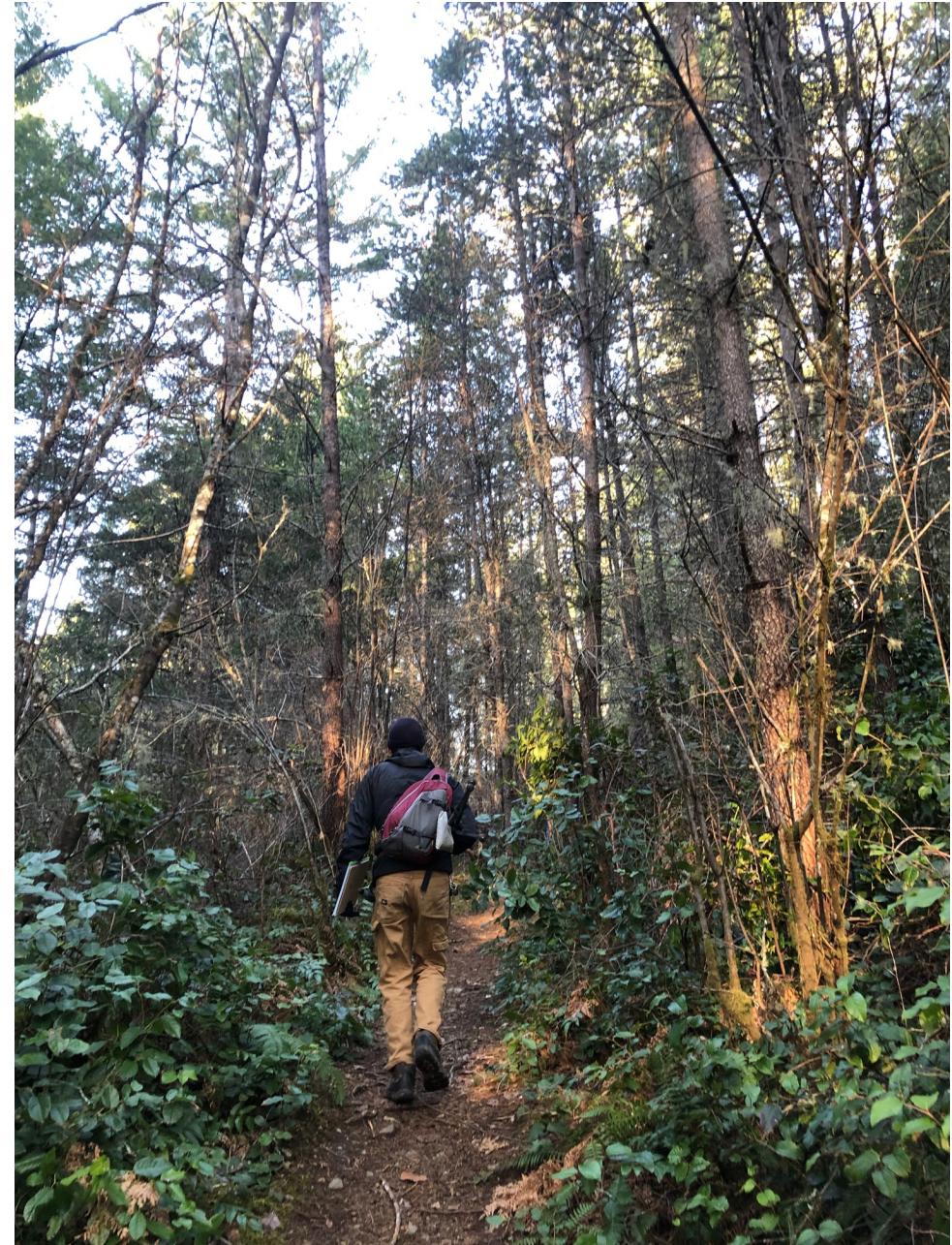


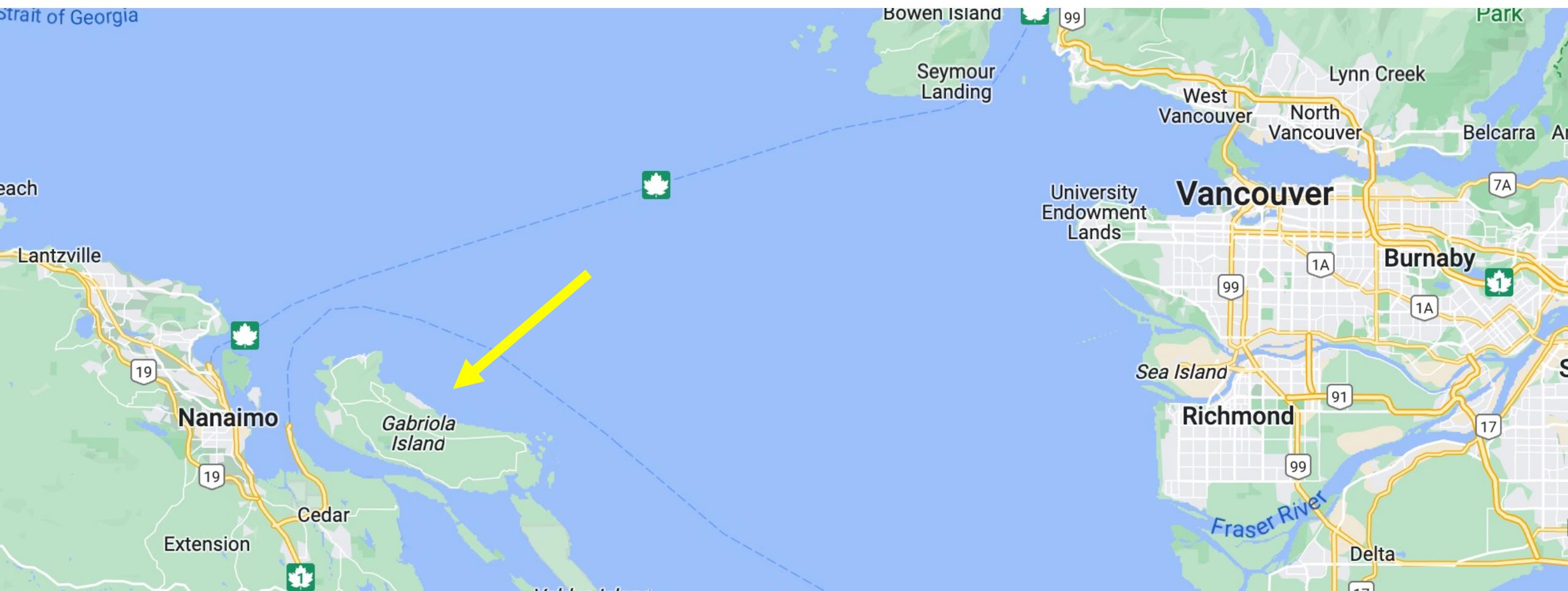
# Pokémon Made Me a Scientist

Rory Macklin (he/him)  
Jankowski Lab  
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# What I want to talk about today:

- Myself
- My (community-science) research (AKA the bit the exam question will be about)
- Unsolicited advice about doing (community) science and university





