In-class Activity:
Exotic Species Scavenger Hunt

Description:
In this activity, students will explore exotic species recorded in the Beaty Biodiversity Museum Collection Database and investigate the impacts of these species to North America (or to Lower Mainland if the species were in North America from the beginning, but new to British Columbia). The activity consists of two parts; the first is to learn how to find an appropriate data using the database. The second is to do deep analytical research of the species found in the database to understand the origin, environment, journey to the new region, and its ecological, social, and political impacts. The resulting research is shared with the class.

Duration: ~45 minutes, plus research and presentation time

Grade range: Grades 8+

BC Curricular Competencies:
- Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, keys, models, and digital technologies as appropriate. (Science 8)
- Identify and assess how human and environmental factors and events influence each other. (Physical Geography 12)
- Develop, demonstrate, and apply conceptual understanding through experimentation, inquiry, and problem solving. (Computer Science 12)
- Contribute to finding solutions to problems at a local and/or global level through inquiry. (Environmental Science 12)

Learning objectives:
Understand the effectiveness and usefulness of data collections.
Raise awareness and evaluate the impacts of exotic species living in new regions.

Limitation:
This activity plan was created in May 2025. Please note that this database is updated on a daily basis, so the data presented here may differ from the data you see when you follow the directions as stated below.

Supplies:
- Presentation supplies for lesson
    - Each student (or pair) to have their own internet-enabled device
    - Instructor to show slides on a larger screen/projector as they walk through the lesson as a class.
- Research materials
- Student project presentation materials

Created for Beaty Museum Educational use by Shun Kurasawa, teacher candidate from the Faculty of Education at UBC.

Lesson hook:
Before doing this activity, it is recommended to ask students how they would interpret "invasive species". The way we define and interpret a species as "invasive" reflects our own values and perspectives. Thus this introductory remark can stimulate students' critical thinking, and can be expected to lead to a deeper analysis of the species.
Possible questions could be;

- What comes to mind when you hear the term "invasive species"?
- What is your definition of invasive species? Exotic species? *
- What is your standard of what impact is considered as "invasive" and what's not? Provide examples

* *In our database, we generally investigate the Lower Mainland, as this is where the museum is located. Therefore, "exotic species" in this context refers to species originally from outside of the Lower Mainland. However, this interpretation might not be the same for everyone. It is recommended to have the students choose the boundary for "exotic species". This might be: Lower Mainland, British Columbia, Canada, North America, Okanagan, etc.*

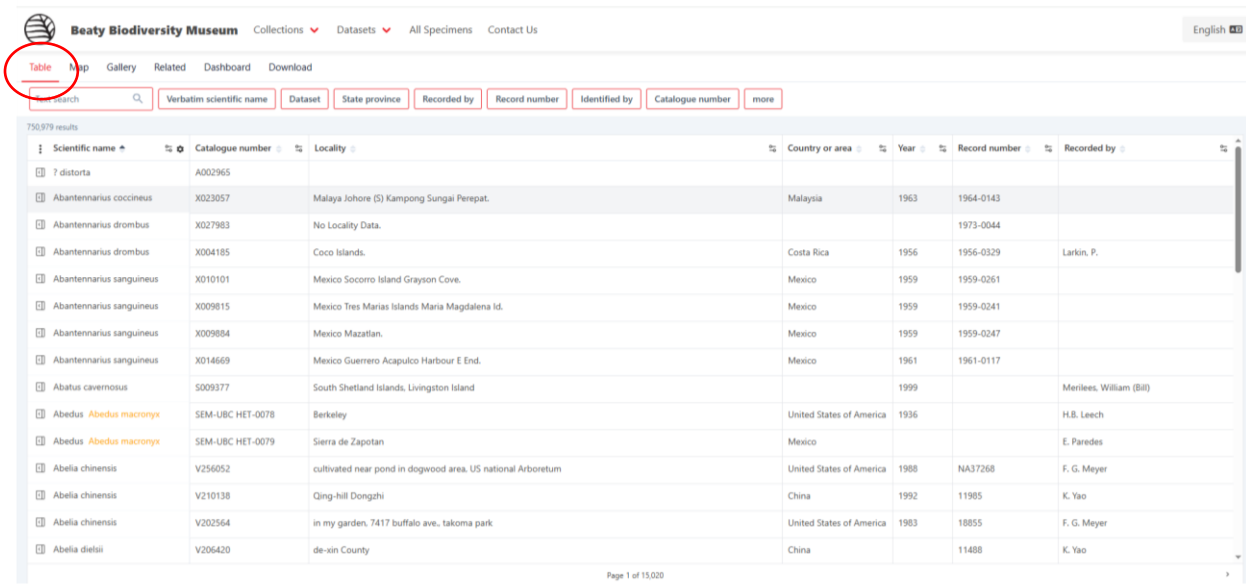
This activity revolves around a museum database. Ask students what they know about databases, and/or collections data. This is to make sure that all the students are on the same level of understanding about the database before learning about how to use it.
Possible questions could be;

