Linking International and Interdisciplinary Data to Enable Data-Intensive Research on Long-Term Human Ecodynamics in the North Atlantic

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What is DataARC?

Research community studying long-term human ecodynamics in the North Atlantic

Building digital tools to *encourage interdisciplinary approaches* at the data discovery phase of research

Contextually connecting data from archaeology, literature and historic documents (e.g. the Sagas), paleoecology, paleoclimate

The diverse DataARC community
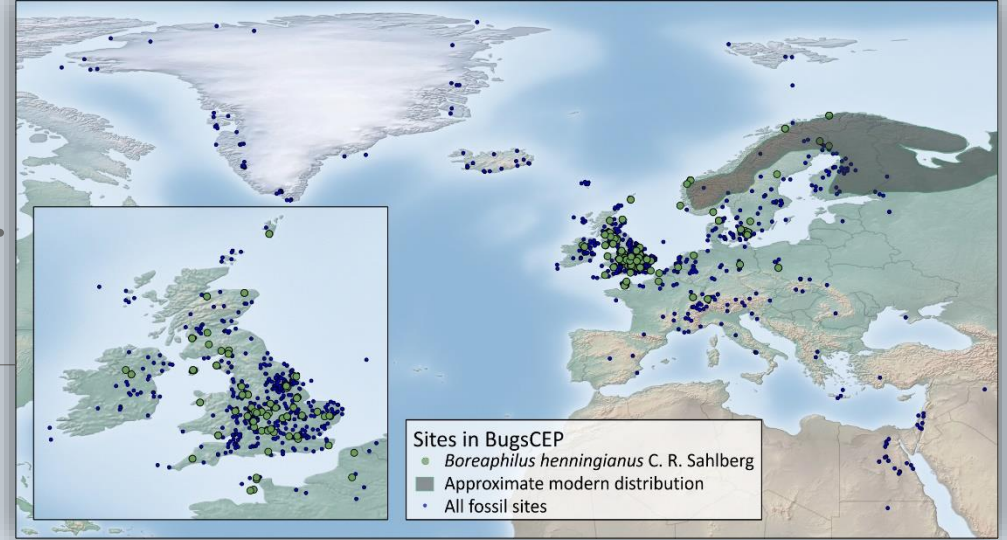
Vicki Szabo
WCU

Project overview:

Analysis of textual, genetic, and archaeological evidence for premodern North Atlantic marine mammal populations (whales, seals, walrus)

https://norsemarinemammalproject.wordpress.com

Sites in BugsCEP
Boreaphilus henningianus C. R. Sahlberg
Approximate modern distribution
All fossil sites

Phil Buckland
Umea

Analysis of paleoecology through aggregated data including modern and historical distributions of insects and pollen
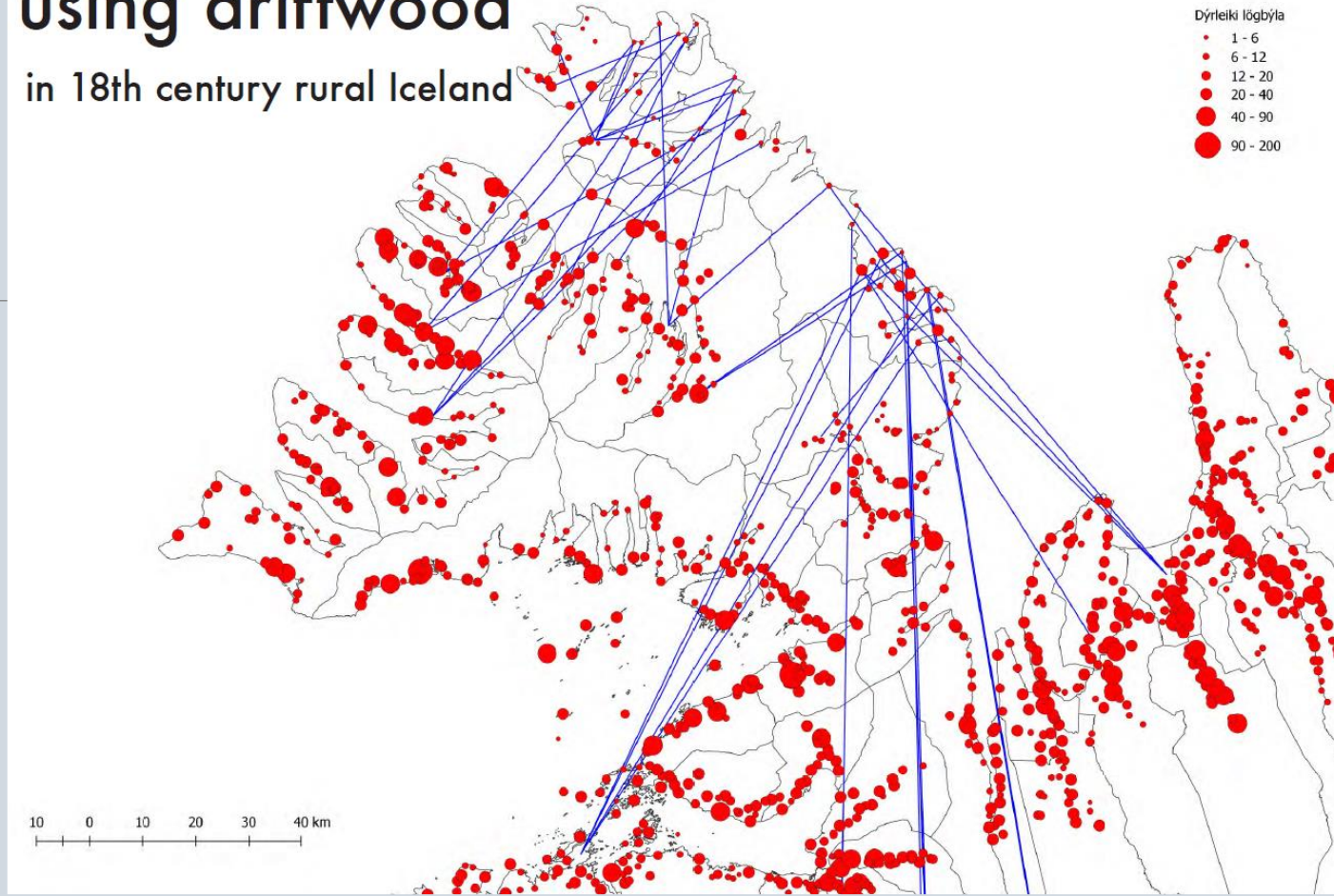
SEAD

Gisli Palsson
Umea

using driftwood
in 18th century rural Iceland

Storied Lines: Farm histories and resources networks in Iceland

Shared Question: Sustenance strategies

Hypothesis: Hard times make people eat species they normally wouldn't

Background reading? Tool: Bibliography browser

Data collation: Infrequent species in midden deposits

Show histogram of midden species
(Standardized data)
Filter data: Low frequency species
Context type: midden
Site type: household

First result: Ravens fit the criteria!

