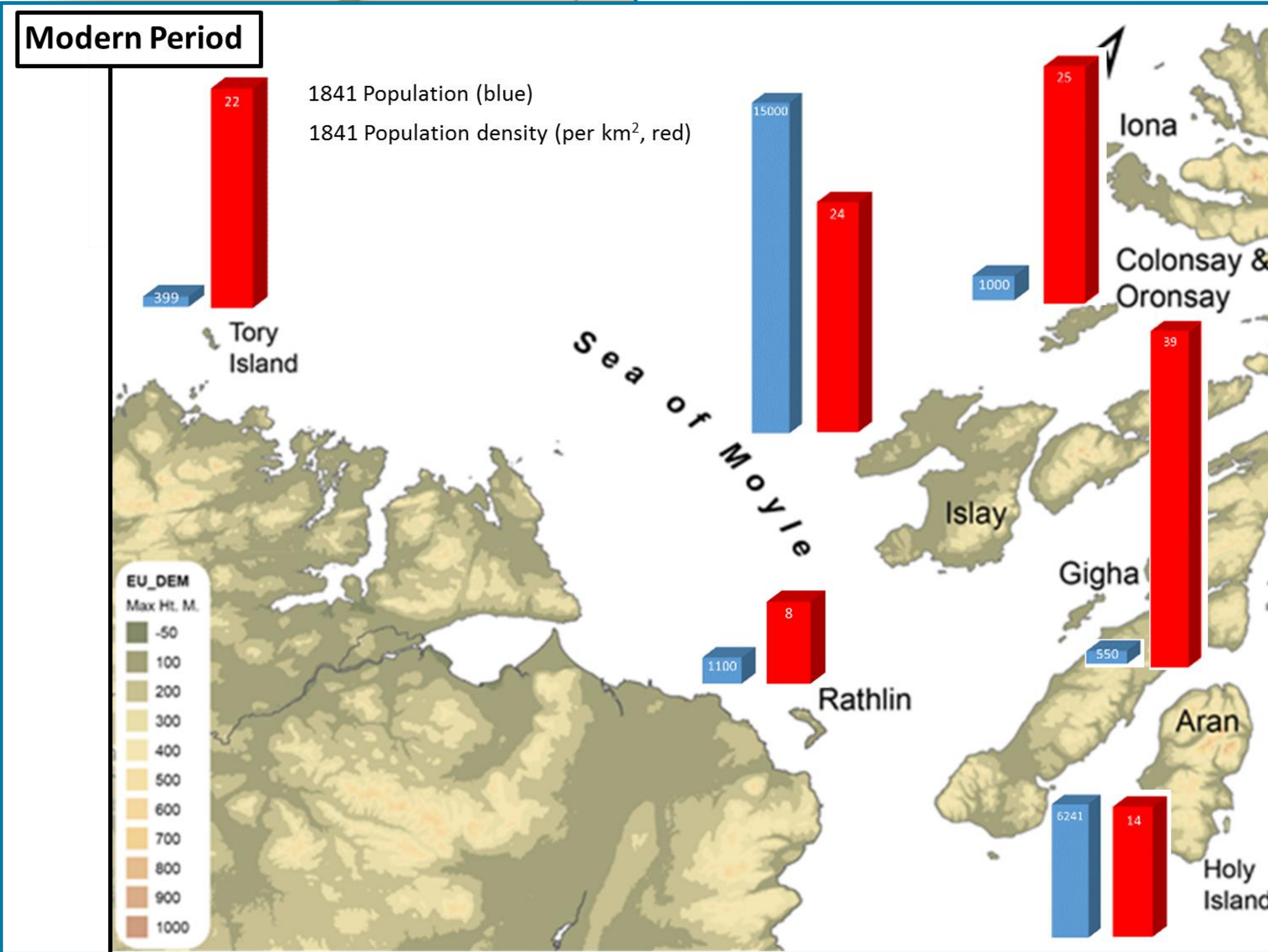
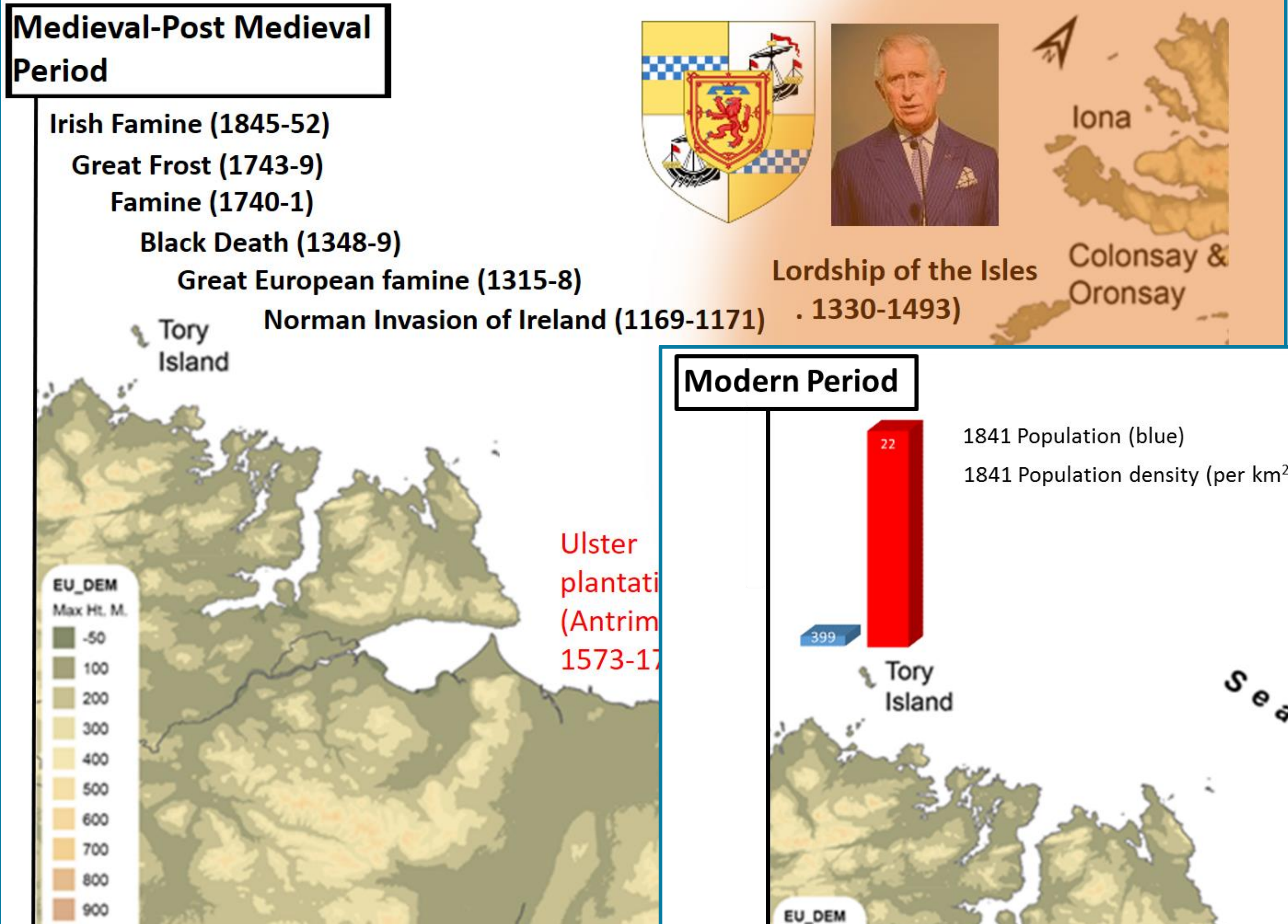
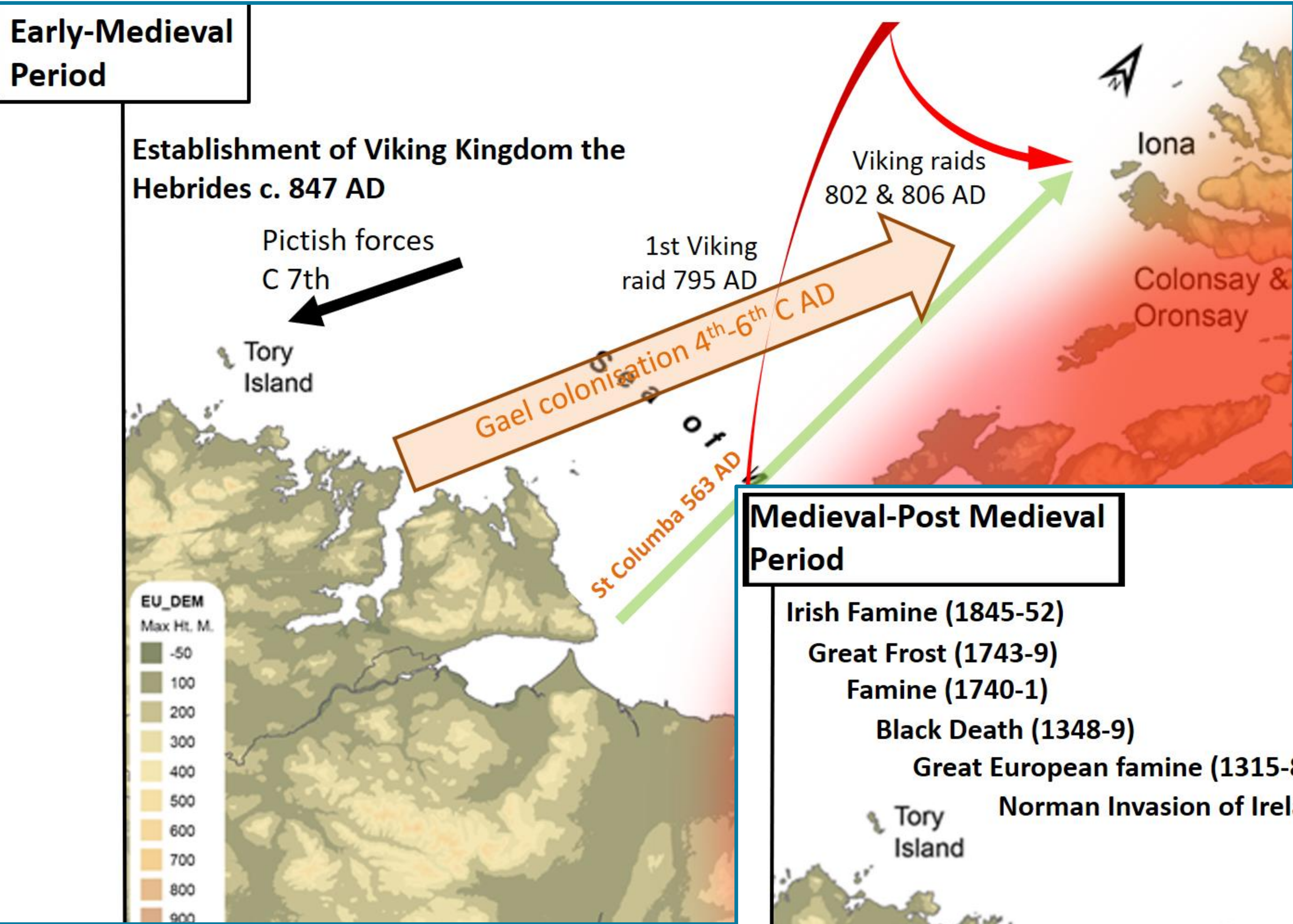
THE ISLANDS



1. Tory Island/Oileán Thoraí
2. Rathlin/Oileán Reachlainn
3. Gigha/Giogha
4. Islay/Eilean Ìle
5. Colonsay/Colbhasa
6. Iona & Mull/Iona & Mhuile
7. Aran/Eilean Arainn

A COMMON PAST: WAVES OF COLONISATION

From the Early Medieval Period (c. 1600 BP) to the 19th Century the area has seen invasions, immigration (forced and unforced), emigration, famines – all resulting in large population fluctuations. The area shaded red in the Early-Medieval period is the Scandinavian Kingdom established in the Southern Hebrides-Isle of Man region in the 9th Century AD.



