

Place-Based Inquiry

with the Beaty Biodiversity Collections Database



This document serves as a guide to create your own inquiry project for your students using the Beaty Biodiversity Museum’s database. It can be easily modified to suit different grade levels.

Overall, this project will have students investigating a specific location with regards to its ecology, exercising research skills by navigating and citing the database, and building a holistic understanding of their local environment.

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Related Core Competencies



Communicating

- **Connecting and engaging with others**
 - This project can serve as an opportunity to pull back the curtain on scientific investigation. By introducing students to a database that professional researchers reference, this enters students into dialogue with academia. This tasks them to engage with the academic sphere, potentially develop a relationship to the institution, and consider a researcher's perspective—all in an accessible, grade-appropriate way.
- **Acquiring and presenting information**
 - At the very beginning of the project, students will be shown the basics of navigating the database. From there, they will have the freedom to poke and prod to their heart's content. They will find what methods of navigation work best for them, and where they will find the information they're looking for.
 - This project's natural endpoint is the communication and presentation of the information found by students. Because the information stored in the database can be overwhelming, students have an opportunity to practice adapting the information for a specific audience—perhaps their peers, perhaps the general public—that is unlike the intended audience for the database.

Thinking

- **Questioning and investigating**
 - This project asks students to investigate the database on their own terms, seeking out specific information based on the choices they make. When creating an inquiry question, students are asked to question the information they have gathered, discern what might be missing or related, and delve deeper.
- **Designing and developing**
 - This project has students creating an inquiry question by assessing and refining their personal curiosities.
 - Additionally, this project can be adapted in multiple ways to encourage students to design their own method of delivery (essay, field report, scientific journal, poster, presentation, data visualization, etc).

Personal and Social

- **Contributing to community and caring for the environment**
 - This project can easily link back to the local community and environment. Because this project's impetus is place-based, the teacher might include questions that have students research local history, environmental organizations, or efforts being taken to preserve habitats.
 - If possible, the teacher might encourage students to visit these locations in person to observe wildlife firsthand, emulating what a researcher might experience in order to contribute to the database.

The Deliverable

What will students be creating?



Students will be tasked with creating a report on the ecology of a specific location. Students will be free to choose any location they wish, provided that there is sufficient data related to that location within the Collections Database. For that reason, encourage students to select a location from within British Columbia. This location can be a city, a national park, a lake, etc. The scope should be manageable but also large enough to find sufficient data.

- Upon selecting a focus, student will pick 3-5* specimens which were collected within the scope of the location.
 - Students are encouraged to find specimens from different collections, eg: Cowan Tetrapod Collection, Fungi Collection, Fish Collection.
- Students will then use the database as both a source of information and a jumping off point to further research the specimens.

**As with most everything in this guide, the number of specimens required is arbitrary. Read on to learn more.*

Customization

Depending on the grade level of the students or the desired focus of the teacher, this assignment can be modified in any number of ways. Required elements per specimen may include but are not limited to:

