NATURAL HISTORY MUSEUM

RECODE
Rethinking Collections Data Ecosystems

Rethinking Collections Management Data Models

Overview

Poster Navigation

The poster is a starting point for publicly sharing and discussing the work that the RECODE programme has done; eliciting ideas that members of the community may have regarding its continuing improvement. The poster will start from the the backbone for data models, from collecting, through the object curation to the scientific identification.

You can follow the Numbers **1** to **11** to explore sections step by step and dive into the details as scrolling down the poster; alternatively, you can click the icon 🖐 next to each section and jump to the detailed information you are interested in and come back to the overview section by clicking the icon 🏠 which is the part you are reading now. If the links don't work in browsers, please view in Adobe PDF Reader.

1 Introduction

● **RECODE Vision**

To promote management of and engagement with natural sciences collections and data, through the development of a scalable, sustainable, and future proof solution, which will transform natural sciences collections management globally and underpin research that will enable people and the planet to thrive.

● **Data Architecture Landscape**

To achieve the vision above, data architecture plays a key role. However, the problem exists: data modelling of natural history collections is far from trivial.

Community standards become vitally important, and existing and emerging standards and models have and will be used heavily to inform this work.
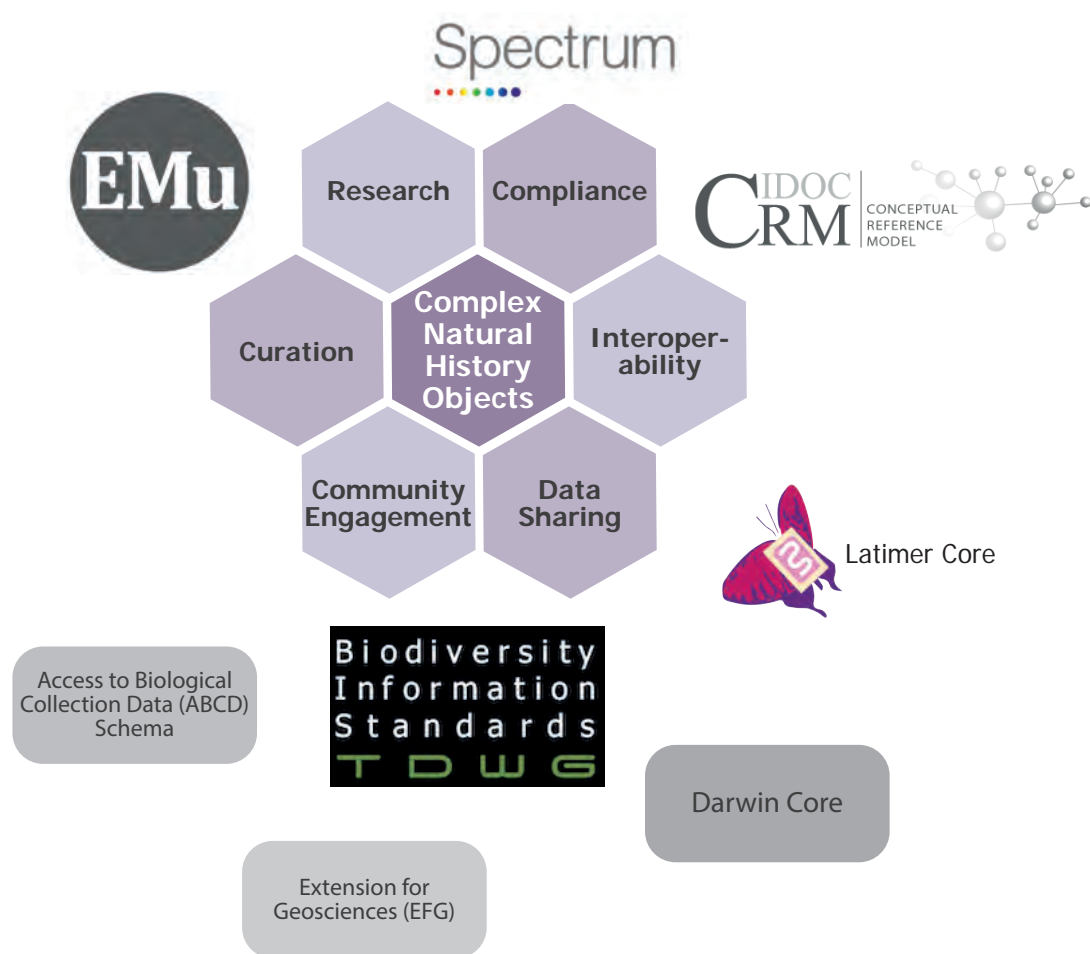