- What is a database?
- What are some purposes of databases, generally?
- Why might the Beaty Biodiversity Museum have created one?
- What kind of information (data) is included in a database? Do you have any idea what information might be in the Beaty Biodiversity Museum Collection Database?
- Who is it for?
- How is it used?

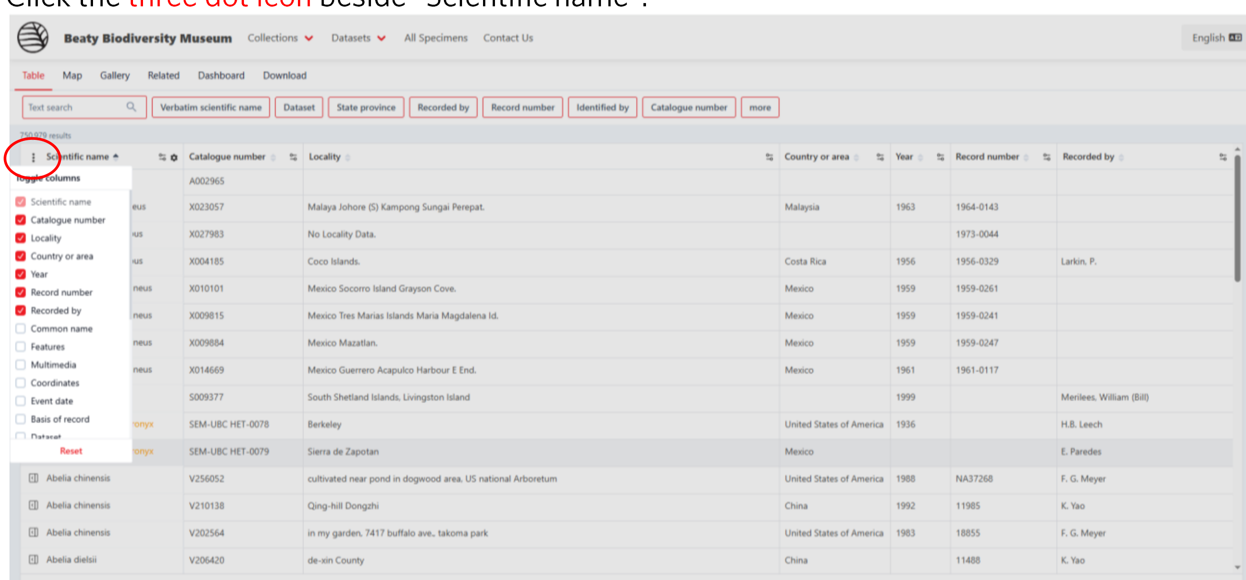
Procedure:

1) Go to the Beaty Biodiversity Museum Collection Database: https://collections.beatymuseum.ubc.ca/

2) Open "All Specimen" tab; Make sure the page shows a "Table".