ENVIRONMENTAL TRAJECTORIES: ARCHAEOLOGY AND PROXIES



Tory Island



Tory Island



Islay

The Archaeology

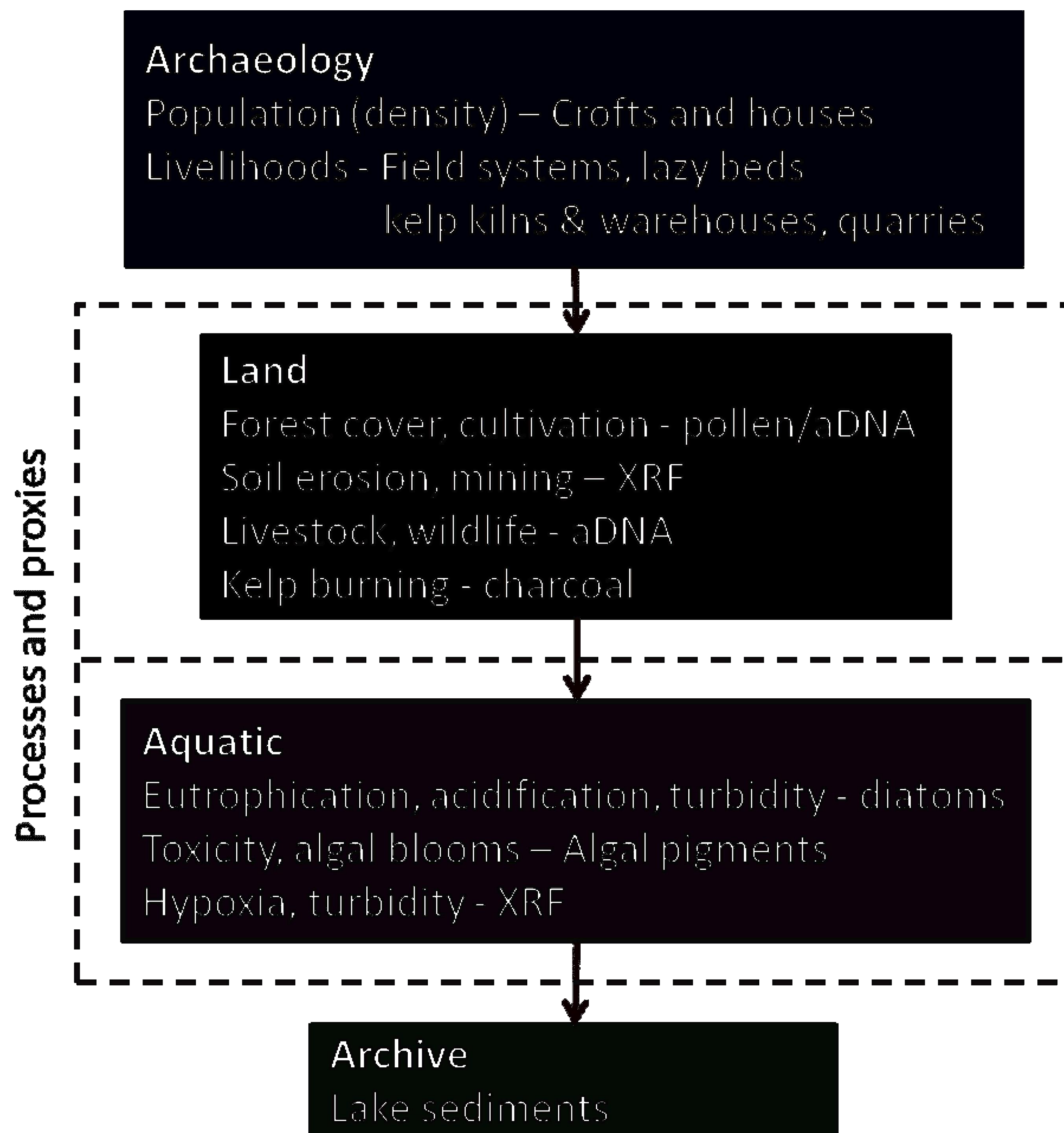
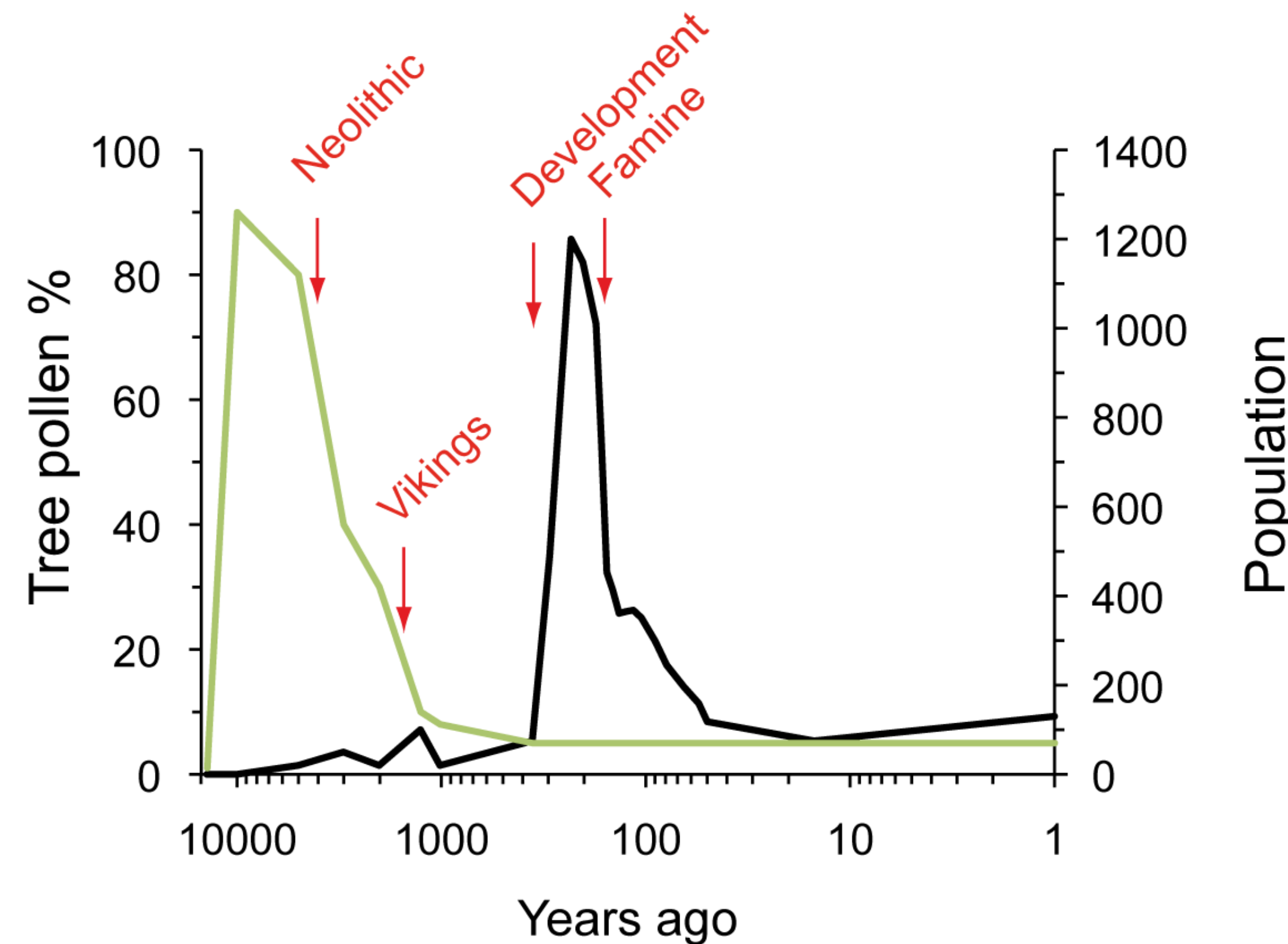
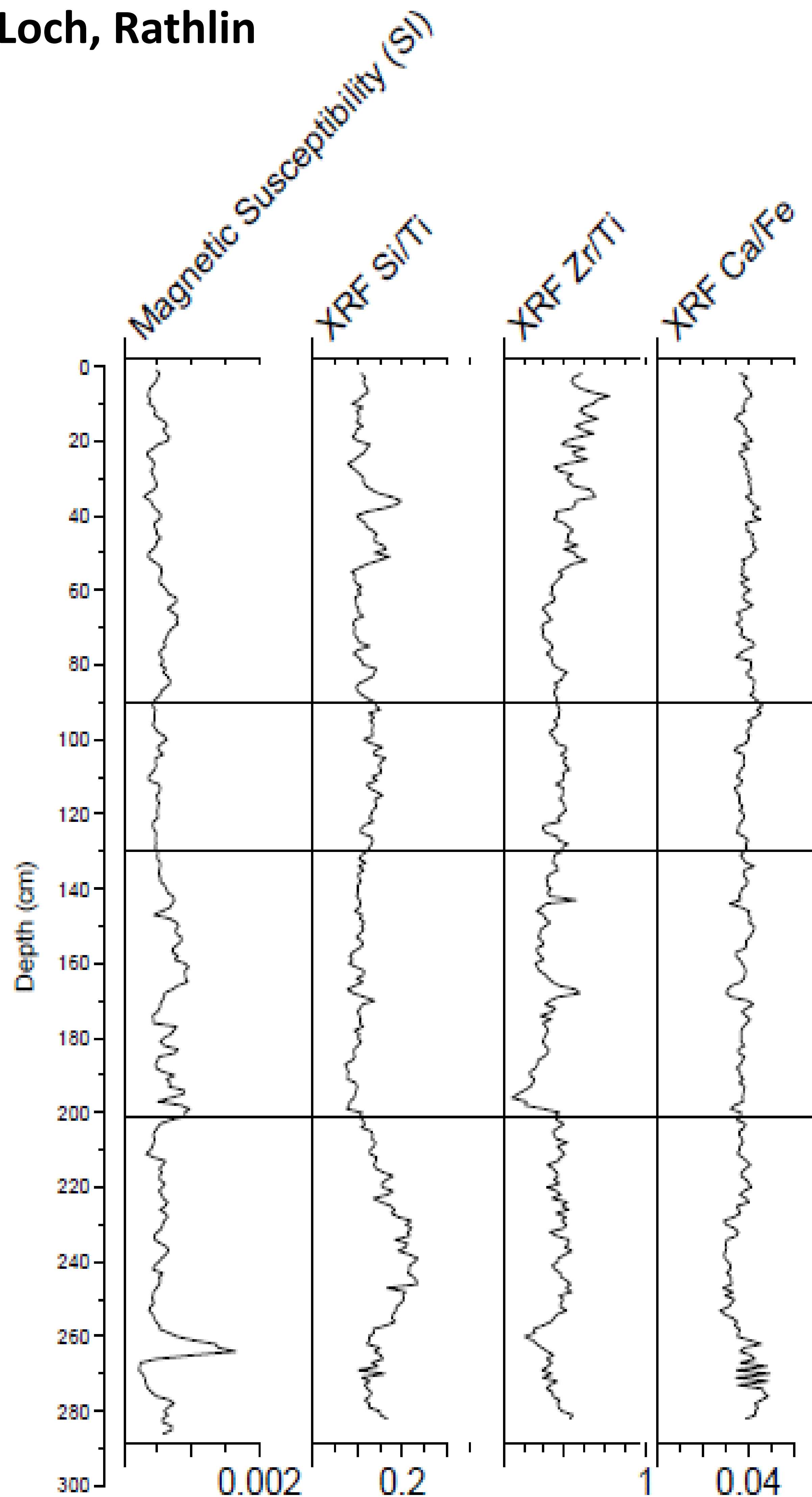
Aerial photography
Ground survey
Soil/test pits