2 Data Model

● **A Complex Collection Object Data Model**

The diagram below is a simplified version of the core of the new Recode data model. It highlights some key entities and relationships.

Legends
ACTIVITY · ENTITY · AGENT · ASSOCIATION
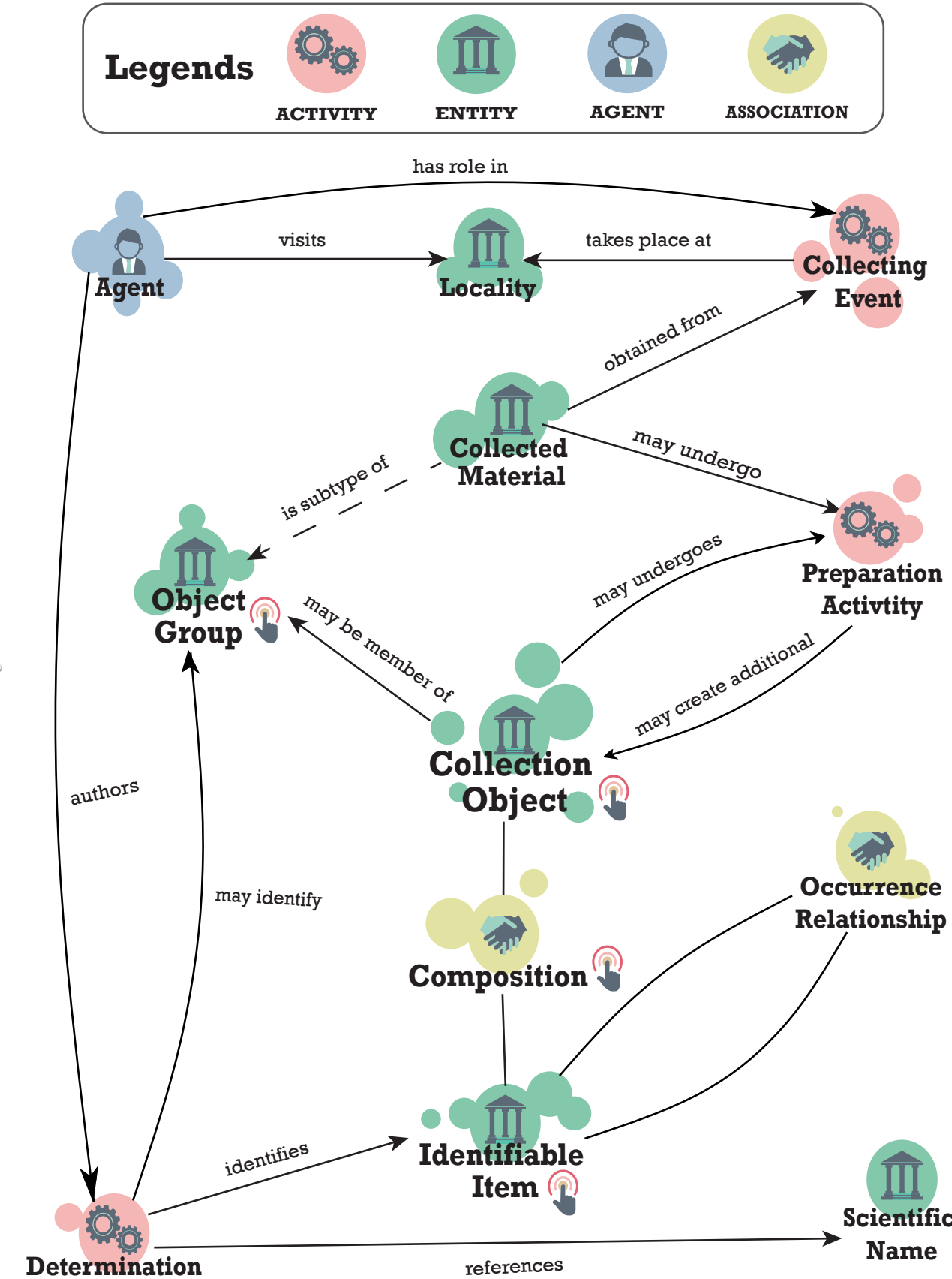
3 Conclusion