External data
and reconstructions

Filter data: Species: Ravens!
Context type: midden

Investigate with respect to
potential hard times causes
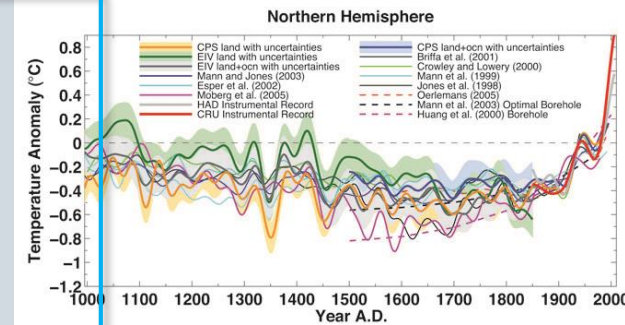(eg. climate reconstructions,
marine mammal records)

Map of sites
Timelines
Bibliography

Show availability of other data
from these sites and times

Tools to: Identify patterns in
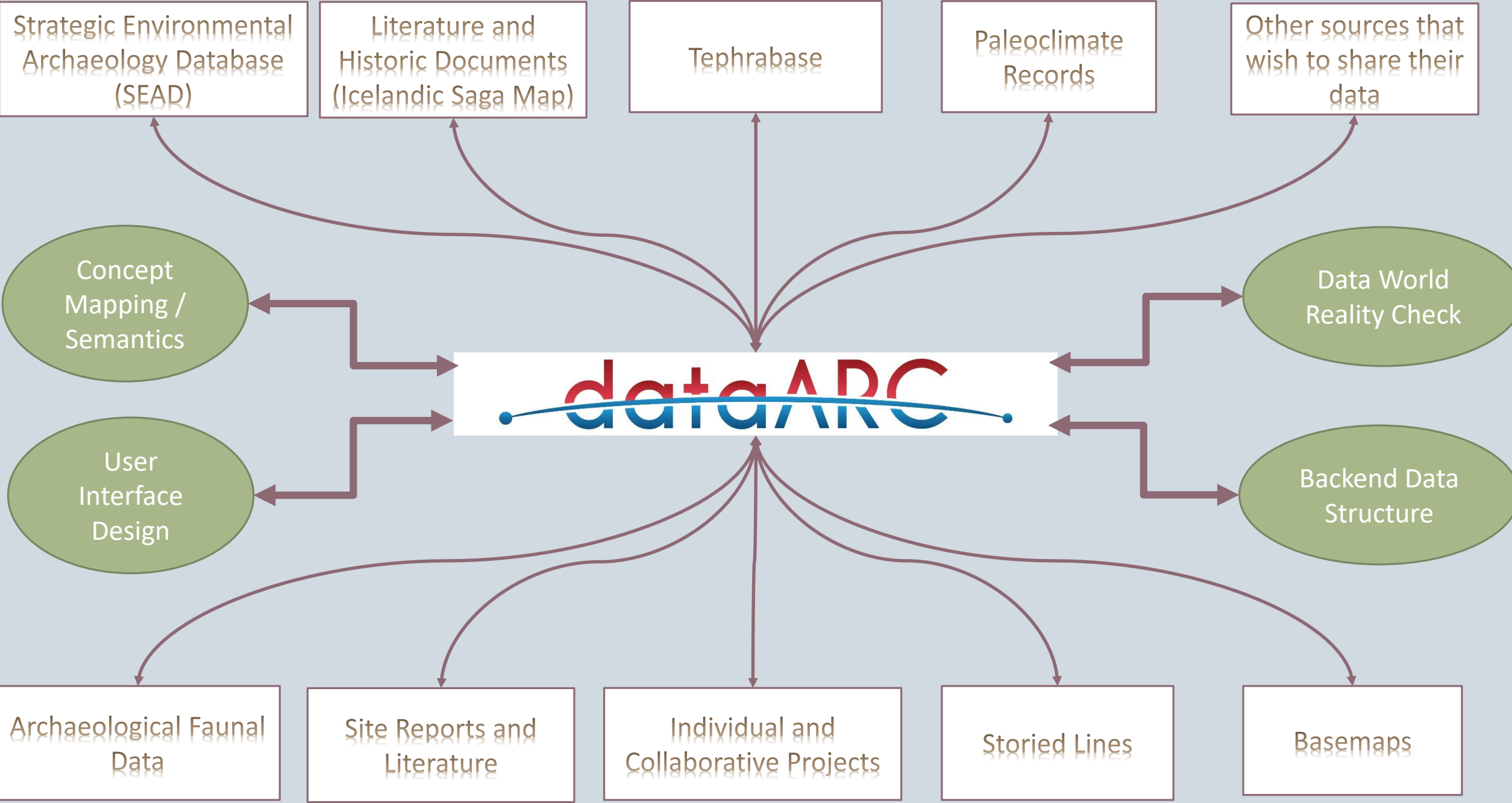these other data types
Correlate with events