The Proxies

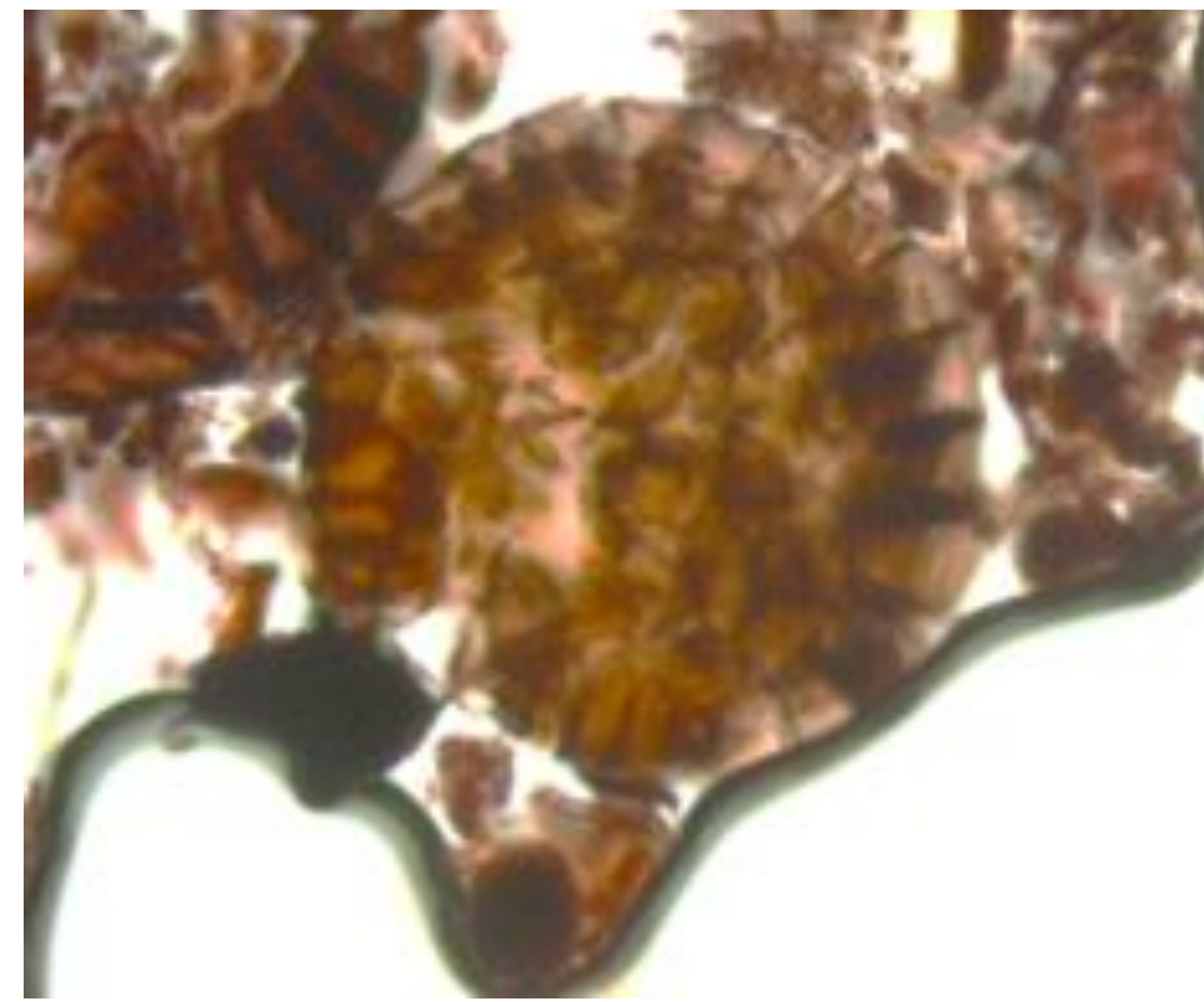
*seda*DNA
Feecal sterols
Bile acids
Geochemistry
Pollen
Diatoms

What has caused differing historical trajectories – what is the balance or geology, location, history-culture and their interaction with climate and disease?

Cleggan Loch, Rathlin



TRADITIONAL PROXIES FOR HUMAN IMPACT & CRANNOG HISTORY



POLLEN & SPORES

(incl. fungal spores)

- Nearly always preserved
- Well used methods

vegetation, activities,
housing....



DIATOMS

(Siliceous Algae)

- Wide spread
- Well preserved

nutrients
water quality

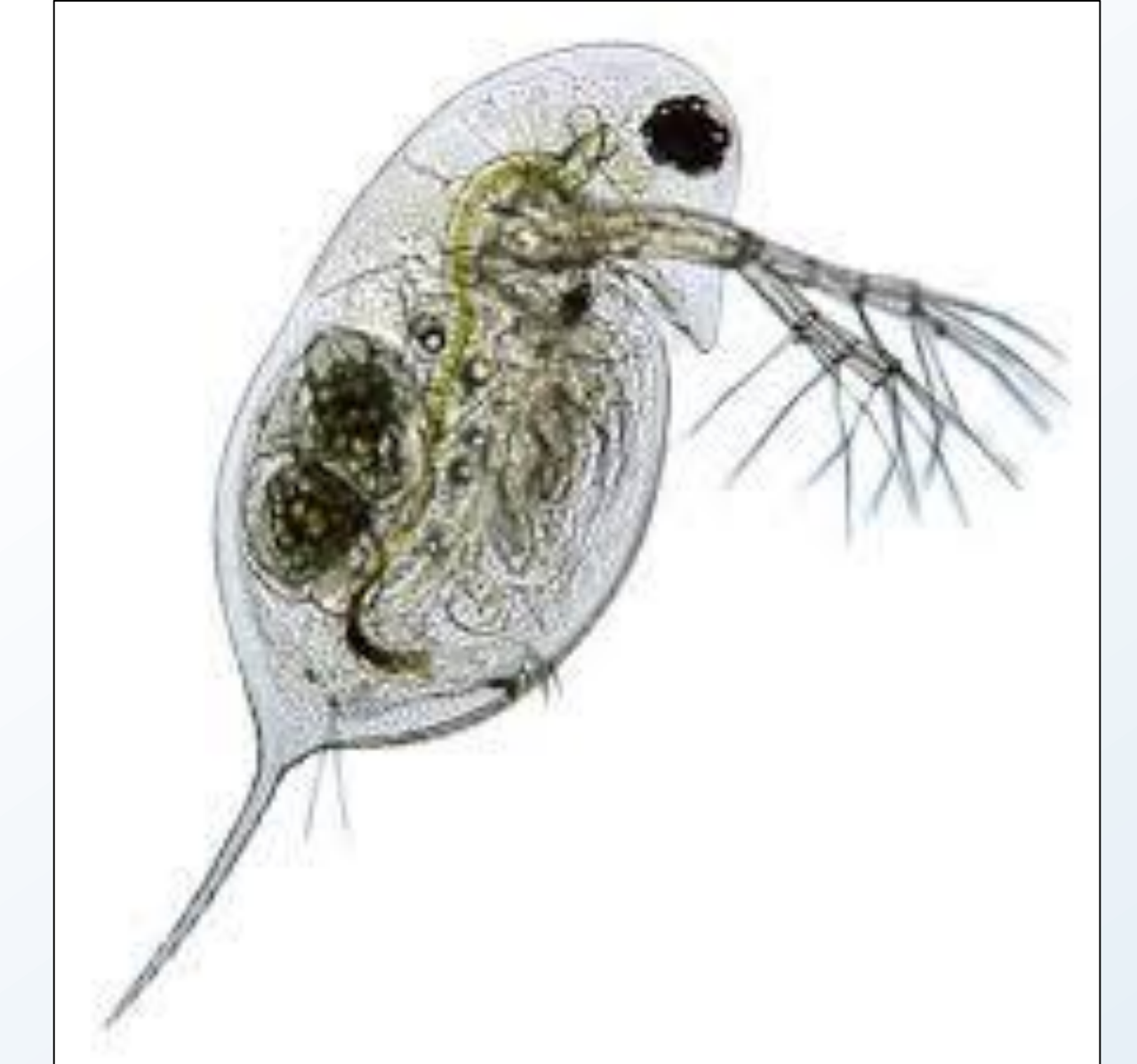


CHIRONOMIDS

(Non-biting midges)