● **The Future System Landscape**

1. The data model **2** sits at the heart of a new Collections Management System (CMS)

2. The new CMS sits at the heart of the NHM's technical infrastructure and platforms (marked yellow below)

3. The new CMS forms a critical part of the global data collections community as illustrated below.
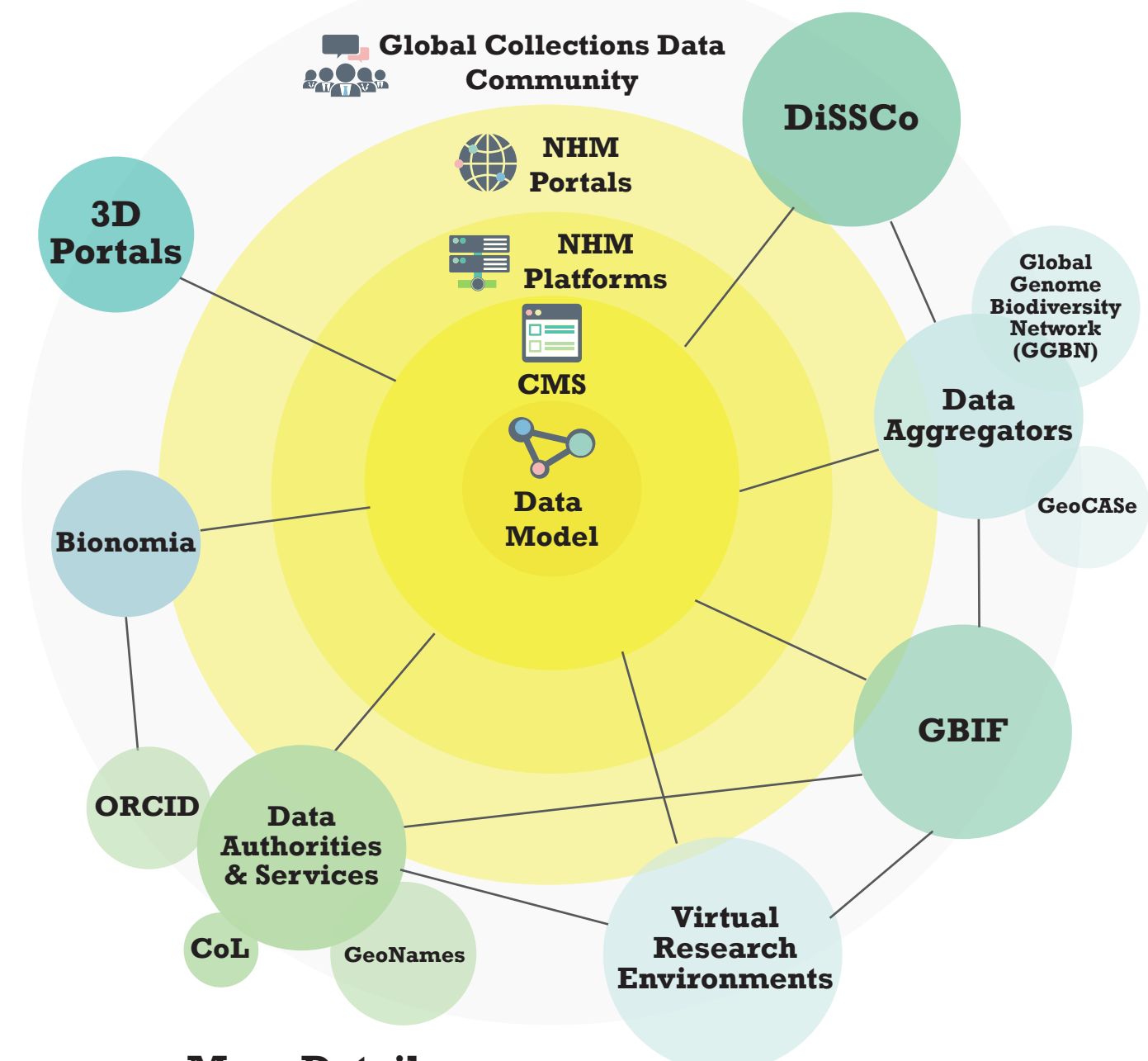
● **More Details**