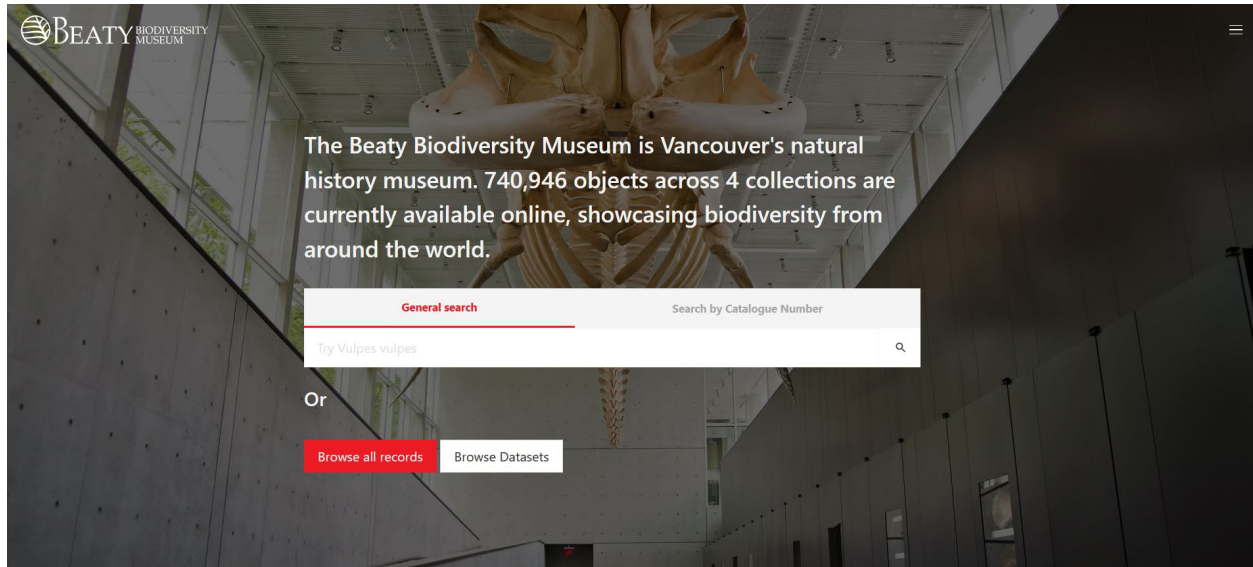
- Taxonomy from the database:
 - Scientific name versus vernacular name
 - Classification and what each name denotes
- Location from the database:
 - Ex: written data or visual data (map)
- Summary of biological/ecological information
 - Information from the database supplemented with research from outside sources
- Visual data
 - Gallery images from the Collections Database
 - Contrasting images of live specimens
- Citations
 - Citations are available, already formatted, in the database. Discuss with students the logic behind this formatting.
 - As an auxiliary activity, have students collect a specimen, identify it, record its data, and format a citation wherein they get to credit themselves.
- Interconnectivity
 - Have students hypothesize and research how their chosen specimens might interact. What are their ecological relationships?
 - For this purpose, you may have students create an overview of the general ecology of their location, including organisms besides their chosen specimens, to illustrate the bigger picture.
- Reflections
 - Students may complete a number of reflections or additional questions including:
 - Performing a CRAAP (currency, relevance, authority, accuracy, and purpose) test on the database or specimen entries (likely with specific attention to the date of collection)
 - Discuss why some specimens have vernacular names and others don't.
 - Reflect on which specimens they are naturally drawn to/are curious about? Why might this be? Do we have a bias towards certain organisms?
 - How might humans fit into, interact, or disrupt this ecosystem? What is their personal relationship to this ecosystem?

A Simple Guide to Navigating the Beaty Biodiversity Museum's Collections Database



The Collections database, despite being very well organized, isn't immediately parseable to students—or teachers, for that matter. The following serves as an entry point for exploring the collection.

To begin, the database can be found at <https://collections.beatymuseum.ubc.ca/>.



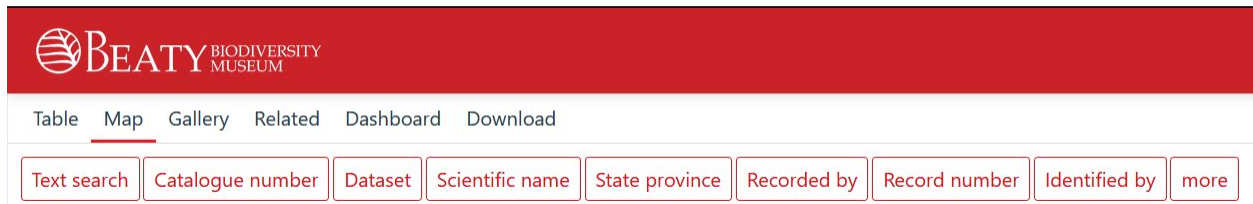
When first accessing the database, this is your landing page. Clicking on “Browse all records” will take you to this page.

A screenshot of the Beaty Biodiversity Museum Collections Database search results page. The page has a red header with the Beaty Biodiversity Museum logo. Below the header, there are tabs for "Table", "Map", "Gallery", "Related", "Dashboard", and "Download". The "Table" tab is selected. Below the tabs, there are search filters: "Text search", "Catalogue number", "Dataset", "Scientific name", "State province", "Recorded by", "Record number", "Identified by", and "more". Below the filters, there is a table with 740,946 results. The table has columns for Scientific name, Features, Catalogue number, Locality, Country or area, Year, Recorded by, and Identified by. The table displays a list of bird species with their corresponding catalogue numbers, localities, countries, years, and the names of the recorders.