- Aquatic larvae develop *in-situ*
- Well preserved

temperature
 O_2
nutrients



CLADOCERA

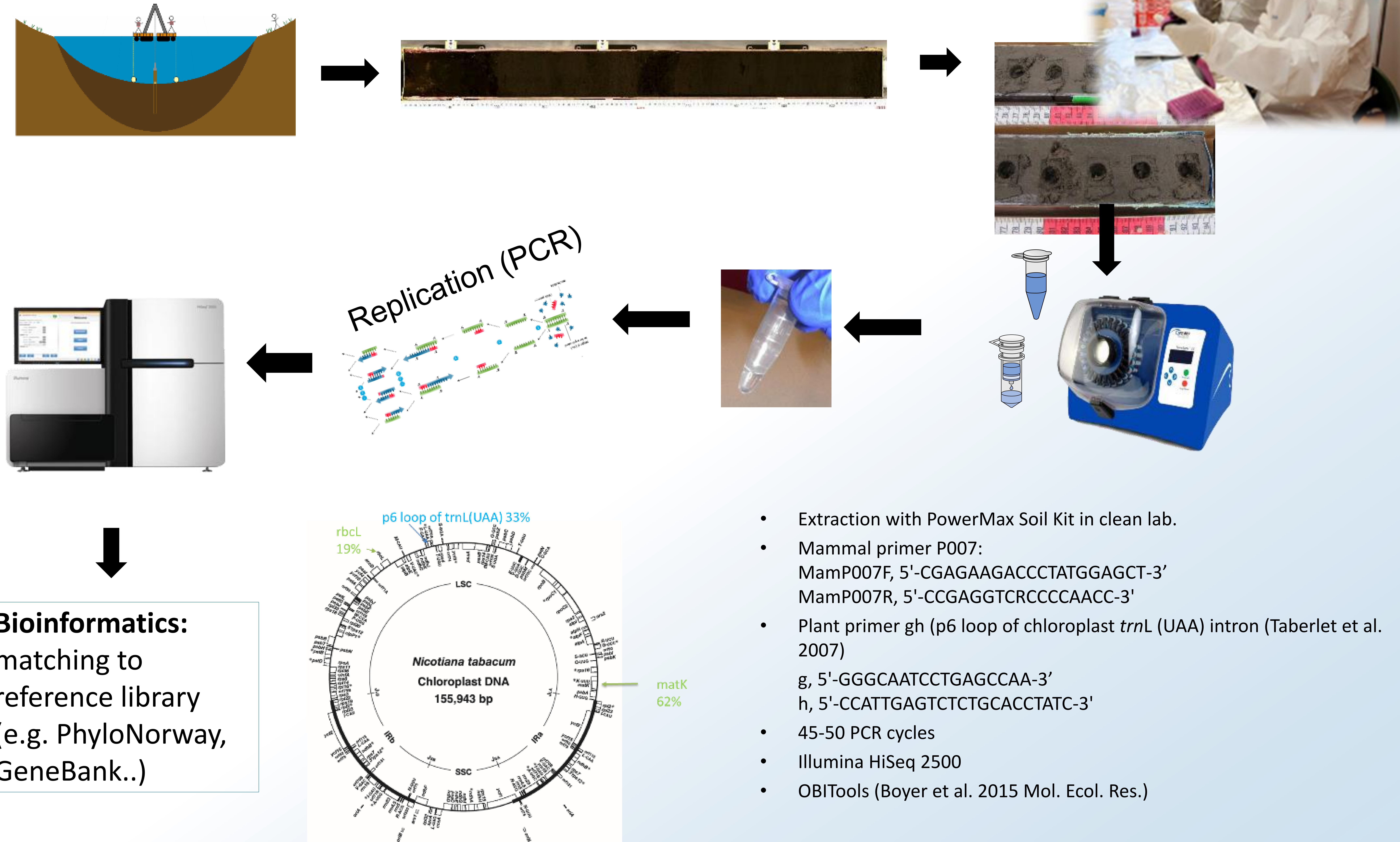
(Water fleas)

- Wide spread
- Well preserved

Bottom up processes
(nutrients, O_2)
top down
(predators)

sedaDNA

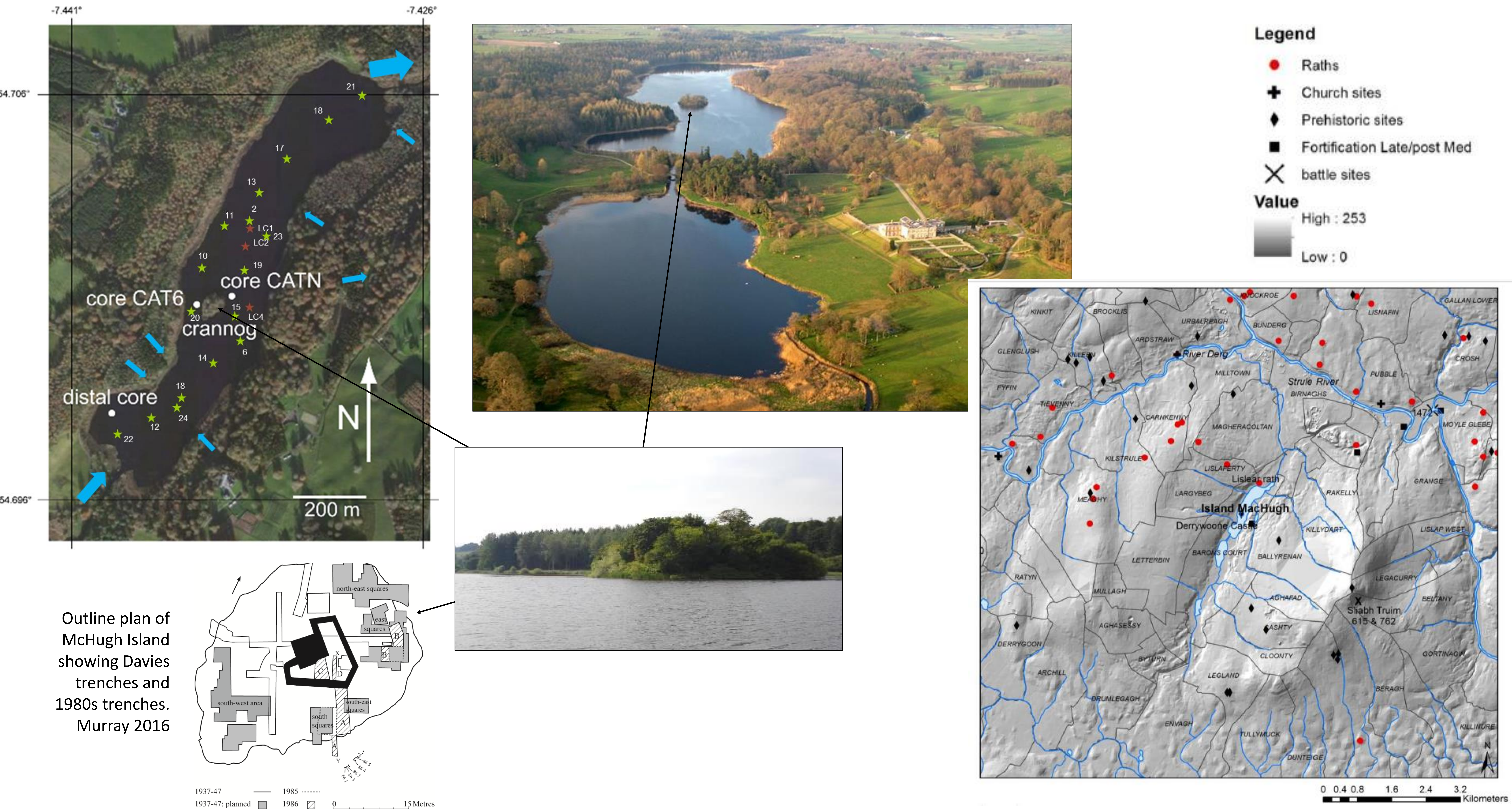
Extra-cellular DNA preserved in sediments that can be identified to genus and often sp



- Extraction with PowerMax Soil Kit in clean lab.
- Mammal primer P007:
MamP007F, 5'-CGAGAAGACCCTATGGAGCT-3'
MamP007R, 5'-CCGAGGTCRCCCAACC-3'
- Plant primer gh (p6 loop of chloroplast *trnL* (UAA) intron (Taberlet et al. 2007)
g, 5'-GGGCAATCCTGAGCCAA-3'
h, 5'-CCATTGAGTCTCTGCACCTATC-3'
- 45-50 PCR cycles
- Illumina HiSeq 2500
- OBITools (Boyer et al. 2015 Mol. Ecol. Res.)