Please click 🖐 to see the whole RECODE Data Ecosystem

Detailed Models

4 Model: Collections Object

● The item that will be physically loaned or handled in collection moves

● May link to one or more Identifiable Items that equate to one or more taxa that are present in the Collection Object

● Also includes any physical media used to preserve and present them, such as a microscope slide, herbarium sheet or jar

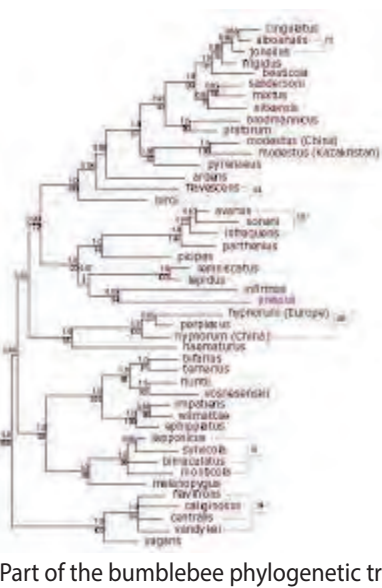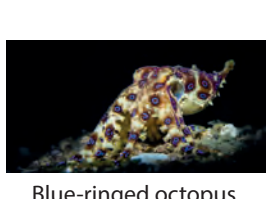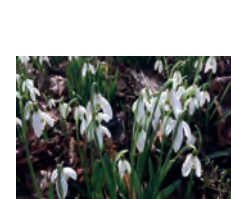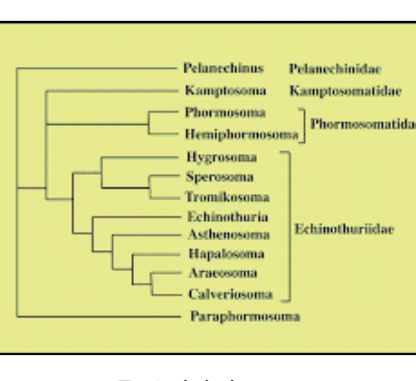● Can have further Collection Objects derived from it, with details of the relationship shown in the Preparation 🏠

Ore specimens in matrix

Herbarium sheet showing seed plants specimens collected by Anna Atkins

A small copper butterfly specimen from the Isle of Wight, collected in August 1

Abudefduf bengalensis (Bloch, 1787) - BMNH 2003.5.16.598

Typical drawer of coleoptera.