Scientific name	Features	Catalogue number	Locality	Country or area	Year	Recorded by	Identified by
<i>Bubo virginianus</i> (J.F.Gmelin, 1788)	⚡	B016765	Vancouver: 4650 W 13th Ave	Canada	2011	Maggie Schet	
<i>Colaptes auratus</i> subsp. <i>auratus</i>	⚡	B007341	Huntingdon	Canada	1934	Kenneth Racey	
<i>Bonasa umbellus</i> subsp. <i>brunnescens</i> Conover, 1935	⚡	B014201	Coquitlam Burke Mountain	Canada	1981	Don Li-Leger	
<i>Regulus regulus</i> subsp. <i>regulus</i>	⚡	B022165	Cornwood	United Kingdom	1903		
<i>Lagopus leucura</i> (Richardson, 1831)	⚡	B000678	Cairn Pass	Canada	1944	Ian McTaggart Cowan	
<i>Spinus tristis</i> subsp. <i>jewetti</i> van Rossem, 1943	⚡	B008654	Sidney	Canada	1958		
<i>Regulus satrapa</i> Lichtenstein, 1823	⚡	B016929	unknown	Canada	1981	E.thorn	
<i>Accipiter gentilis</i> subsp. <i>atricapillus</i> (A.Wilson, 1812)	⚡	B015406	Penticton	Canada	1998	Anne Gims	

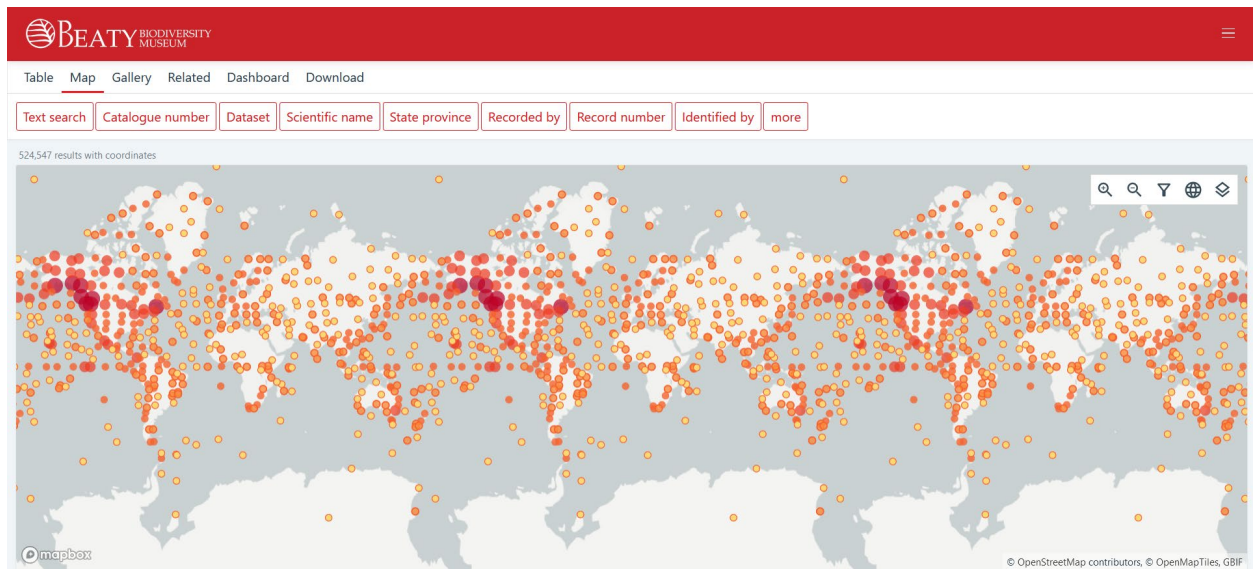
A Simple Guide to Navigating the Beaty Biodiversity Museum's Collections Database Cont.

Because this project is place-based, we will be using the Map feature in the top navigation bar.