Impress people
with cleverness

⊘ **TIMELINE**   ▢ **MAP**   ⛭ **CONCEPT**

Timeline

■ Archaeological ■ Textual ■ Environmental

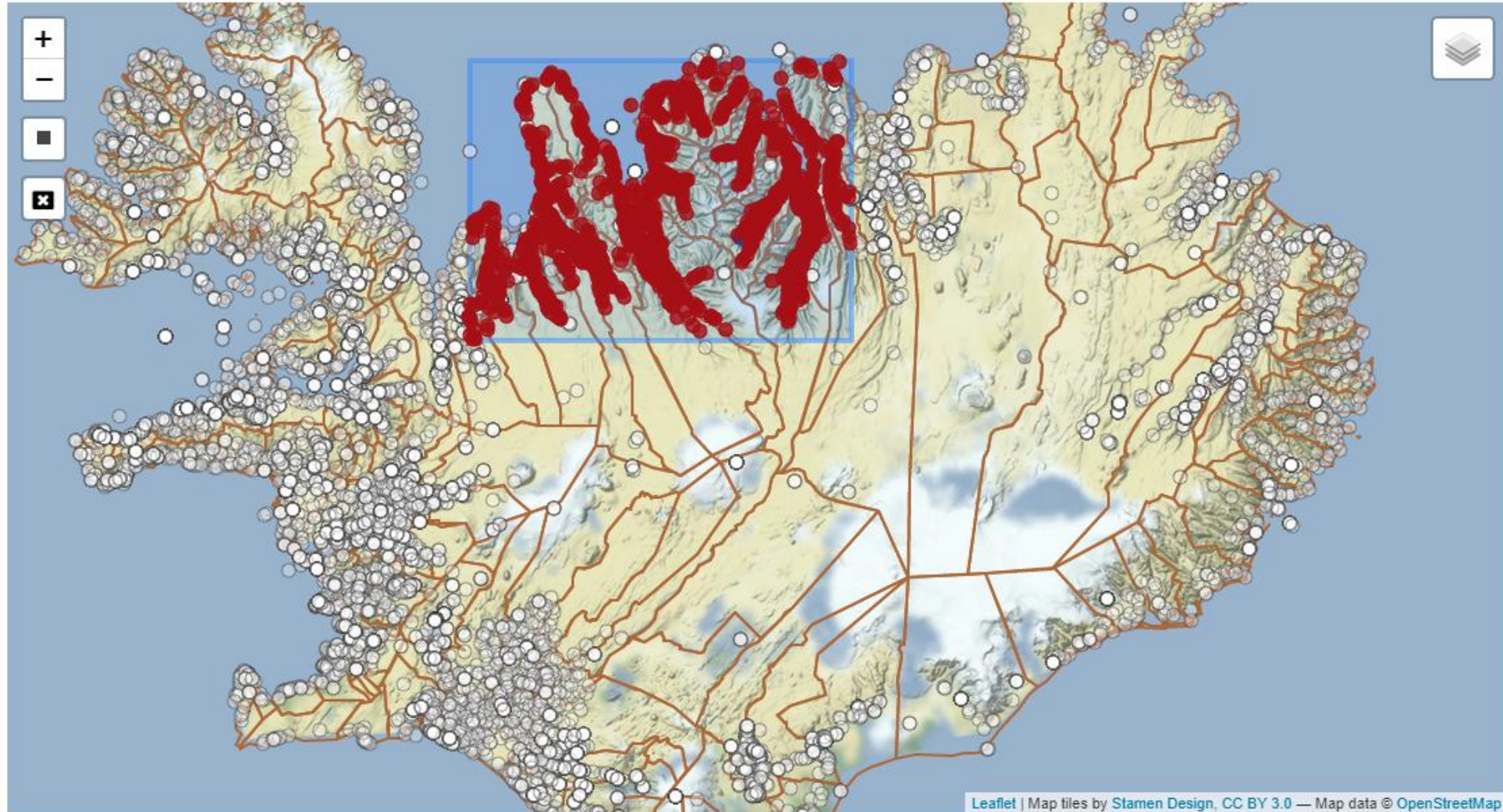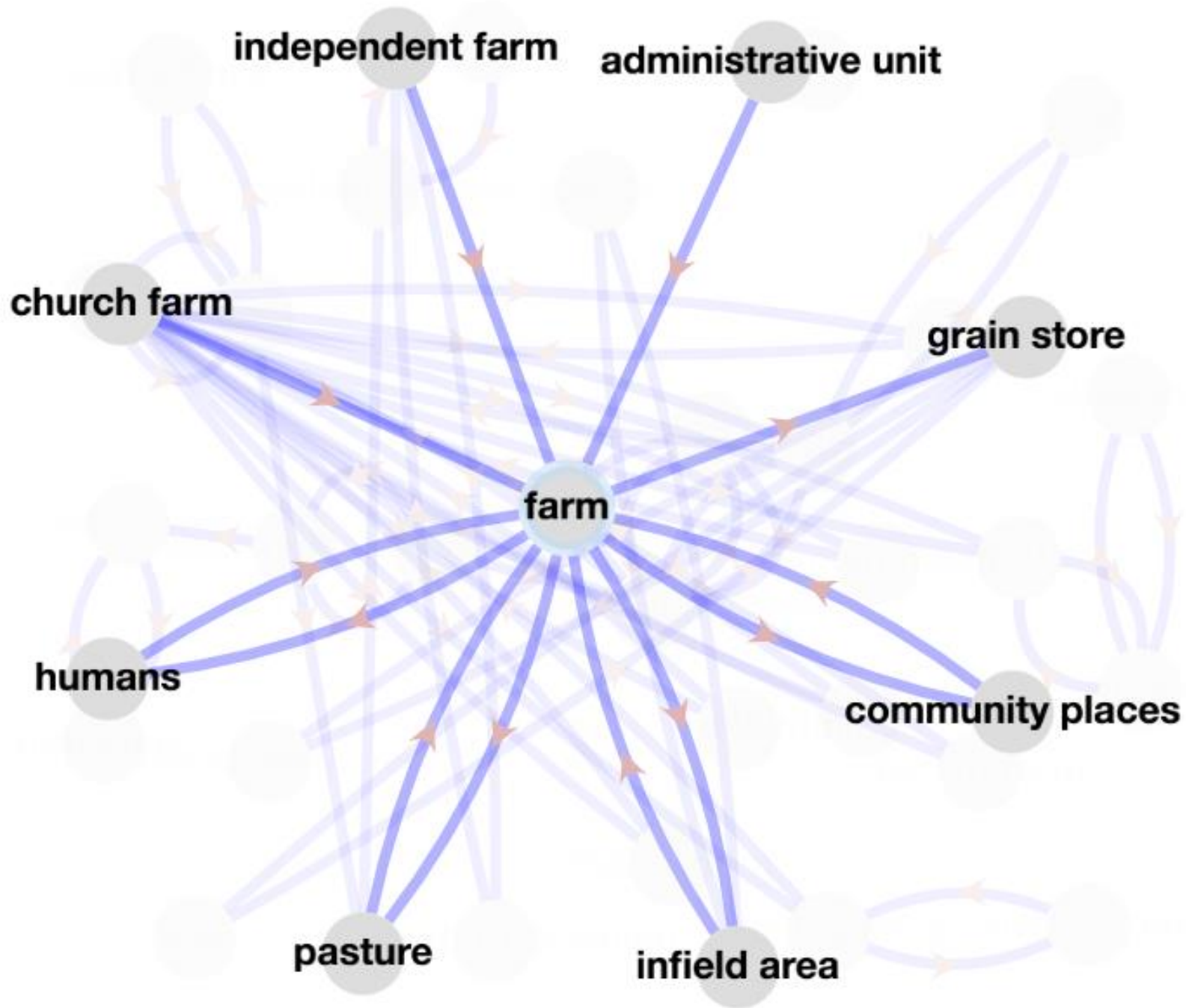| 1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
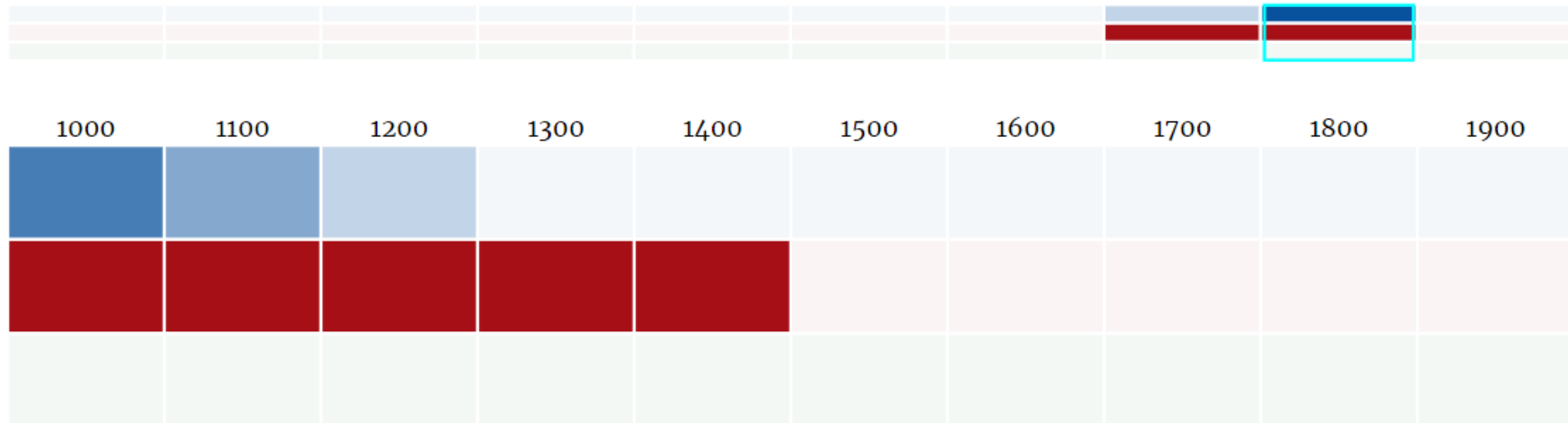
⊘ **APPLY FILTER**   ⊘ **CLEAR FILTER**