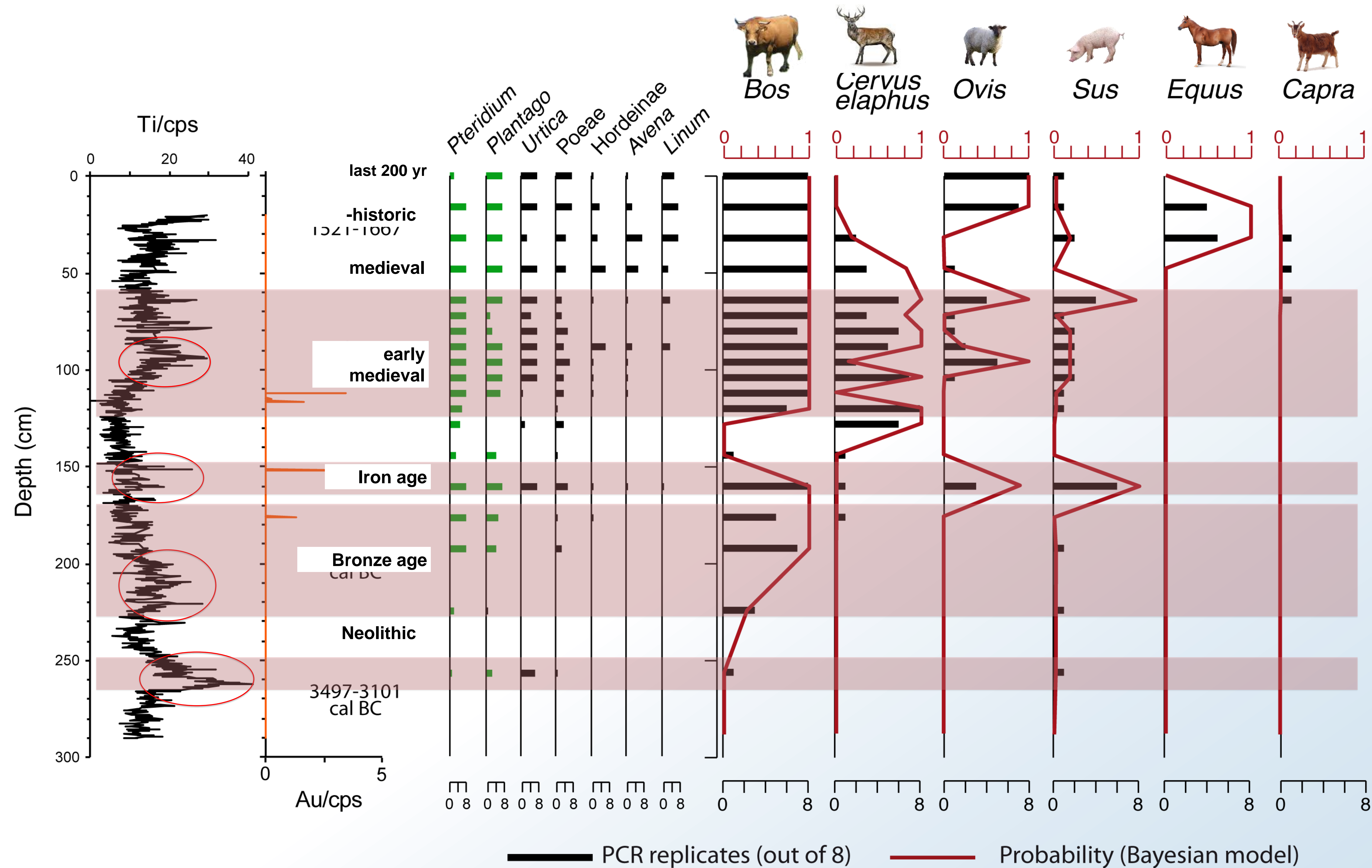
Lough Catherine, Co. Tyrone

Island McHugh – archaeological site on a natural island




Lough Catherine, Co. Tyrone


sedaDNA: domesticates & related





LIPID BIOMARKERS

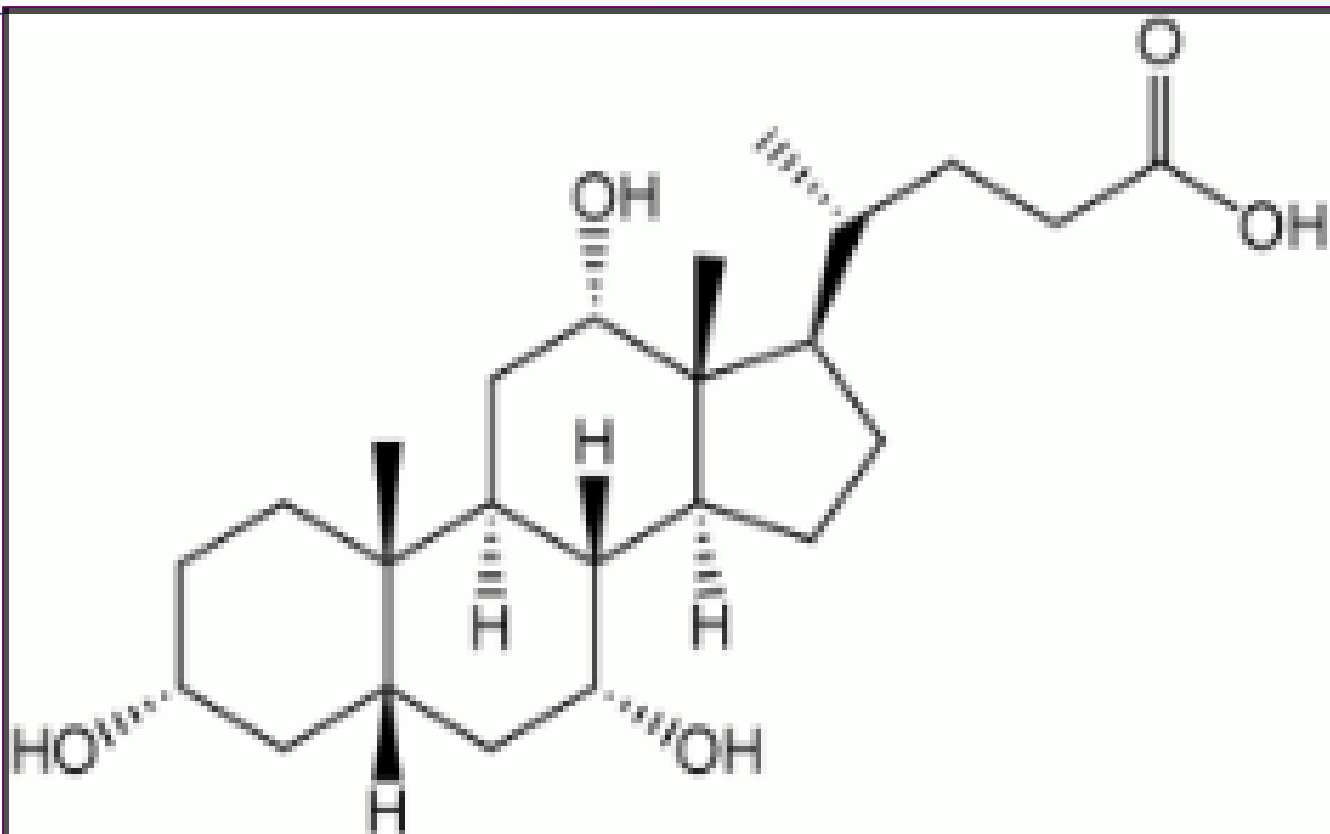
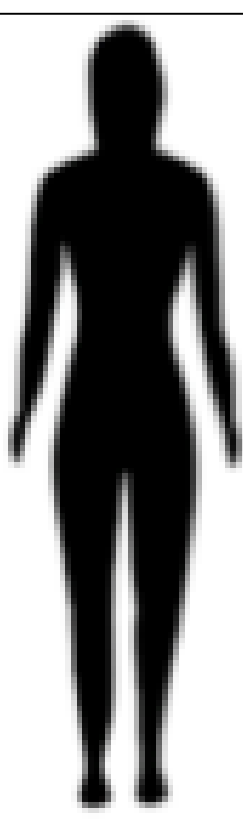


Molecular fossils preserved within sediments that are indicative of a particular **biological source**

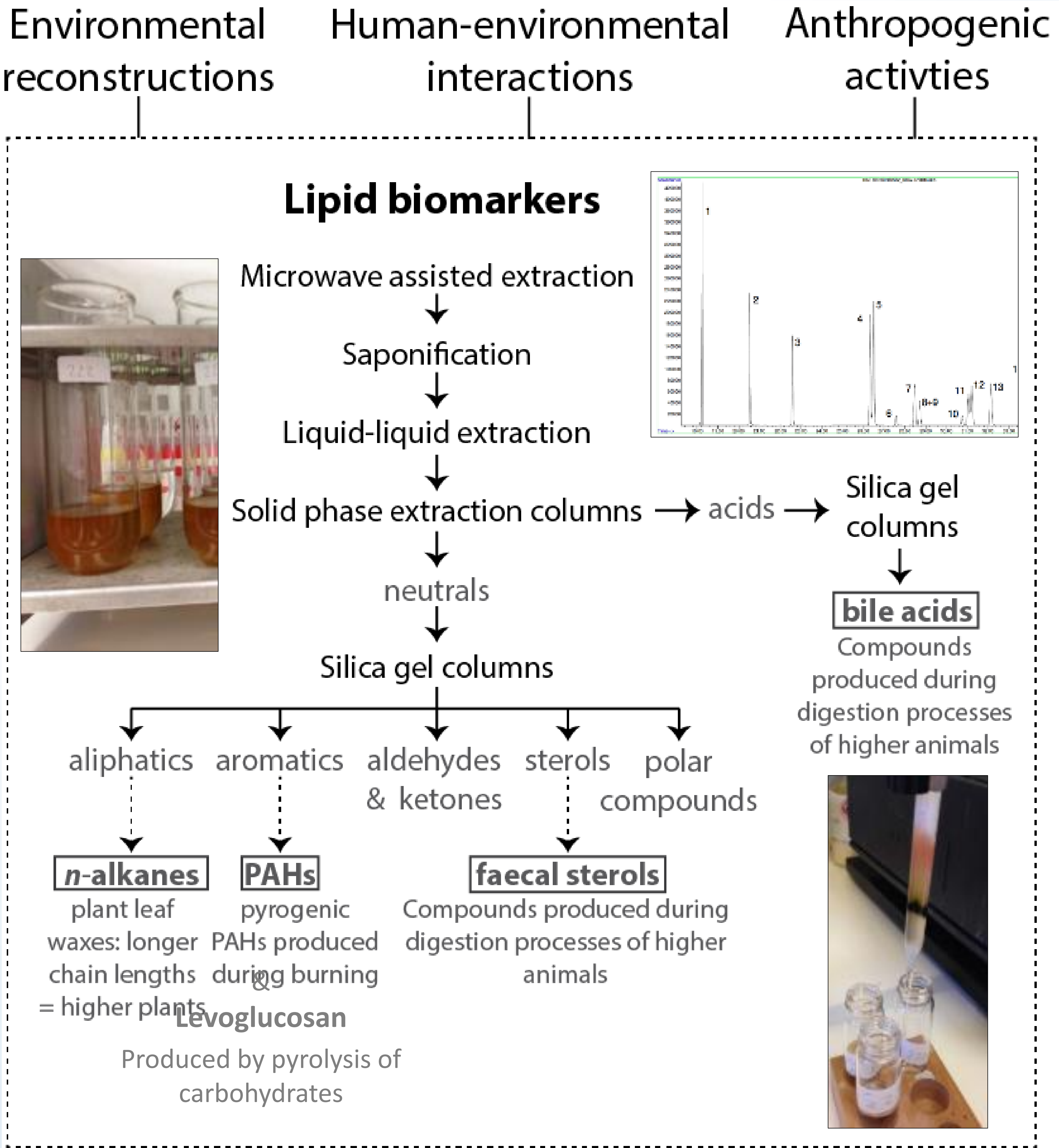



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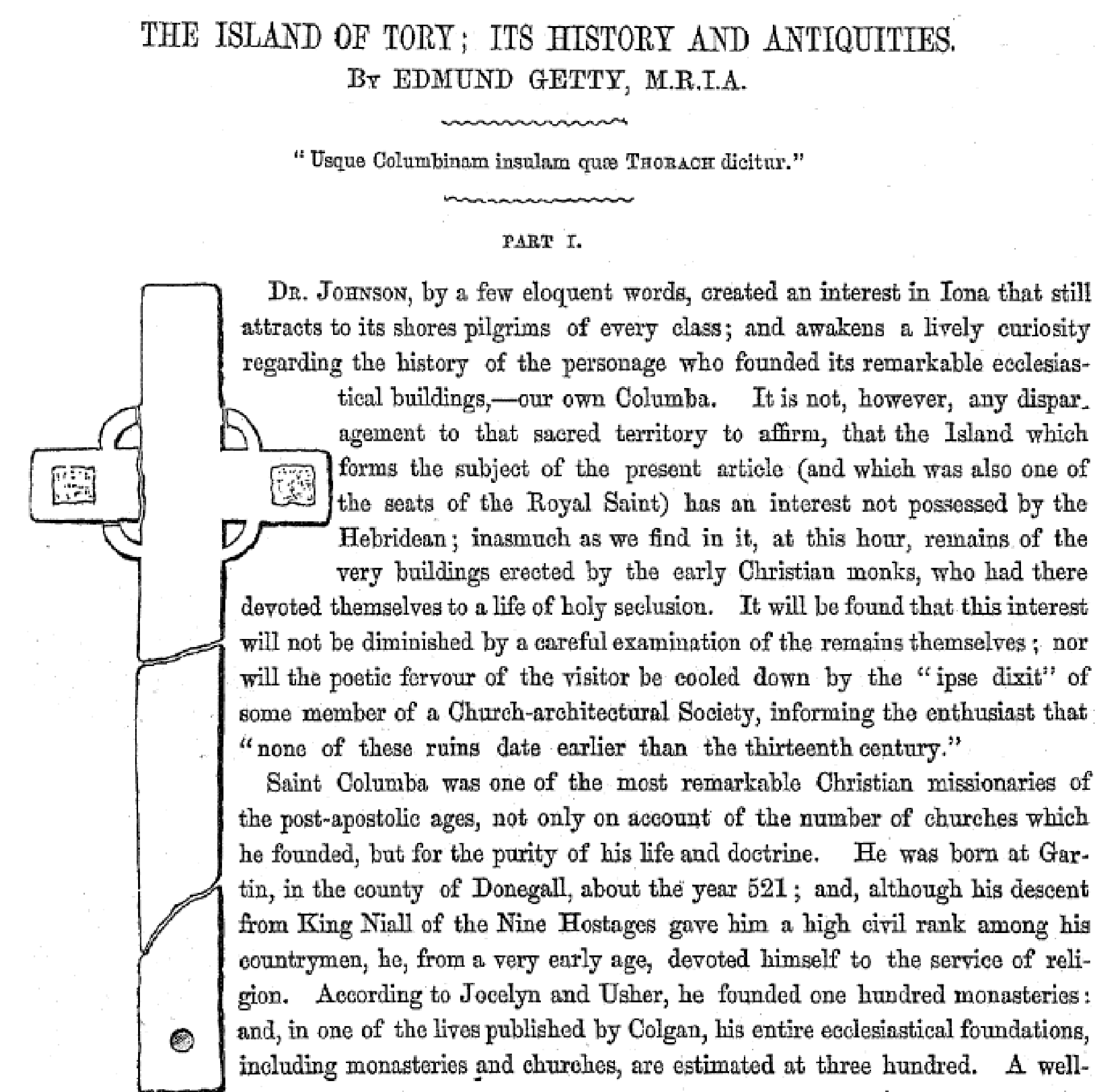