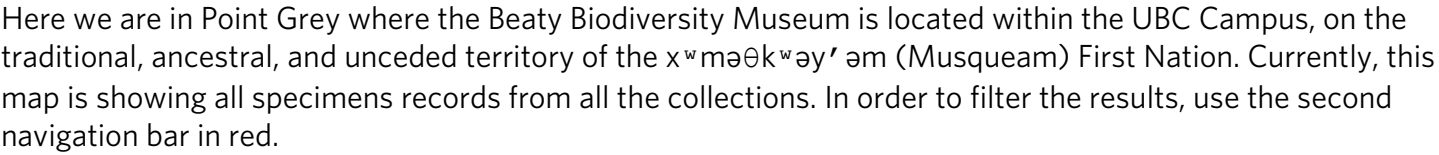
The map displays search results organized by the specimen's physical origin. This means that your search can be refined by collection, keyword, record number, etc, and the results will be shown visually on the map.

- The database is a massive, collective, and ongoing project. Because of this, some of the map data may not be 100% accurate and is being updated all the time. You might choose to discuss this with your students, how to critically question the information and deduce its accuracy.



For those who have used similar tools such as Google Maps, navigating this map should feel familiar. Drag to move, scroll to zoom, etc. From here, you can zoom in on any location and click on the dots to view specimen records.

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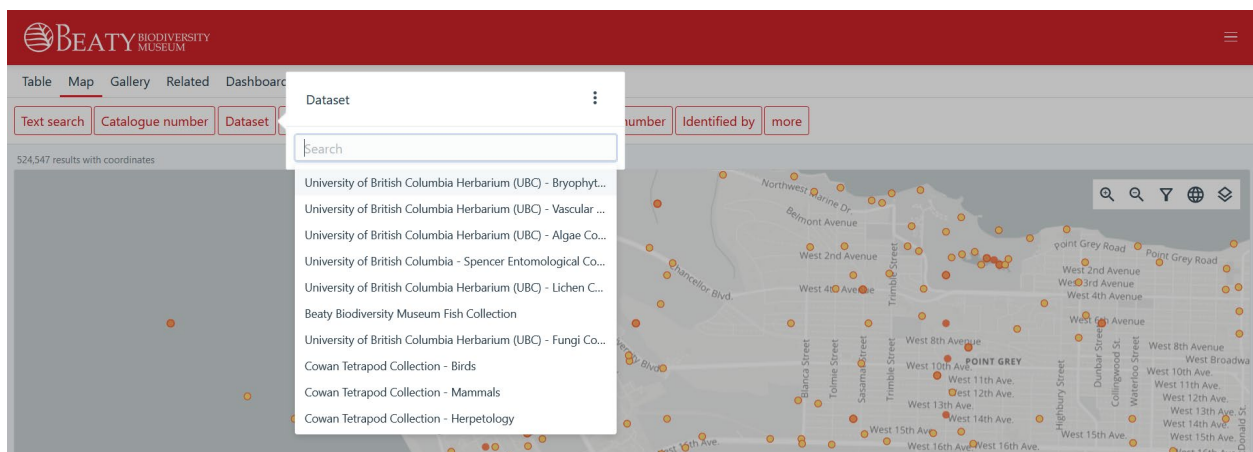
These are the categories you can search by in order to filter results. You can get very specific with your searches, but for the purposes of this project, searching using the “Dataset” filter is most useful. Datasets refer to the different collections at the BBM.

- Cowan Tetrapod Collection
 - Birds
 - Herpetology (Reptiles and amphibians)
 - Mammals
- Herbarium
 - Algae
 - Bryophyte (Moss and liverwort)
 - Fungi
 - Lichen
 - Vascular (Plants with roots, leaves, and stems)
- Spencer Entomological Collection (Insects)
- Fish Collection

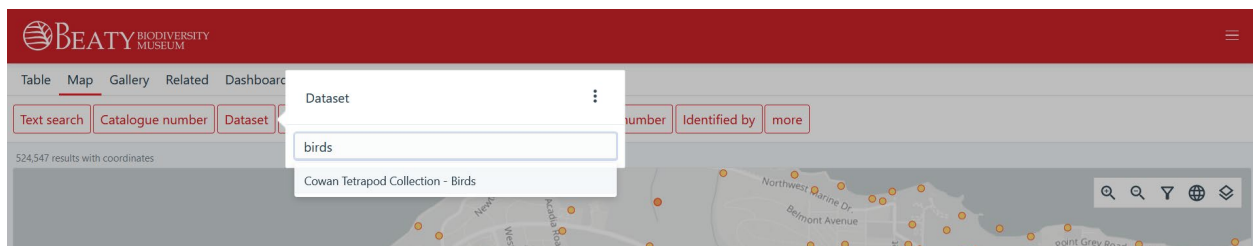
Created for Beaty Museum Educational use by Missy Bilawka, teacher candidate from the Faculty of Education at UBC.
All photos and drawings © Missy Bilawka, 2024 unless otherwise noted.