DATAARC

Map

Archaeological ■ Textual ■ Environmental

farm (Center)

Matched, Related and Contextual Results
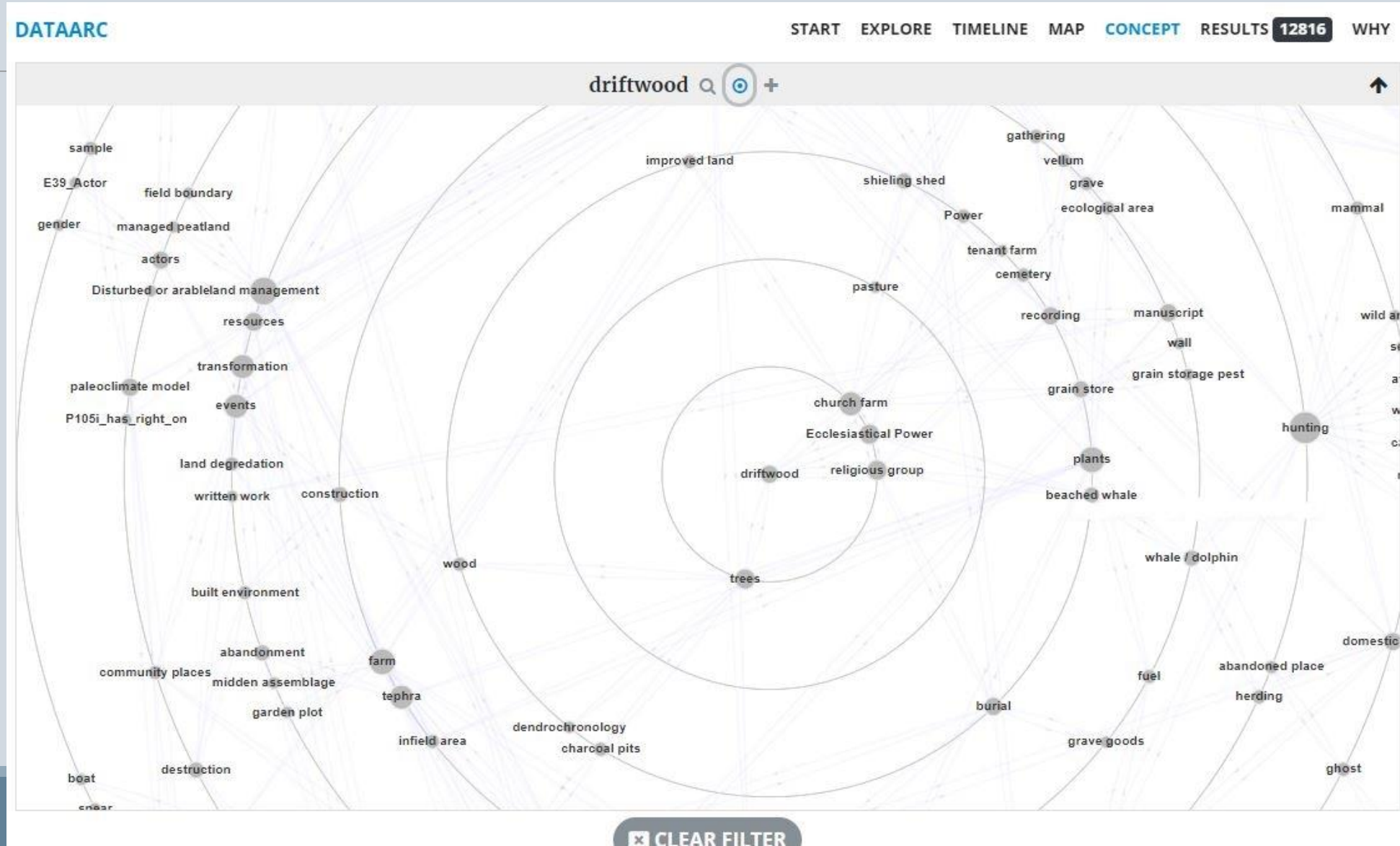
Matched, Related and Contextual Results