Benzo[e]pyrene

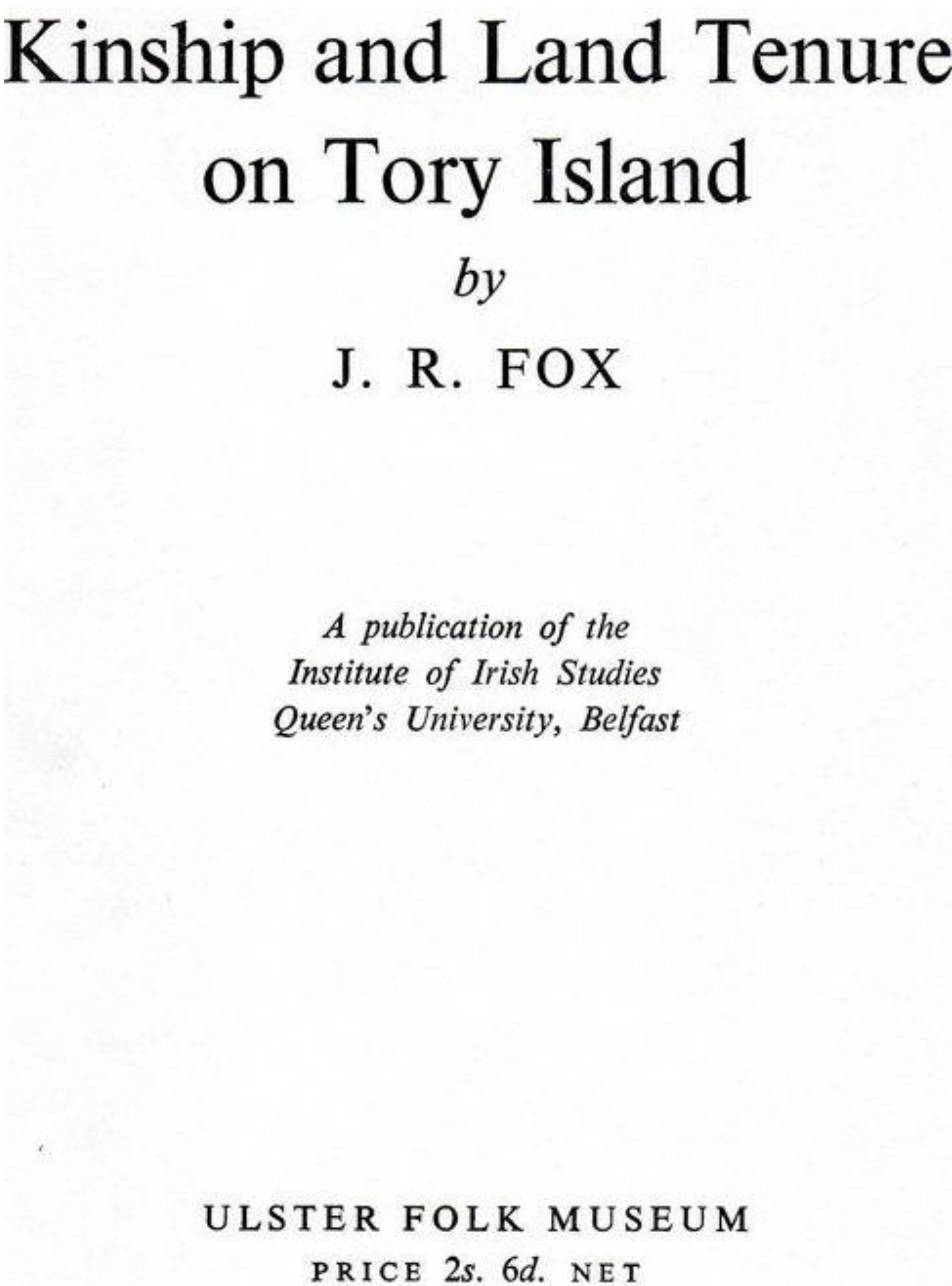




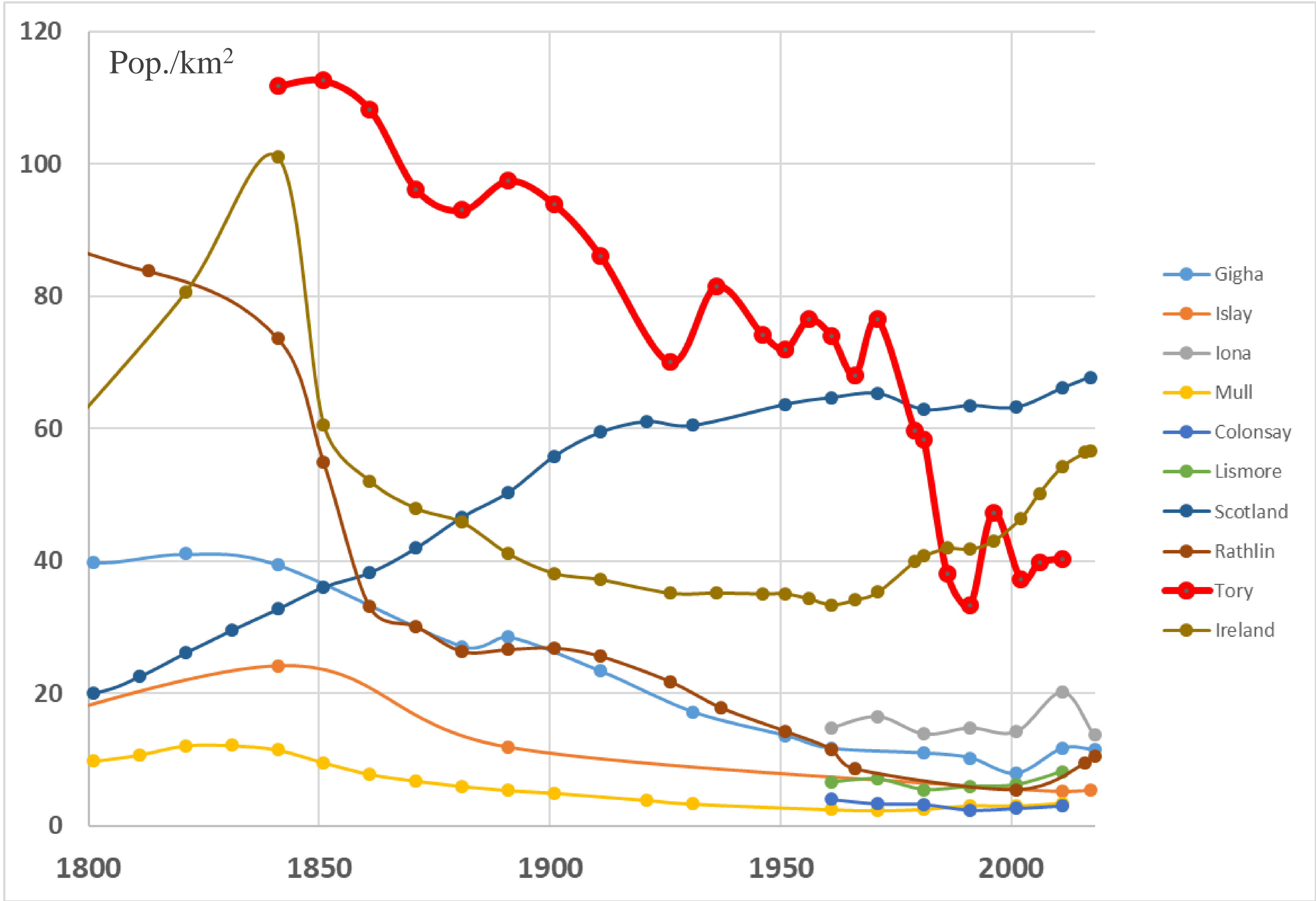
HISTORICAL SOURCES



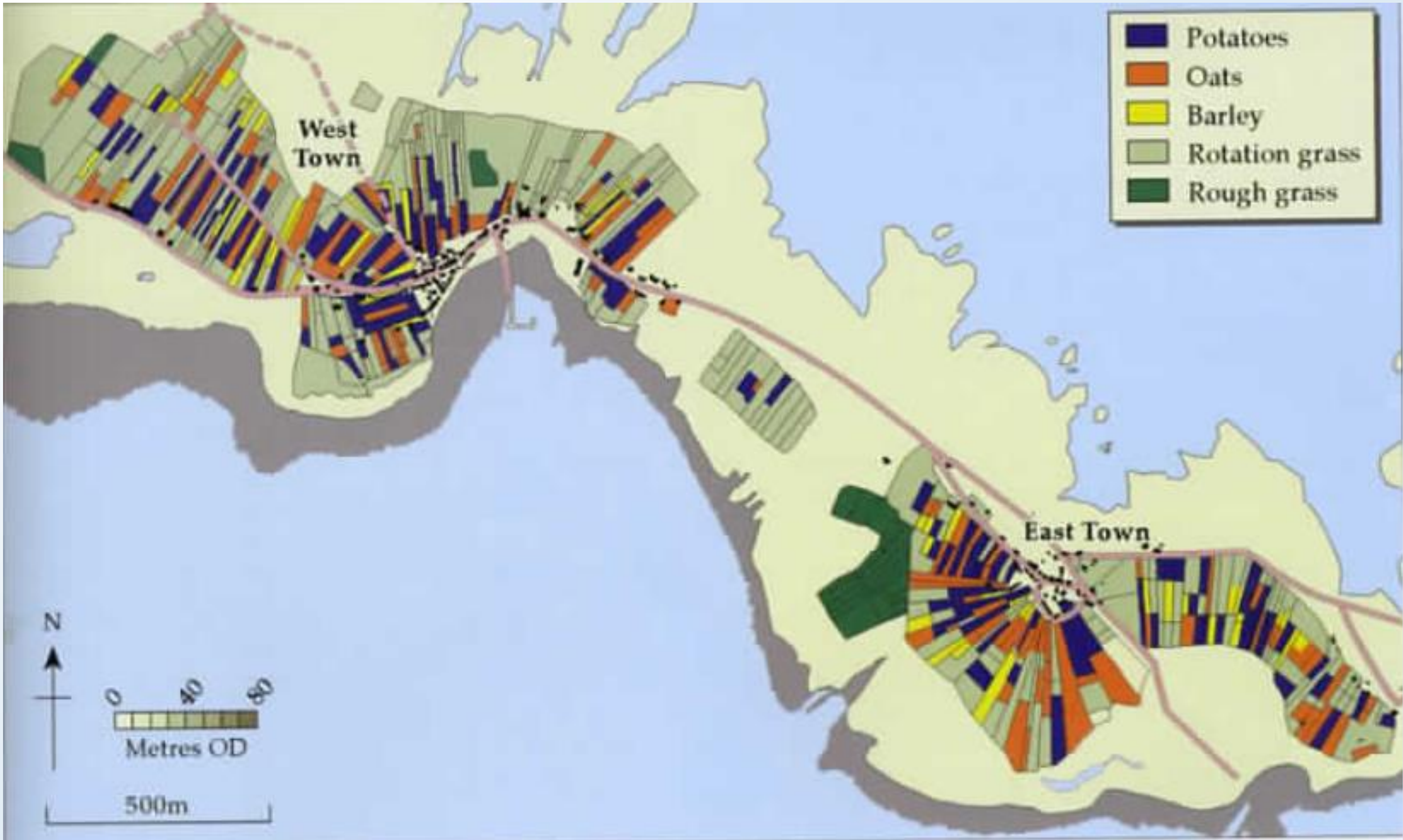
Getty 1853