A Simple Guide to Navigating the Beaty Biodiversity Museum's Collections Database Cont.

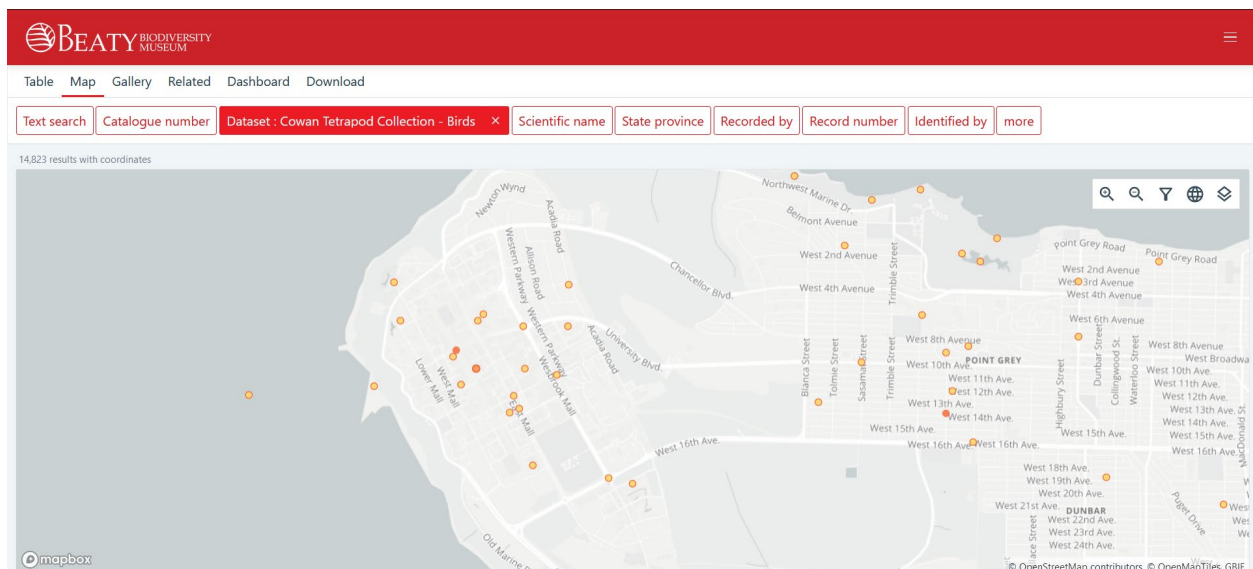
Typing any character into the Dataset filter will pull up this list:



Typing a keyword will refine the list. As an example, let's explore the bird specimens collected from Point Gray.



Select the Cowan Tetrapod Collection - Birds, and click apply to filter the results.



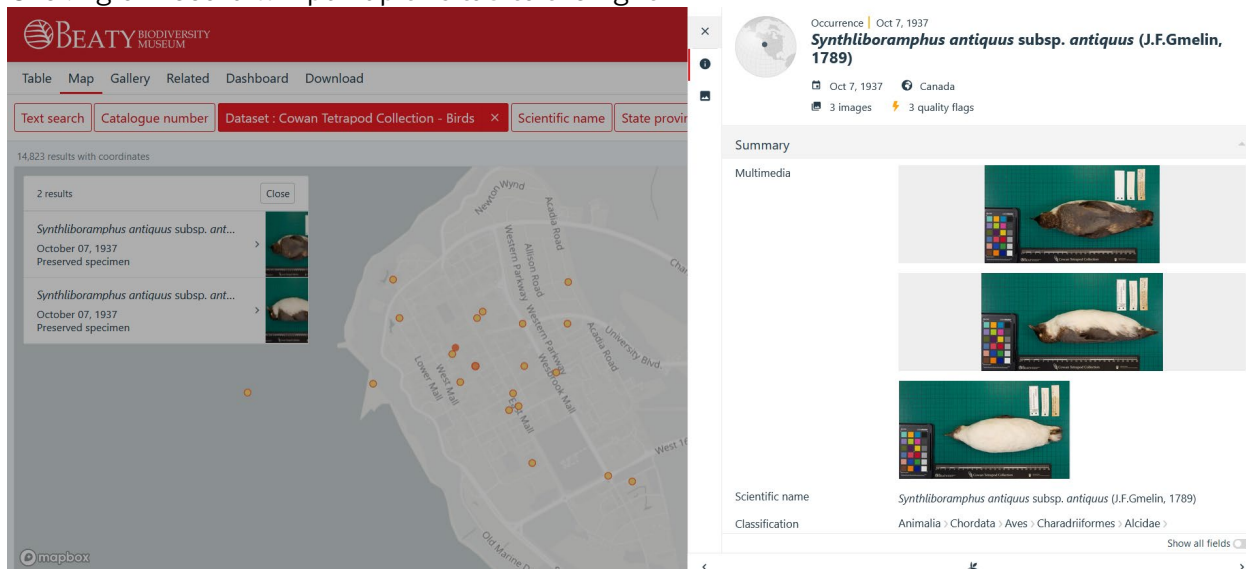
A Simple Guide to Navigating the Beaty Biodiversity Museum's Collections Database Cont.