Combinators: Choosing a level of detail
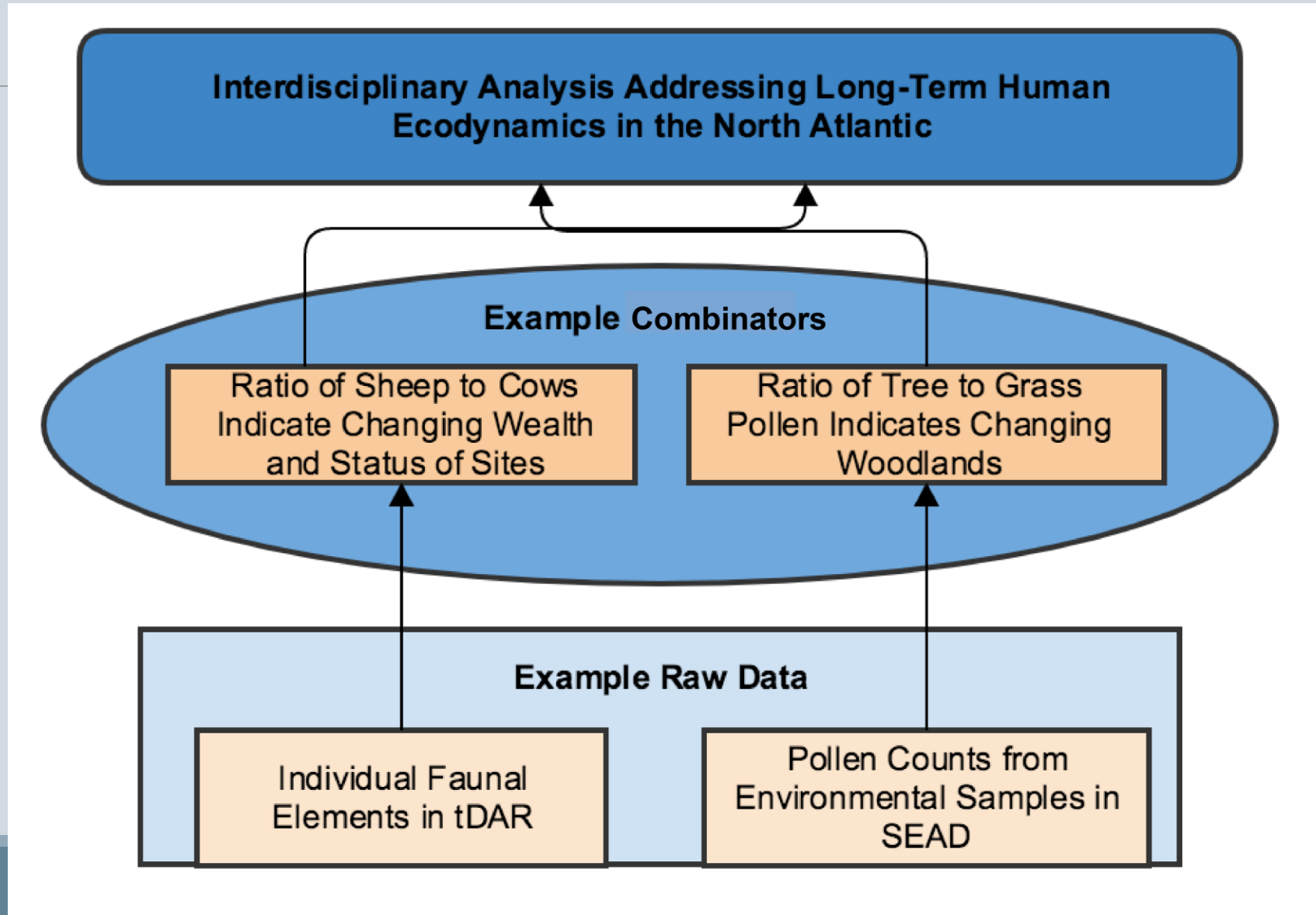
individual

Your research dataset

Someone else's research dataset

Someone else's research dataset

Type of data = column in a table

Types of data

Types of data

Types of data

combinator

combinator

combinator

Multiple fields in database's tables that mean something to an expert when combined

concept

A subject addressed by all your research

concept

concept

concept

concept

community
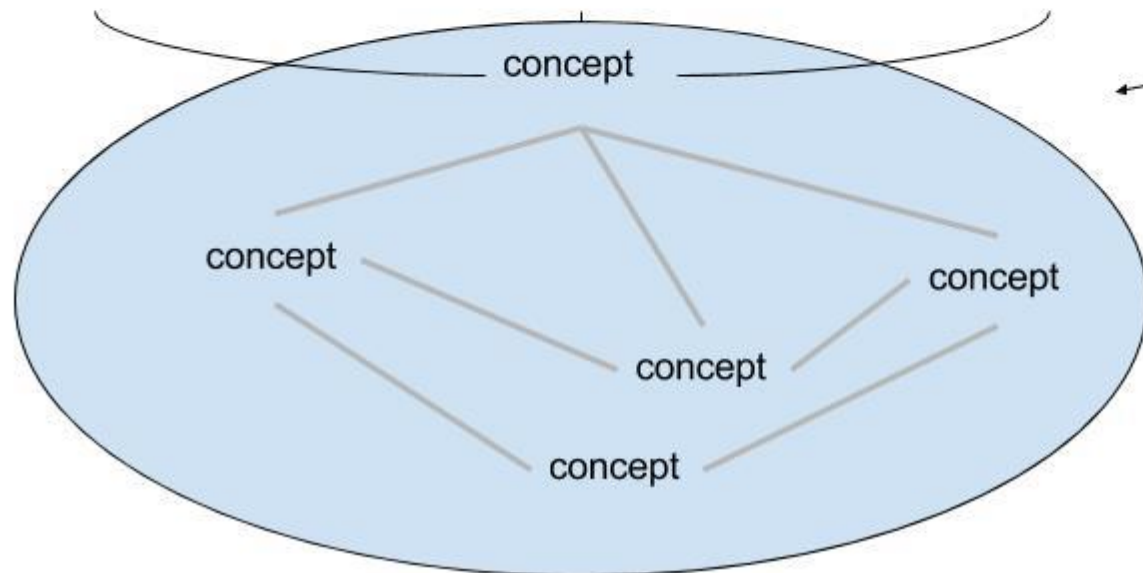
Contextualizing data

Connect your data to DataARC's core shared concepts

DataARC's concept map is a network of high-level ideas such as 'land degradation' or 'exchange' that are important when we think about human ecodynamics in the North Atlantic. On this page you can connect individual categories of base-level data, usually represented as individual fields in your database or spreadsheet, or combinations of categories of base-level data, to these high-level concepts. These connections are created by defining a mid-level idea, which we call a combinator, which acts as a bridge between your data and the concept map.