5 Model: Object Group

● The core entity in the collection descriptions part of the data model, and the Latimer Core data standard

● Represents a group of physical objects with one or more common characteristics

● May represent a mixture of objects that are not individually digitised and not represented by individual Collection Objects, as well as those that are

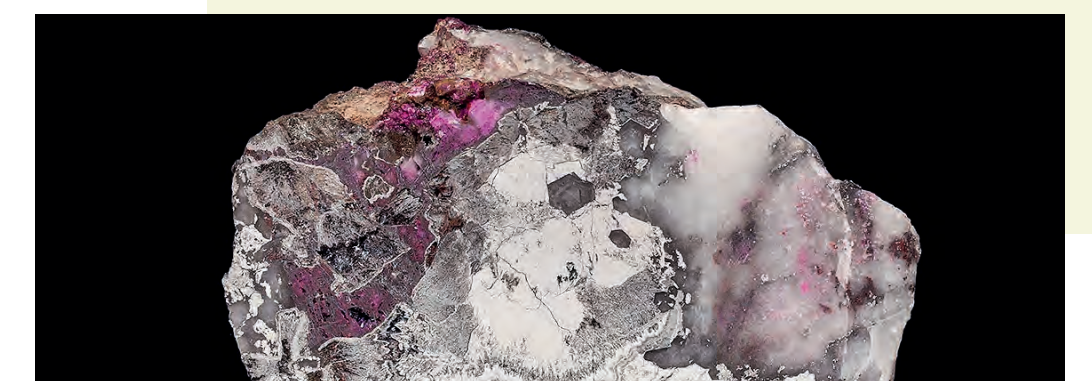● Can be conceptually linked to many of the same entities as the Collection Object within the data model 🏠

Patrick Russell's 18th century volume of Indian serpent skin
A bound volume is a single Collection Object with multiple Identifiable Items.
The details of page number and position on a page can be recorded in the Compositions

6 Model: Identifiable Item

● Represents an instance of a single taxon of mineralogical classification in one or more Collection Object

● Identifiable Items of different taxa, that were collected together can be related to each via the Occurrence Relationship, e.g. species A is a parasite of species B

● Can correspond to a single Collection Object, be spread across multiple Identifiable Items or be part of one

● Each Identifiable Item could have multiple determinations of its taxon name 🏠

Typical cladogram

The earliest armoured dinosaur found in all of Asia

European Robin

Snowdrops

Blue-ringed octopus

Part of the bumblebee phylogenetic tree

An artificially coloured image of an ant head with three parasites embedded inside it

7 Model: Composition

● Establishes a relationship between a Collection Object and and Identifiable Item

● Enables details of the relationship to be stored, e.g. the page number of a specimen in a bound volume, or the proportion and locations of a mineral species in an aggregate mineral sample 🏠

Colloform mass of silver-white skutterudite associated with crimson-pink erythrite, from the Bou-Azzer Mine in Morocco

Test: Map the Narratives to Model

8 NARRATIVES 🏠

We asked stakeholders to describe specimen narratives and this is one example

During the HMS Challenger Expedition (1872-76) on <date> at <location>, a sample was taken from the sea floor at a depth of 500m during a sounding. Seafloor sediment was collected and described by its sedimentology as mud. Following further tests is was concluded to be radiolarian clay, this has since been split into 5 preparations:

1. Jar of mud, identified as M 567 Radiolarian clay, consisting of multiple species (deduced from Preparation 3). It is now managed by ES-Mineralogy.

2. Tube of residual biota from washed clay, identified as M 567a tube of Radiolaria & echinoid spines, managed by ES-Mineralogy.

3. Section of representative biota from washings, identified as M 567b section containing radiolaria (of various families), managed by ES-Palaeontology

4. Section of a single genus/species picked from washed clay, identified as M 567c section containing 14 individuals of the genus Cornutella Ehrenberg, 1838. Now managed by ES-Palaeontology

5. A sharks tooth, identified as 1880.45.3 Squatina occulta Vooren & K. G. da Silva, 1992. Now managed by LS-Zoology.

A separate collection event may have occurred at the same station - different collection method e.g. net pulled up through top 300m of water column. The collected material and preparations might be part of the Zoology collection.