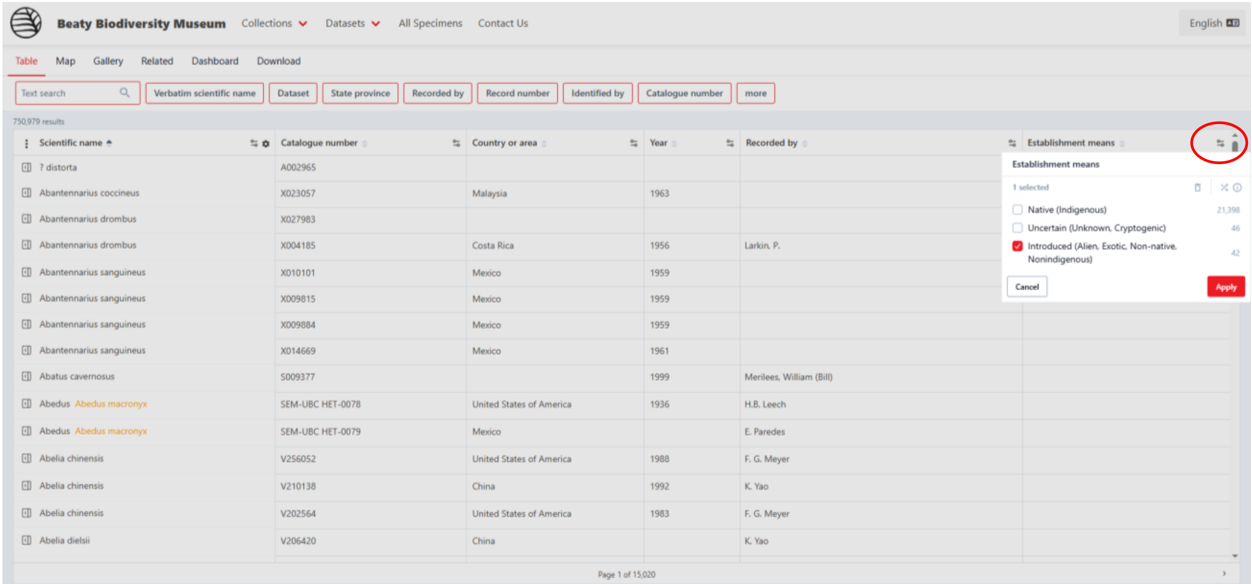


3) Click the three dot icon beside "Scientific name".



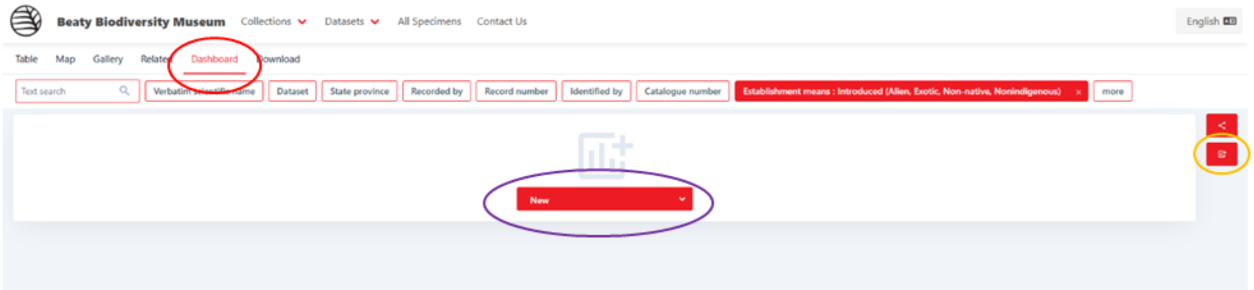
4) Check "Catalogue number", "Country", "Year", and "Establishment means".
You may add any another columns that interest you. For example, "Recorded by", "Common name"

5) Click the filter icon beside "Establishment means" column.