① Choose a Data Source: sead ▼   ❷

② Create / Select Combinator: Animals ▼   ❷

③ Query: ❷

Dung/Foul Habitats ▼	Greater Than ▼	▼
Carrion ▼	Greater Than ▼	▼
Indicators: Dung ▼	Greater Than ▼	▼
Pasture/Dung ▼	Greater Than ▼	▼

Or ▼

④ Description: Insects indicating either dung or carrion indicate the presence of animals, or the waste products from animals in the area.   ❷

⑤ Assign Topic: ❷
- agricultural landscape (0) ▼   -
- pasture (0) ▼   -
- animal (0) ▼   -   +
- fuel (0) ▼

⑥ Combinator Name: Animals   ❷

⑦ Citation: TBD   ❷

Matching Data

Search Results: 8837 out of 9139 total records

id	link
59c2d0a52ab79c0005cdcc98	
59c2d0a52ab79c0005cdcc99	
59c2d0a52ab79c0005cdcc9a	
59c2d0a52ab79c0005cdcc9b	
59c2d0a52ab79c0005cdcc9c	
59c2d0a52ab79c0005cdcc9d	
59c2d0a52ab79c0005cdcc9e	
59c2d0a52ab79c0005cdcc9f	
59c2d0a52ab79c0005cdcca0	
59c2d0a52ab79c0005cdcca1	
59c2d0a52ab79c0005cdcca3	
59c2d0a52ab79c0005cdcca4	
59c2d0a52ab79c0005cdcca5	
59c2d0a52ab79c0005cdcca6	
59c2d0a52ab79c0005cdcca7	
59c2d0a52ab79c0005cdcca8	
59c2d0a52ab79c0005cdcca9	
59c2d0a52ab79c0005cdccaa	

The Strategic
Environmental Archaeology
Database

www.sead.se   qsead.sead.se

ArchLab
Consortium of Swedish Archaeological Research Laboratories
www.archlab.se

Ceramic Research Lab Lund

Environmental Archaeology Lab Umeå

Laboratory for Wood Anatomy & Dendrochronology Lund

Humlab Umeå universitet

Archaeological Research Lab Stockholm
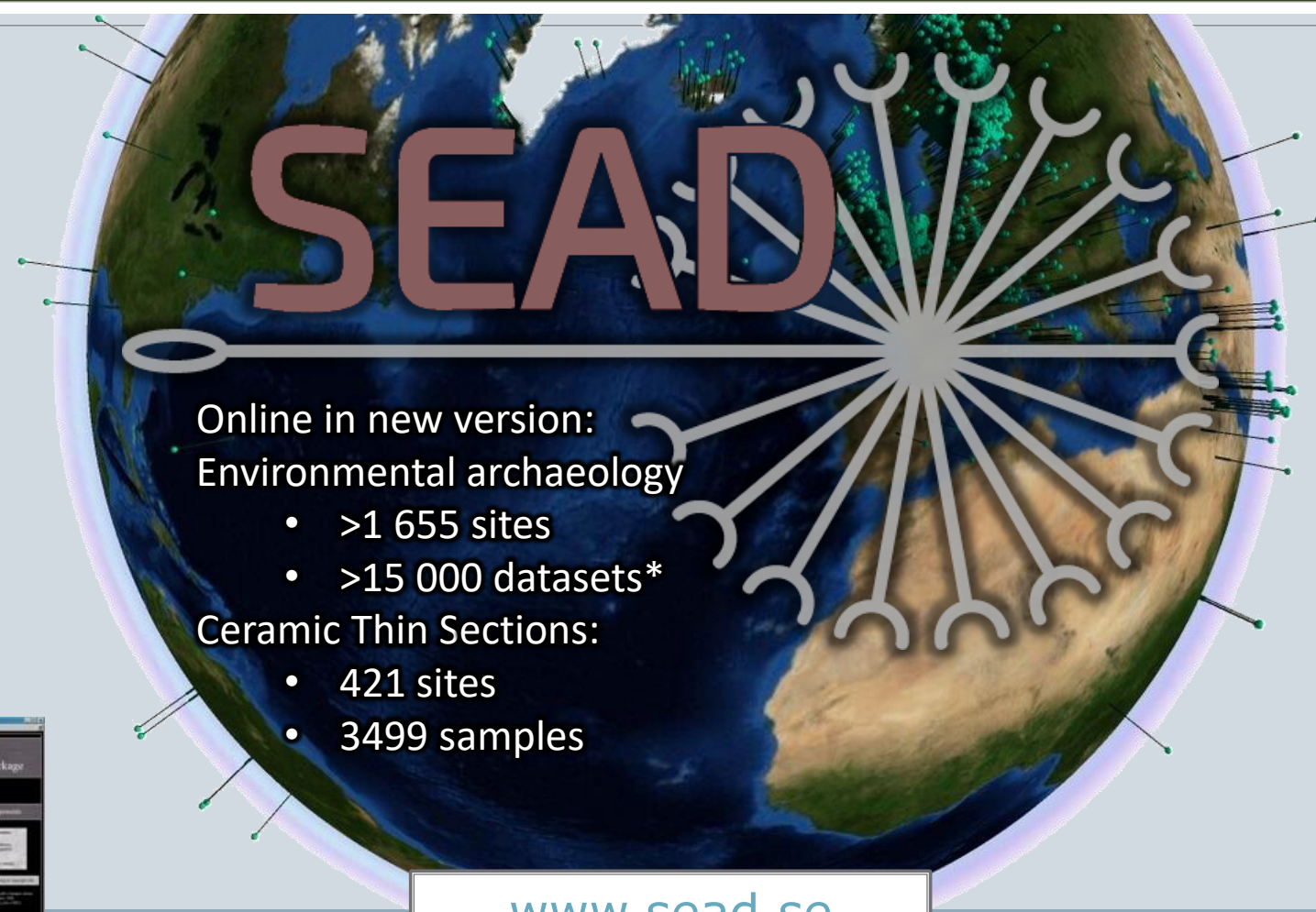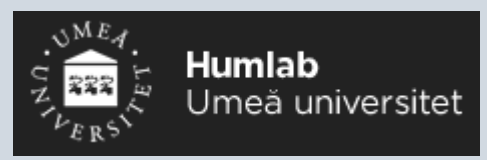
SEAD

Online in new version:
Environmental archaeology
- >1 655 sites
- >15 000 datasets*
Ceramic Thin Sections:
- 421 sites
- 3499 samples