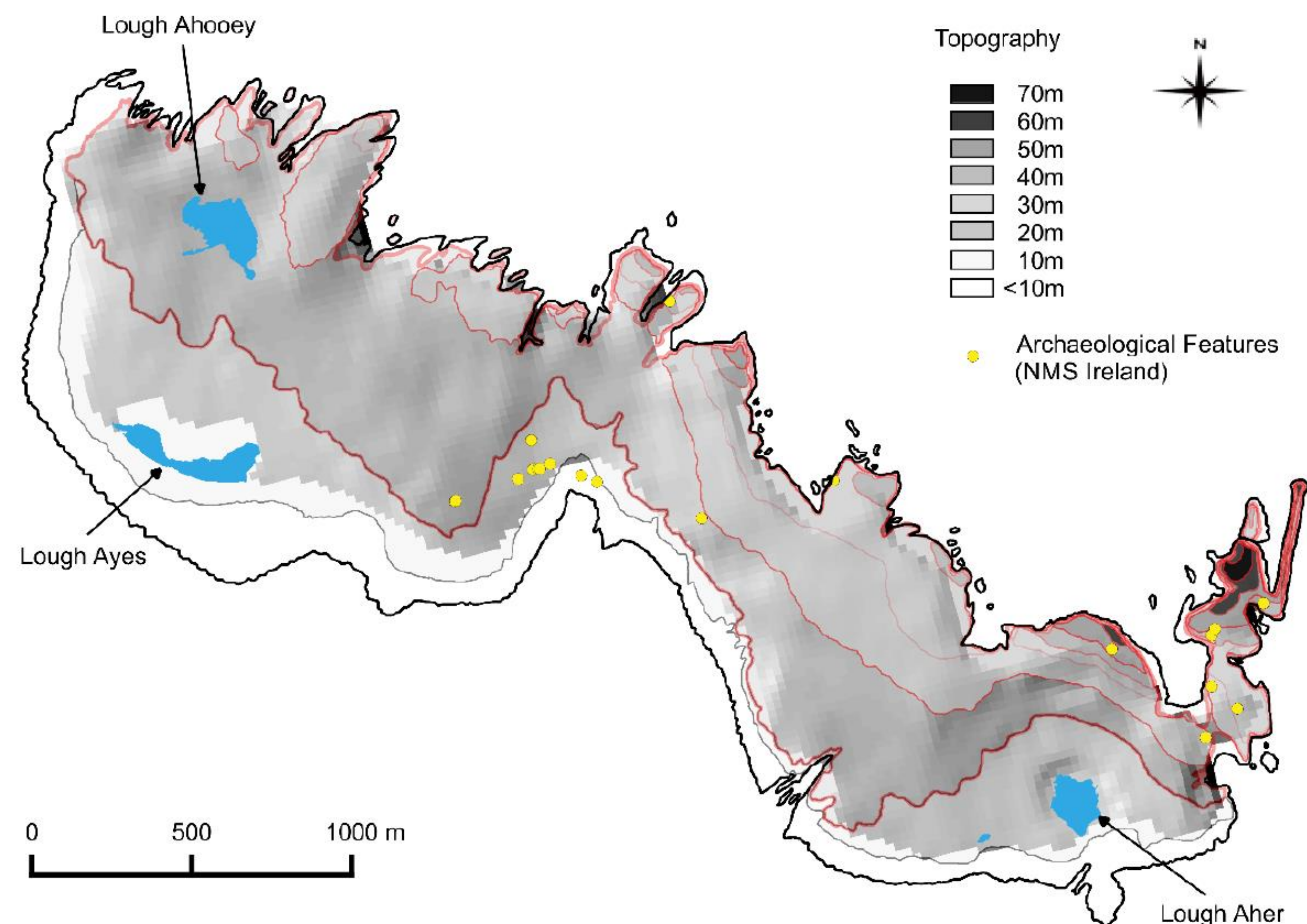
Fox 1966



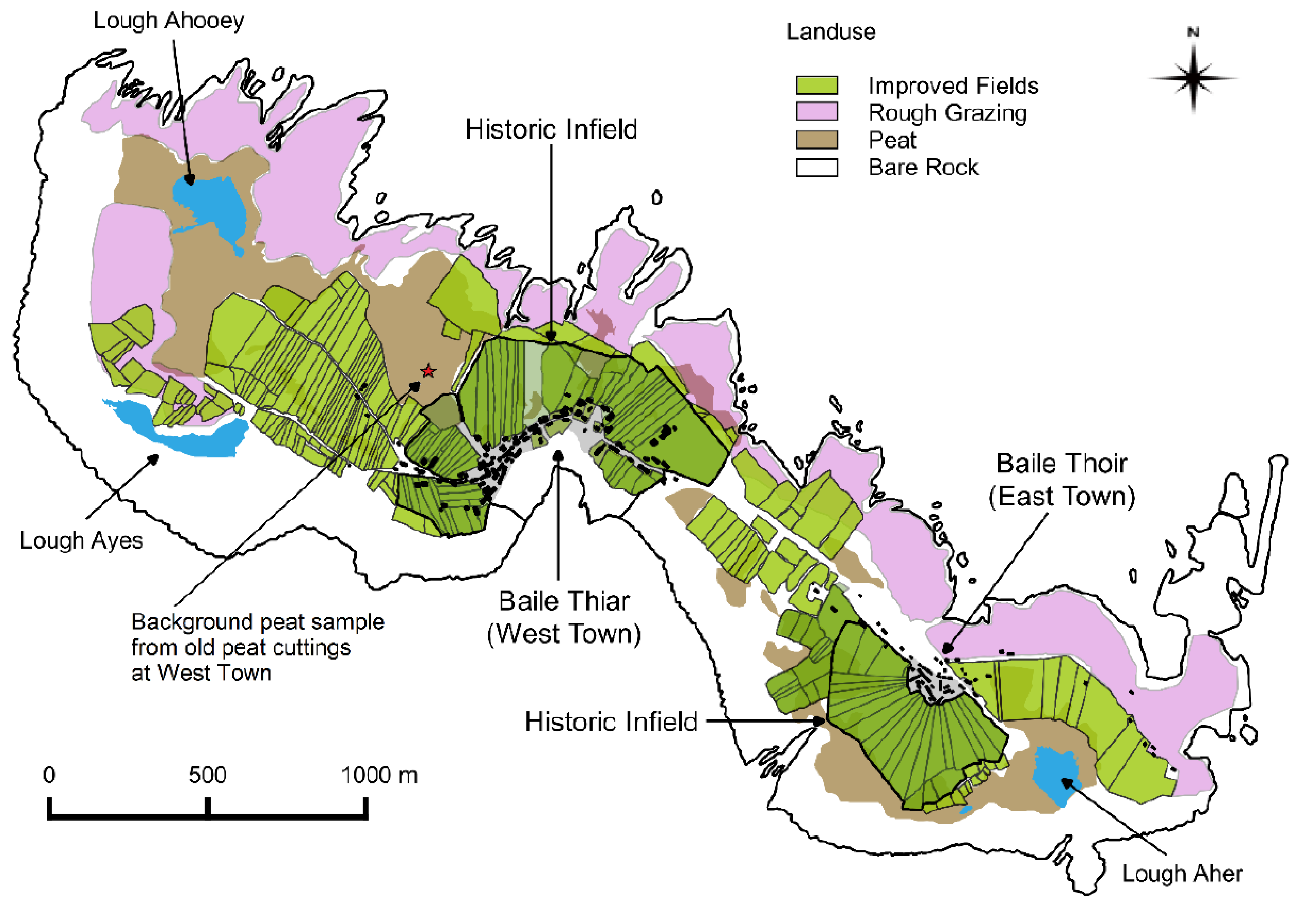
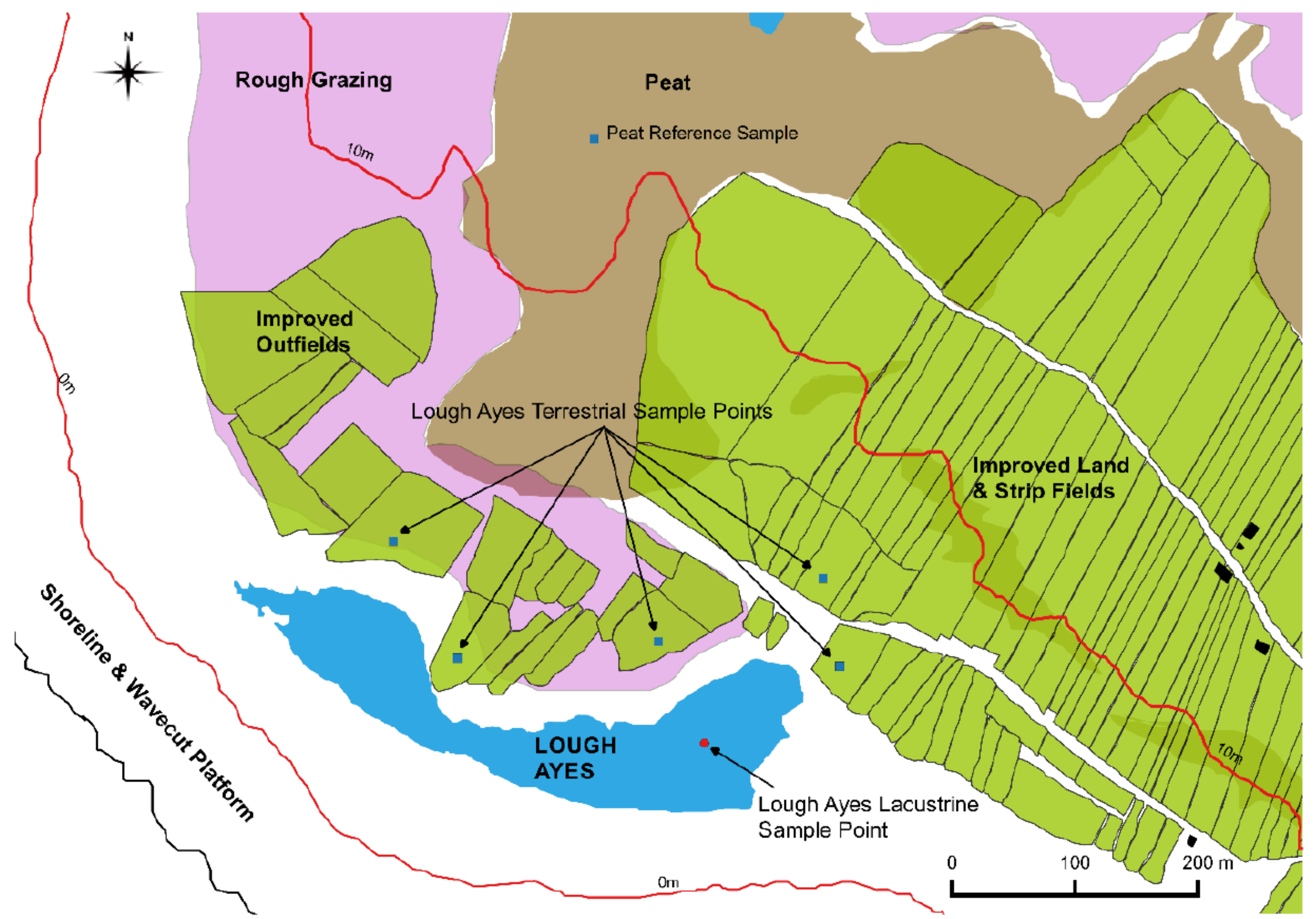
Land Utilization Survey 1958