Clicking on any point on the map will pull up a window on the left. Here we see any specimen records that correlate with that location.

This preview will show the scientific name, the date the specimen was collected, and potentially some images from the gallery.



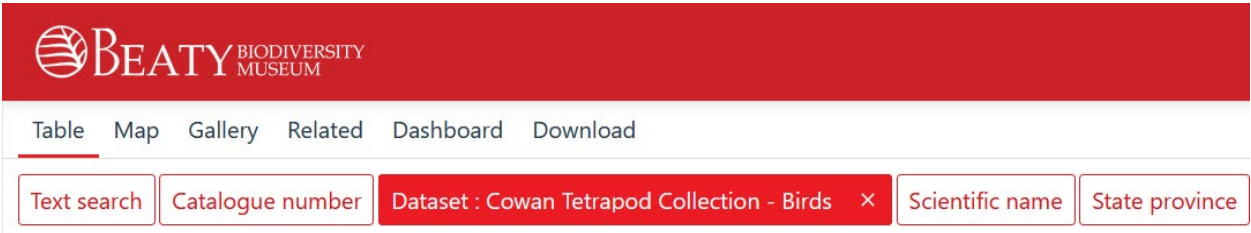
Clicking on record will pull up this tab to the right.



Scrolling down through this record will show you the specimen's record, taxonomy, exact location, citation, etc. In the case of this record, we can find its vernacular name (Ancient murrelet) as well as some gallery pictures. This makes for an excellent springboard for further investigating this species.

This Map + Dataset filter method is detailed here because it is a simple, intuitive way to navigate the collection for the purposes of this project, but it is by no means the only one.

A Simple Guide to Navigating the Beaty Biodiversity Museum's Collections Database Cont.



Returning to the top navigation bar, you can search by Table, which provides a text-heavy spreadsheet. You can also search the Gallery, which pulls up only those specimen records that have been photographed and digitized. You can also explore the Related search, which provides an intriguing, interactive visualization of the connections between specimen records across various countries and collections.

However, the Map + Dataset is the encouraged method. Should you wish for your students to diversify the specimens they research, they can pick 3-5 different collections to select specimens from. A brief example using Point Gray:

Cowan Tetrapod Collection: Birds	Cowan Tetrapod Collection: Mammals	Herbarium: Vascular Plants
Ancient Murrelet	Ermine	Mountain Bluet
<i>Synthliboramphus antiquus</i> subsp. <i>antiquus</i> (J.F.Gmelin, 1789)	<i>Mustela erminea</i> subsp. <i>fallenda</i> Hall, 1945	<i>Centaurea montana</i> L.

A Simple Guide to Navigating the Beaty Biodiversity Museum's Collections Database Cont.



Note: Specimen records will not always have a vernacular name included in the entry. This is often because there is no common vernacular name for this species, or else it simply isn't listed. Some light research using the scientific name will usually lead to the vernacular name, if there is one.