9

Legends
Collecting Trip · Collected Material · Identifiable Item
Collecting Event · Collection Object
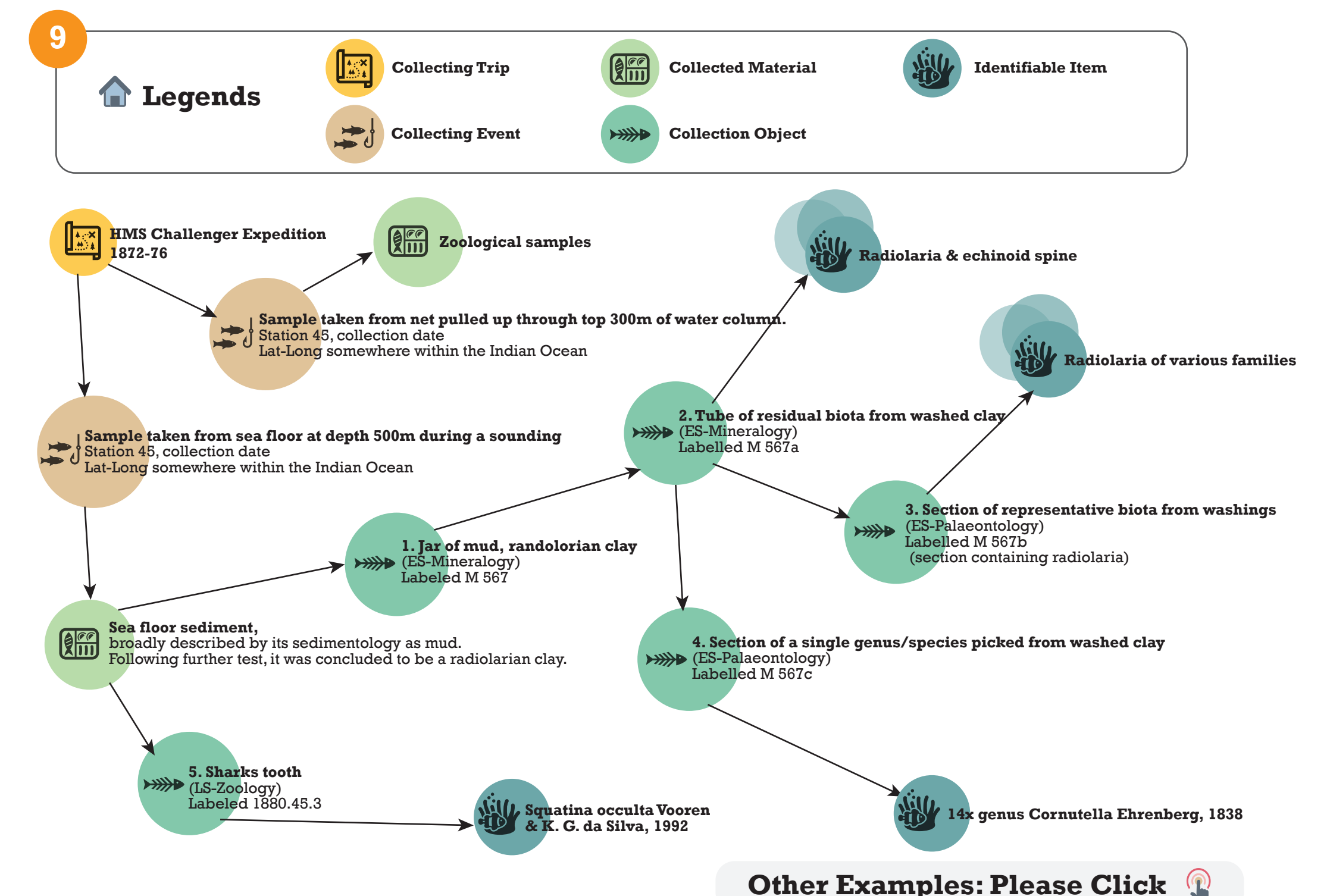
Other Examples: Please Click 🖐

Learn More...

10 Reference 🏠

Beyond Lot, Specimen, and Preparation: Models for handling complex collection object information.
P.J. Morris, J.A. Macklin, G.E. Tocci , M. Kelly (Unpublished)

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11 Additional Information Link 🏠

Please visit the NHM RECODE Programme's OSF site: https://osf.io/968y7/ and see the folder **TDWG 2022**