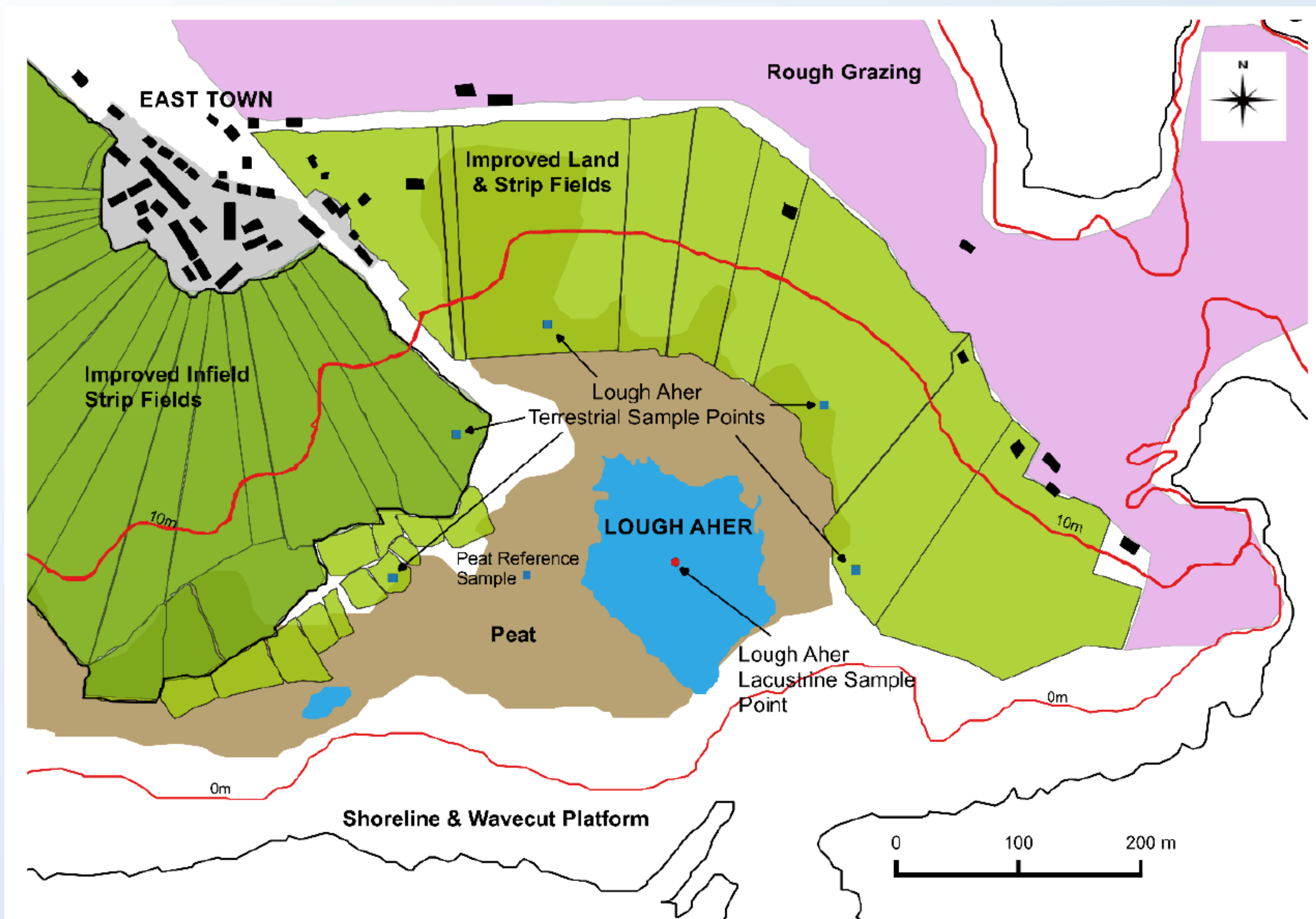
TORY ISLAND AND OUR WORK



Lough Ayes (barrier lake)

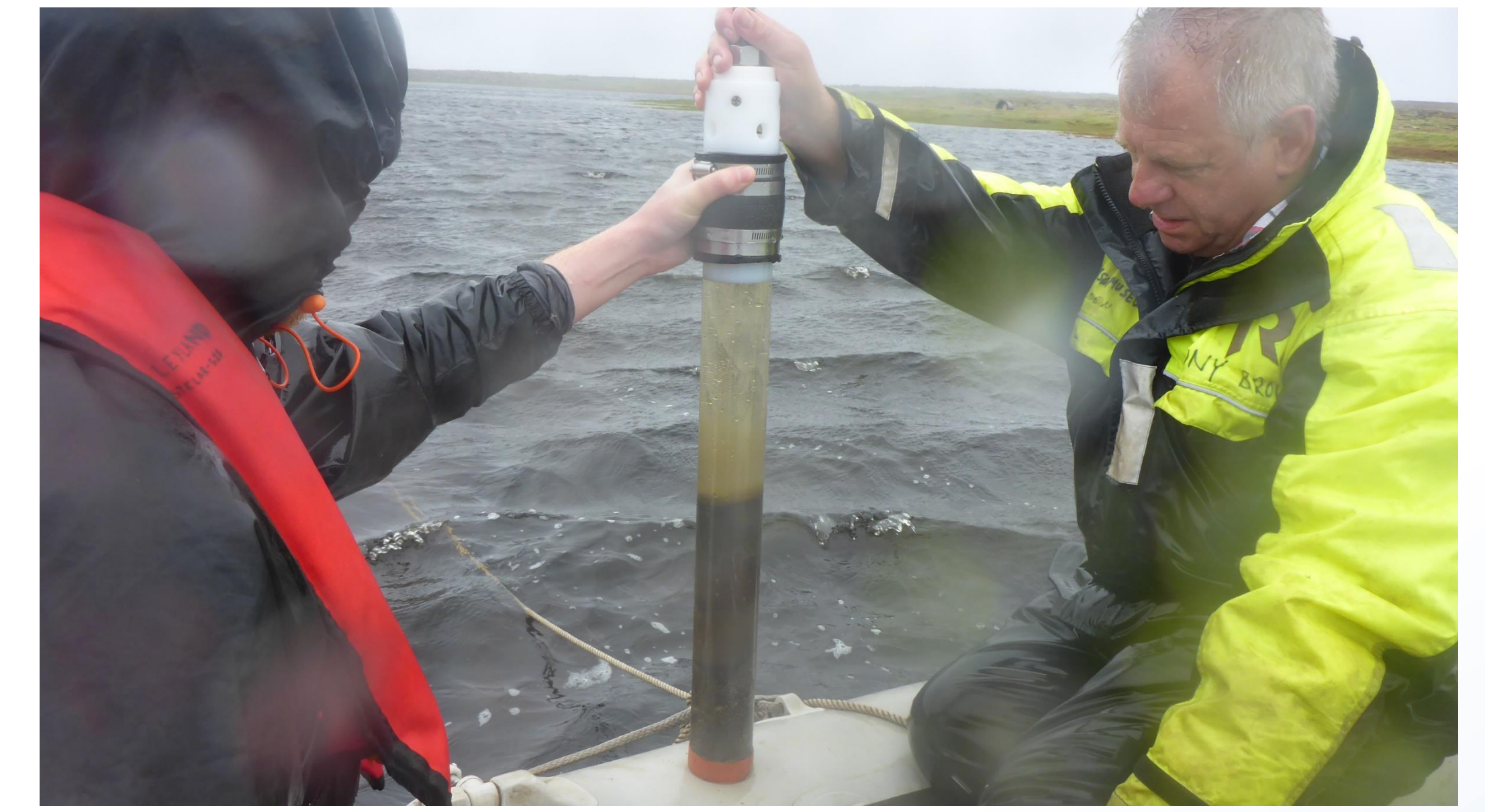


Lough Aher (peat cutting lake?)



TORY ISLAND: WHAT WE HAVE DONE

Short cores from 2 Loughs (Ayes and An Loch Thoir)



Core from a mire



Core from peat under a soil



10 soil profiles



2 exposures for longer history

TORY ISLAND: SOME OBSERVATIONS DURING OUR WORK

The Irish botanist Robert Lloyd Praeger visited Tory in 1920s botanical surveys in 1898 (Hart), 1970 and 2004 (Randall)

Increases in bracken, crocosmia and *Phragmites australis*



Contained since 2004: Fuchsia, Japanese knotweed



New arrivals: *Rhododendron*



Key to control of these species is grazing – enough (but not too much)

TORY ISLAND: SOME QUESTIONS WE WOULD LIKE TO BE ABLE TO ANSWER

1. What was Tory Island like when Neolithic peoples arrived 6000 years ago?
2. How much land was cultivated (and where) in the Iron Age?
3. What was the population size in the early Medieval period?
4. When did peat cutting start?
5. Can we date the arrival and extent of potato cultivation in the historical period?
6.

We will also produce an updated map of the archaeology of the island using GIS



AND THANKS FOR LISTENING!

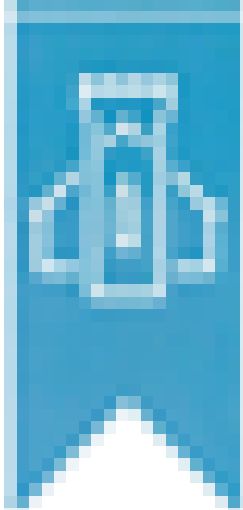
You can follow our work on: <http://gtr.rcuk.ac.uk/projects?ref=AH/M005259/1>

Also if you are interested in being involved or contributing email us at: Tony.Brown@soton.ac.uk

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HISTORIC  SCOTLAND

Carried out by:

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