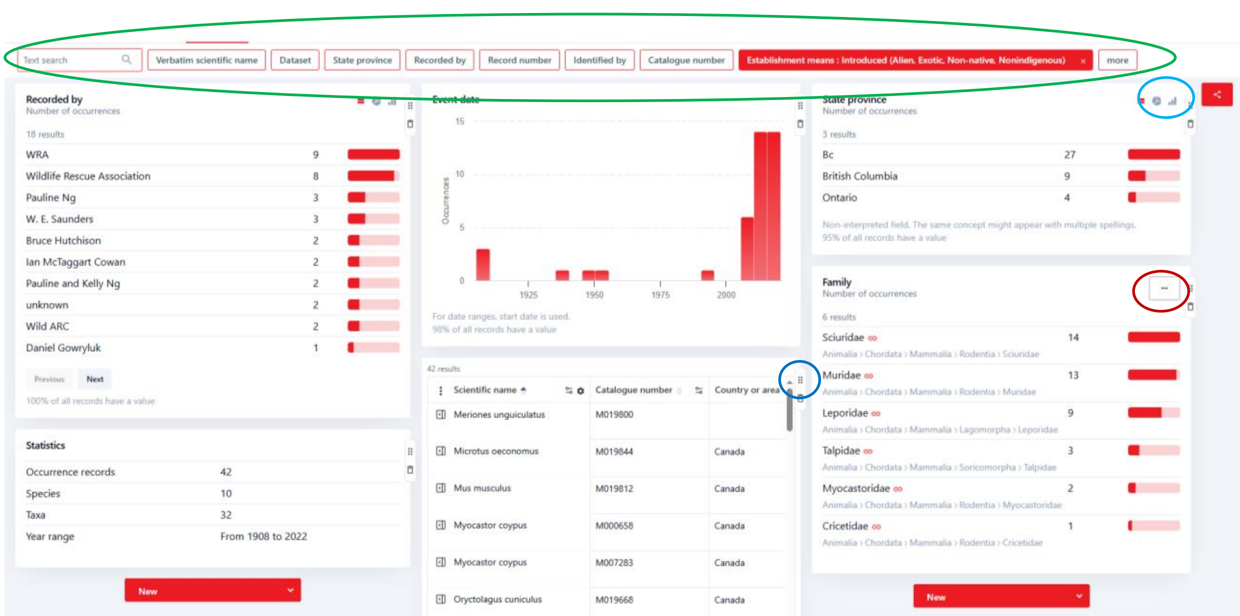


6) Check "Introduced (Alien, Exotic, Non-native, nonIndigenous)" and press apply. Today, May 30, 2025, there were 42 results. You may have more (or less) results depending on when you access the data.