BugsCEP

Tandem Laboratory uppsala

www.sead.se
qsead.sead.se
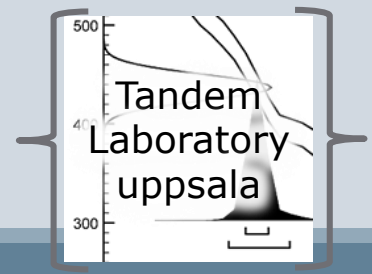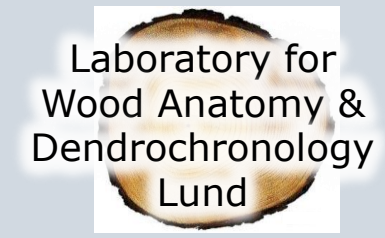
SEAD raw data

- Counts (organisms) and measurements (properties) for samples

- New (www.archlab.se, www.visead.se):
  Nearly ready: ceramic geochemistry/properties
  Next: dendrochronology, isotopes, lipids

- Metadata: dating evidence, site and sample details, bibliography

- Environmental reference data (calibration, text abstracts, ecocodes)

Structure

Connection at environmental indication level

Allows presence only and relative importance visualisation (one of several alternatives)

Habitats/landscape elements

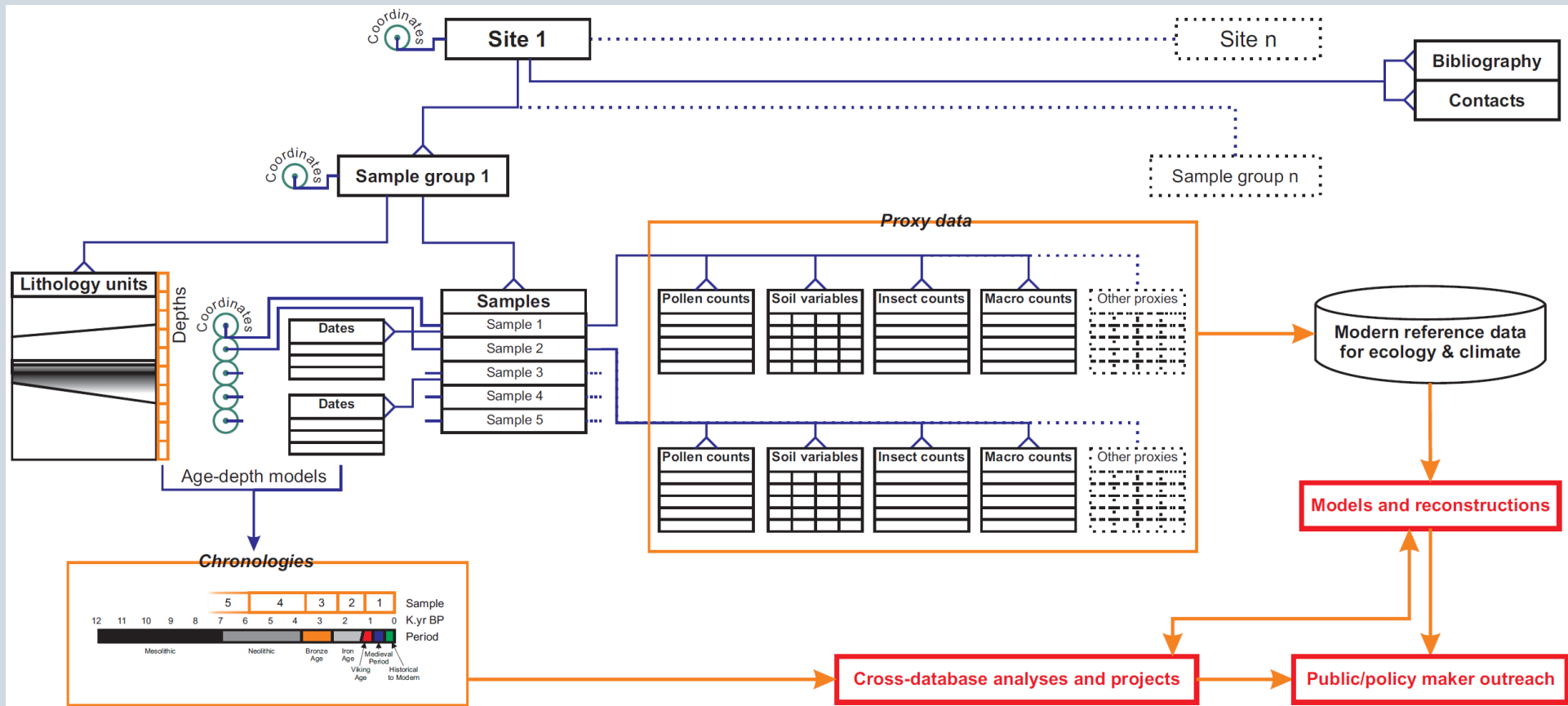| Visualization	Aquatics	Indicators: Standing water	Pasture/Dung	Meadowland	Wood and trees	Indicators: Deciduous	Wetlands/marshes	Open wet habitats	Disturbed/arable	Sandy/dry disturbed/arable	Dung/foul habitats	Carrion	Indicators: Dung	Mould beetles	General synanthropic	Dry dead wood	Heathland & moorland	Halotolerant	SumRep	Abundance	NSpec
Species richness, sum.rep., to species id's only	1.11	0.37	15.50	9.59	10.70	1.48	8.12	0.37	11.07	10.70	12.92	2.95	3.69	2.58	4.06	0.37	3.32	1.11	271	606	156
Abundance, sum.rep., to species id's only	0.28	0.09	24.95	7.14	9.74	0.74	3.06	0.09	8.16	10.11	20.69	2.04	1.67	4.08	4.92	0.09	1.58	0.56	1078	606	156

```sql
/***********************************************************************************
**   View      humlab_utility.ecocode_dating_geojson
**   What      Returns GeoJSON objects for each aggregate type (sum and count) from data returned by VIEW ecocode_dating
**   Who       Phil & Roger
***********************************************************************************/
CREATE OR REPLACE VIEW humlab_utility.ecocode_dating_geojson as

    SELECT agg_type, json_build_object(
        'type', 'FeatureCollection',
        'features', json_agg(json_build_object(
            'type', 'Feature',
            'id', physical_sample_id,
            'geometry', json_build_object(
                'type', 'Point',
                'coordinates', json_build_array(longitude_dd, latitude_dd)
            ),
            'properties', json_build_object(

                'id', physical_sample_id,
                'country', location_name,
                'sampleData',  json_build_object(
                    'site_id', site_id,
                    'site_name', site_name,
                    'sample_name', "sample_name",
                    'sample_group_id', "sample_group_id",
                    'dating_type', (ARRAY['tbl_analysis_entity_ages', 'tbl_relative_dates'])[dating_type],
                    'age_older', age_older,
                    'age_younger', age_younger,
                    'age_name', age_name,
                    'age_abbreviation', age_abbreviation
                ),
                'indicators', json_build_object(
                    'Aquatics', Aquatics,
                    'Indicators: Standing water', "Indicators: Standing water",
                    'Indicators: Running water', "Indicators: Running water",
                    'Pasture/Dung', "Pasture/Dung",
                    'Meadowland', Meadowland,
```