Specimen entry with a vernacular name

Taxon	
Scientific name	Mergus serrator Linnaeus, 1758 Altered Mergus serrator original
Kingdom	Animalia
Phylum	Chordata
Class	Aves
Order	Anseriformes
Family	Anatidae
Genus	Mergus
Vernacular name	Red-breasted Merganser
Taxonomic status	Accepted Inferred

Specimen entry without a vernacular name

Taxon	
Scientific name	Antennaria howellii Greene Inferred
Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Asterales
Family	Asteraceae
Genus	Antennaria
Taxonomic status	Accepted Inferred

Vernacular names are located second from the bottom in the Taxon box.

Student Inquiry into the Database



Once students have decided on their location and chosen their specimen records, you may choose to prompt their independent inquiry in a variety of ways.

Big Picture:

- What biome does this location exist in? In what ways are the chosen specimens' species suited to this biome?
- What is the human impact on this location, and how might humans interact specifically with the chosen species?
- Are these species native to the area? If so, what significance or connection might they have to the local Indigenous peoples? If not, how did they get there?

Database Specific:

- Who recorded the specimen? Do they have any other specimens recorded in the database? What patterns might emerge, and what can we learn about this person based on their scientific contributions?
- How was this specimen preserved? Why was it preserved this way?
- What do the scientific names mean? What other species might belong to the same taxonomic family?

Of course, students are always encouraged to develop their own inquiry questions according to their personal curiosities.

Project Example

What follows is an example of what a portion of the entire project could look like. Included is a graphic organizer for students to use if you decide that this format is workable for your classroom.

Myotis californicus subsp. *caurinus* Miller, 1897



(Left) Szabo I, Stinson C, Pitblado M (2024). Cowan Tetrapod Collection - Mammals. Version 5.2. University of British Columbia. Occurrence dataset <https://doi.org/10.15468/qgdpad> accessed via GBIF.org on 2024-05-21. <https://gbif.org/occurrence/1291995780>

(Right) By The High Fin Sperm Whale - Self-photographed, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=10281170>

This specimen was collected on January 8th, 1941 by Dr. Ian McTaggart Cowan from the UBC campus in Greater Vancouver. The common name for the *Myotis californicus* is the California myotis, and it is a species of bat. These bats are small (some of the smallest!) with a fuzzy, brown body and black wings. However, the specimen stored in the Beaty Biodiversity Museum is only the bat's skull with the jawbone detached and sitting beside it. The catalogue number is M000518.

Even though its name is California myotis, this bat is found all over the west coast of the Americas, from BC to Mexico. Because of this, we can conclude that this bat is native to the Greater Vancouver area, and this location has been a part of its range since at least 1941.

One thing that stands out about this specimen is that it was collected by Dr. Ian McTaggart Cowan. This name might be familiar, because he is also the founder of the Cowan Tetrapod Collection, within which this specimen is found. Cowan joined the faculty at UBC in 1940, a year before this specimen was documented. There, he studied, taught, and helped to create over a hundred TV documentaries. He was an acclaimed conservationist, but he sadly passed away in 2010.

Dr. Cowan also provided many more specimens to the collection, including a Pacific water shrew (catalogue number M009257), a Coast Mole (catalogue number M000527), and a North American Deermouse (catalogue number M000716). Though one might assume that Cowan had an interest in rodents, bats like the California Myotis aren't rodents at. They are considered flying mammals. Furthermore, shrews belong to a different scientific family. From this, we might conclude that Cowan had an interest in small mammals.

Citations:

- "Cowan Tetrapod Collection Timeline and History." *Beaty Biodiversity Museum*, <https://beatymuseum.ubc.ca/research-2/collections/cowan-tetrapod-collection/history-of-the-cowan-tetrapod-collection/>. Accessed May 21st, 2024.
- "California myotis." *Bat Conservation International*, <https://www.batcon.org/bat/myotis-californicus/>. Accessed May 21st, 2024

Name: _____ Date: _____



Inquiry into the Beaty Biodiversity Museum's Database - Graphic Organizer

Use this sheet to organize your research on one specimen in the database.

Scientific Name:	
Vernacular Name:	
Catalogue Number	

Date:	
Location:	

Description:
• What does the specimen look like in the database? • What did this specimen look like when it was alive? • Where can this species be found?

Inquiry Question
What do you wonder about the specimen in the collection? What might stand out as strange, confusing, or unique about the entry? (Tip: Ask an open-ended question that starts with why or how.)