7) Click "Dashboard" tab

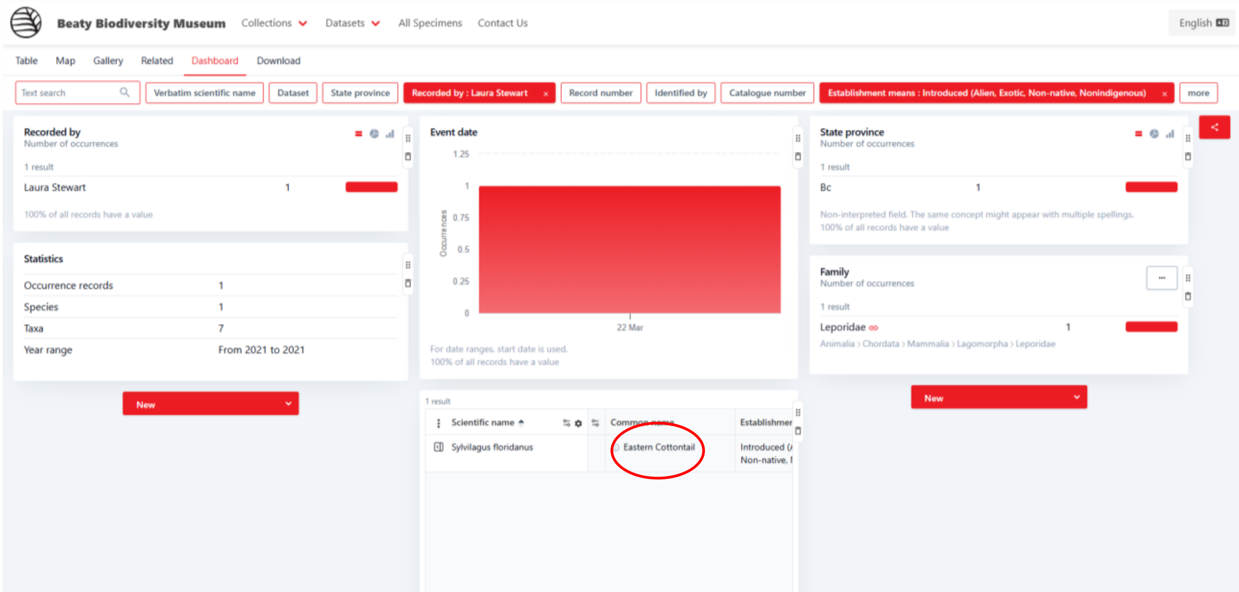


8) From here, it is up to you how you want to customize. This is just an example of how you may want to show the data.
   1) Click red bar that says "New"
   2) Select "Table" (You may able to customize the table with the instruction above)
   3) Click red bar that says "New" again and select "Recorded by" (You may change the representation of graph into pie chart or bar graph)
   4) Click red bar that says "New" again and select "Year"
   5) Click red bar that says "New" again and select "State province" (You may change the representation of graph into pie chart or bar graph)
   6) Click red bar that says "New" again and select "Taxa" (You may change into different taxonomy by clicking the three dot icon. A default is family.)
   7) Click red bar that says "New" again and select "Statistics".
      1) You may also adjust the organization of the data
         1) Click the second red icon next to the first data that says "Add new group" to show different data horizontally.
         2) Change the order of data by dragging the data you want to move while pressing the six dot icon.
         3) Filter the data by clicking different tabs on top.

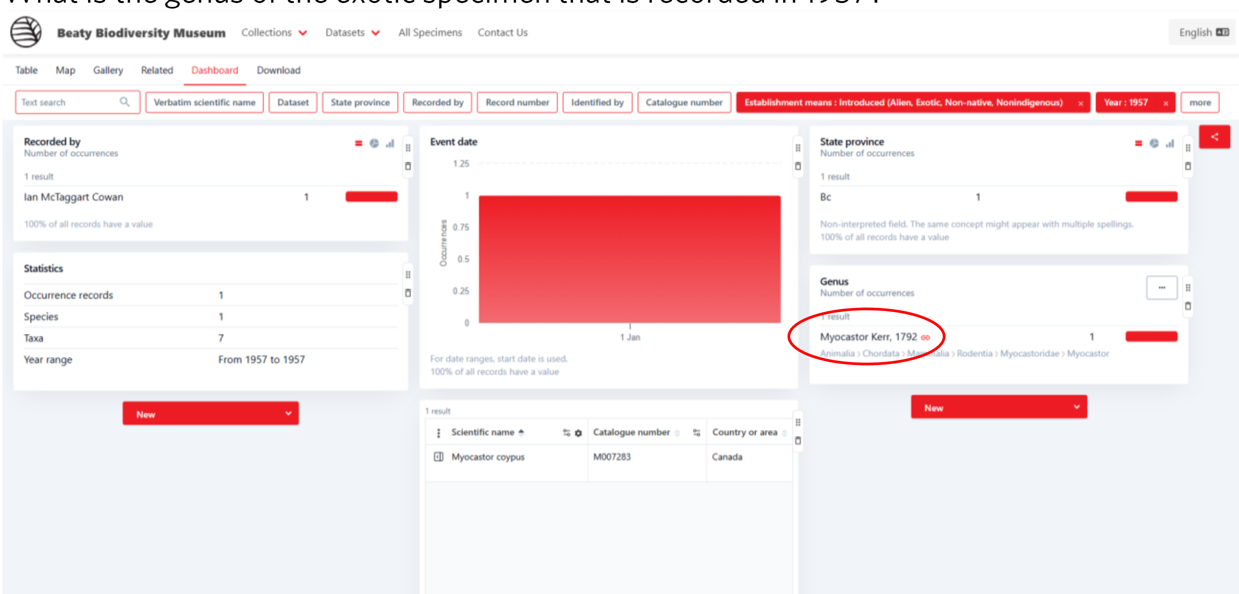


Example Questions using the dashboard on the database:

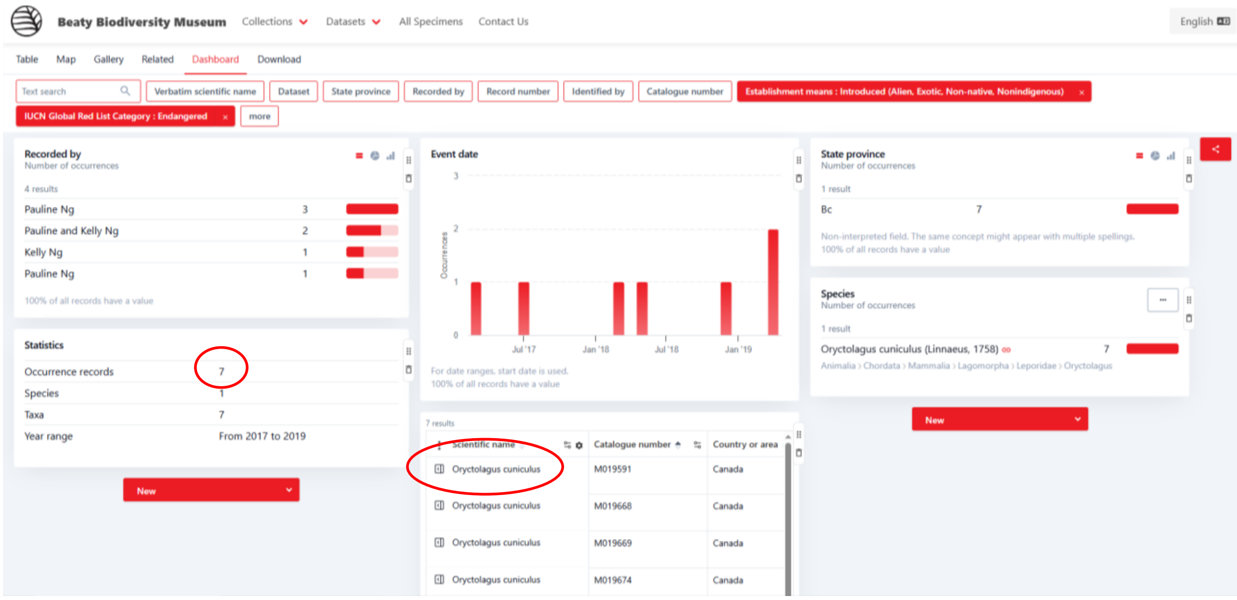
- What is the common name of the exotic specimen that is recorded by Laura Stewart?



- What is the genus of the exotic specimen that is recorded in 1957?



- What is the scientific name of the exotic species that are endangered according to IUCN (International Union for Conservation of Nature)?
- How many specimens are there?



- What are some limitations of using the Beaty Biodiversity Museum Collection Database? (Ex. Is there any bias in the data? Is the data useful for not only the researchers? What could be improved to expand the users of the database?)

Further research questions:

- Choose a specimen from the data and answer following questions:
  - Where did the specimen come from? Why you chose that specimen?
  - In what kind of environment did that species use to live? (Climate, geographical feature, temperature, moisture, ecosystem, prey and predators, etc.)
  - When was the first time the presence of that species were sighted in your focus area?
  - Why or how did it come to your focus area.
  - What environmental, cultural, social, economical, or political impact did the species bring to your focus area?
  - Is it considered as invasive species? If yes, what led the species to increase its population and harm the local environment?
  - What measures are taken by the government to limit the damage? Is it successful? What could we done to help?
  - Is there any other exotic species that originate in the same region or country?

Presentation:

There are several ways to present the results of your research. Assemble a research presentation and share it within the class!

1) Oral Presentation; Google slides, PowerPoint, Canva
2) Essay; Introduction, Body Paragraphs, Conclusion, Citation
3) Poster; Galley walk, Virtual Museum Exhibition
4) Website; WordPress, Google Sites
5) Any other artwork; story, poetry, sculpture, drawing etc.

Resources:

- Beaty Biodiversity Museum. (n.d.). Beaty Biodiversity Museum Collection Database. *Beaty Biodiversity Museum Collection*. Retrieved May 15, 2025, from https://collections.beatymuseum.ubc.ca/
- Beaty Biodiversity Museum. (2023, November 29). *Researchers Revealed Mark Pitblado*. Beaty / Explore. Retrieved May 22, 2025, from https://explore.beatymuseum.ubc.ca/researchers-revealed/m_pitblado/
- Invasive Species Council of BC. (2023). Home. *Invasive Species Council of British Columbia*. Retrieved May 15, 2025, from https://bcinvasives.ca/
- 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 2025-05-20. https://gbif.org/occurrence/4532804759