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2 Create / Select Combinator: Animals ▾ ❓

3 Query: ❓

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Indicators: Dung ▾	Greater Than ▾	▾
Pasture/Dung ▾	Greater Than ▾	▾

Or ▾

4 Description: ❓

Insects indicating either dung or carrion indicate the presence of animals, or the waste products from animals in the area.

5 Assign Topic: ❓

agricultural landscape (0) ▾ −
pasture (0) ▾ −
animal (0) ▾ − +
fuel (0) ▾

6 Combinator Name: Animals ❓

7 Citation: TBD ❓

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59c2d0a52ab79c0005cdcc9e	
59c2d0a52ab79c0005cdcc9f	
59c2d0a52ab79c0005cdcca0	
59c2d0a52ab79c0005cdcca1	
59c2d0a52ab79c0005cdcca3	
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59c2d0a52ab79c0005cdcca7	
59c2d0a52ab79c0005cdcca8	
59c2d0a52ab79c0005cdcca9	
59c2d0a52ab79c0005cdccaa	

Storaborg - G55N

Results

Matched Results

Environmental

1320

Sources

Strategic Environmental Archaeology Database (SEAD)	Tephrabase
1122	198

View

50

Carrion | Open Wet Habitats | Heathland & Moorland | Wetlands/Marshes | Indicators: Dung | Aquatics | Meadowland | Dry Dead Wood | Halotolerant | General Synanthropic | Indicators: Deciduous | Sandy/Dry Disturbed/Arable | Ectoparasite | Pasture/Dung | Indicators: Coniferous | Disturbed/Arable | Indicators: Standing Water | Wood and Trees | Stored Grain Pest | Indicators: Running Water | Mould Beetles

Dung
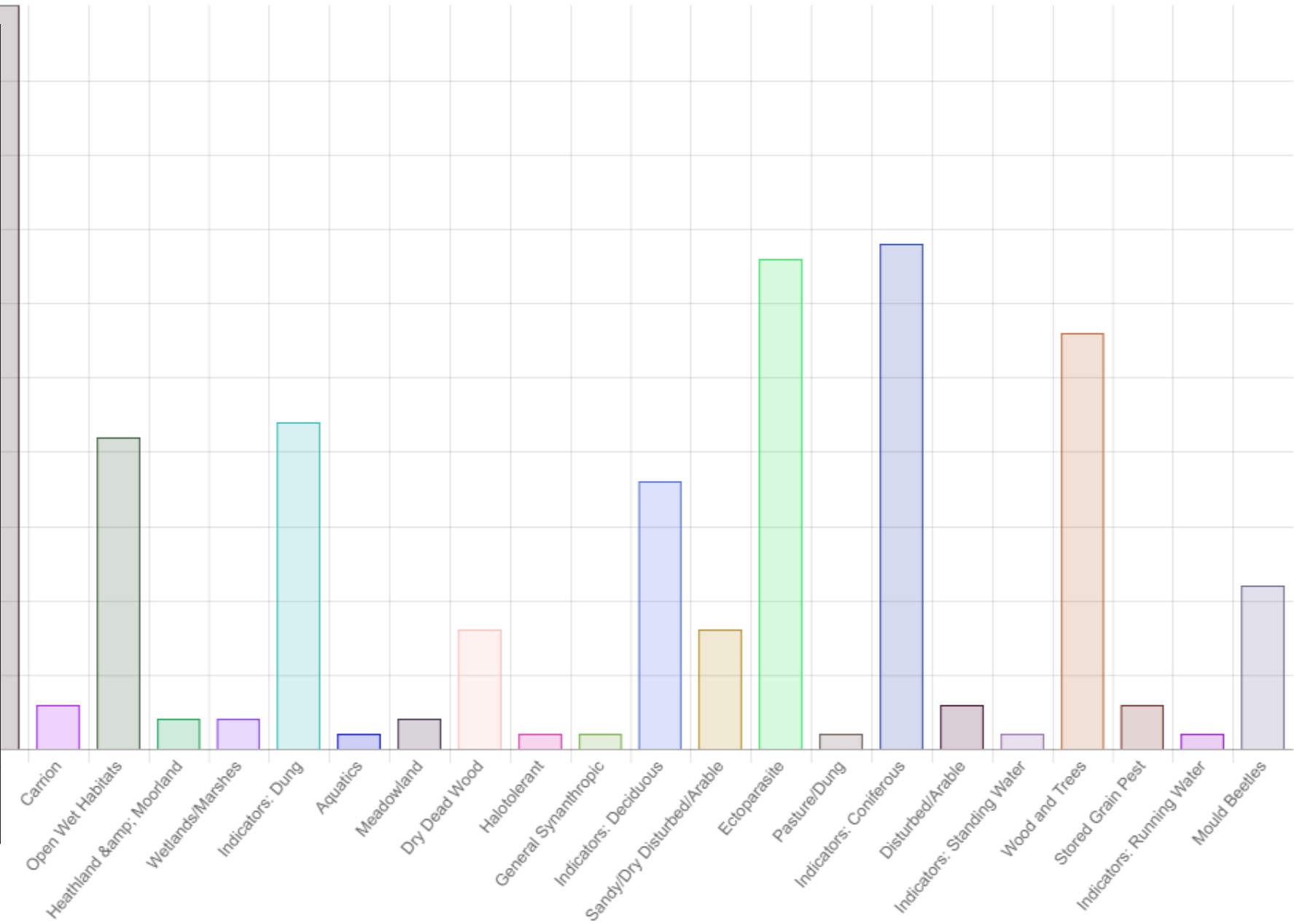
Challenges

Data and User Diversity

Experts and sufficient expertise

Knowledge Modelling

Long(er) Term Plans

Incorporate new data sources

Training and outreach

Sustainability

Results

⚙

SAVE RESULTS | **PRINT RESULTS**

Thank you!

Find us online:

http://beta.data-arc.org/

https://www.data-arc.org/