Vancouver Island/Coast

4 years ago



231 Kayaked yo the Malaspina Galleries on Gabriola Island this weekend... our  
↓ province has some pretty darned weird shoreline!

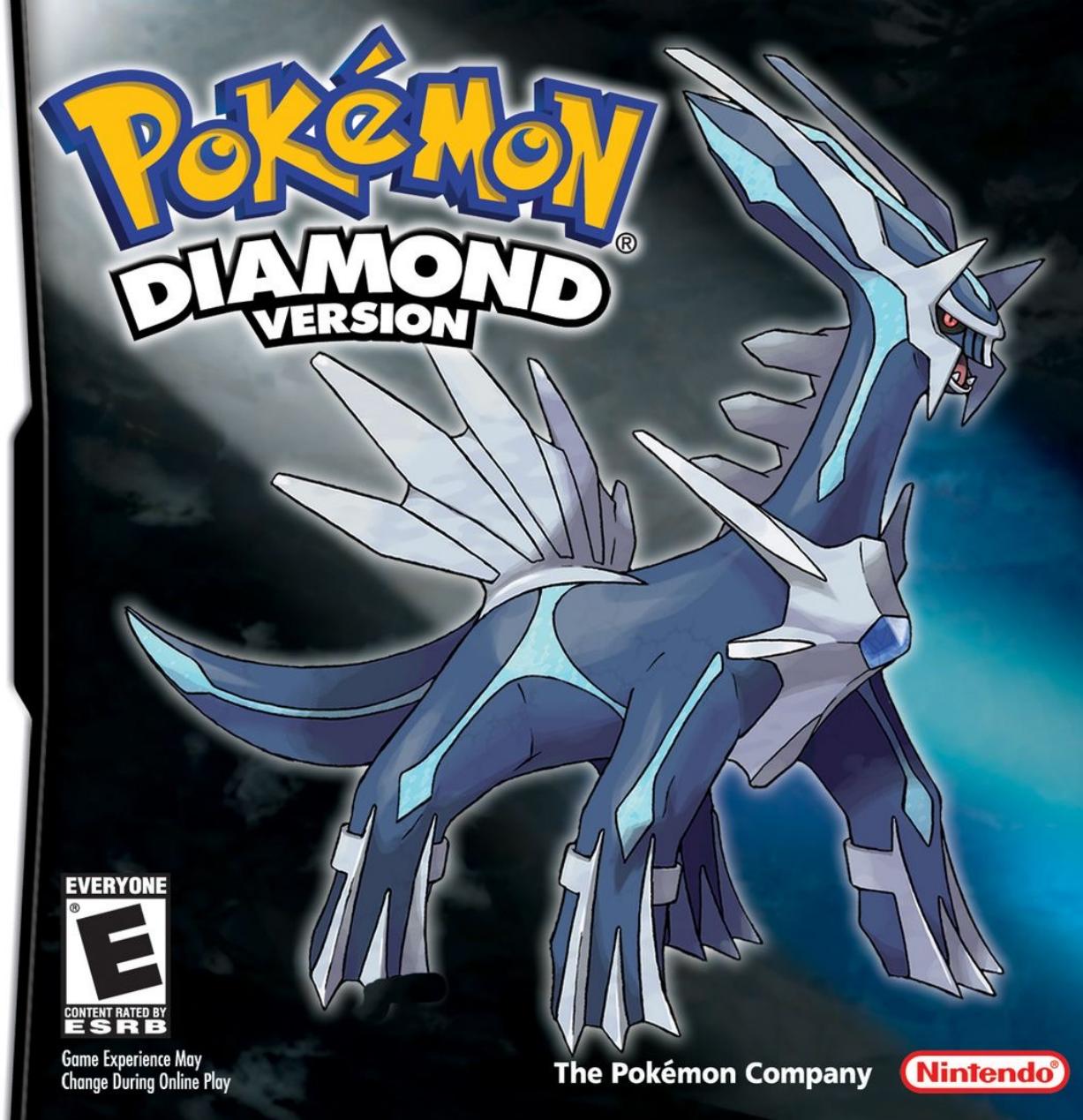




© Rory Macklin



NINTENDO DS™



Game Experience May  
Change During Online Play

Pokémon is a community  
science project



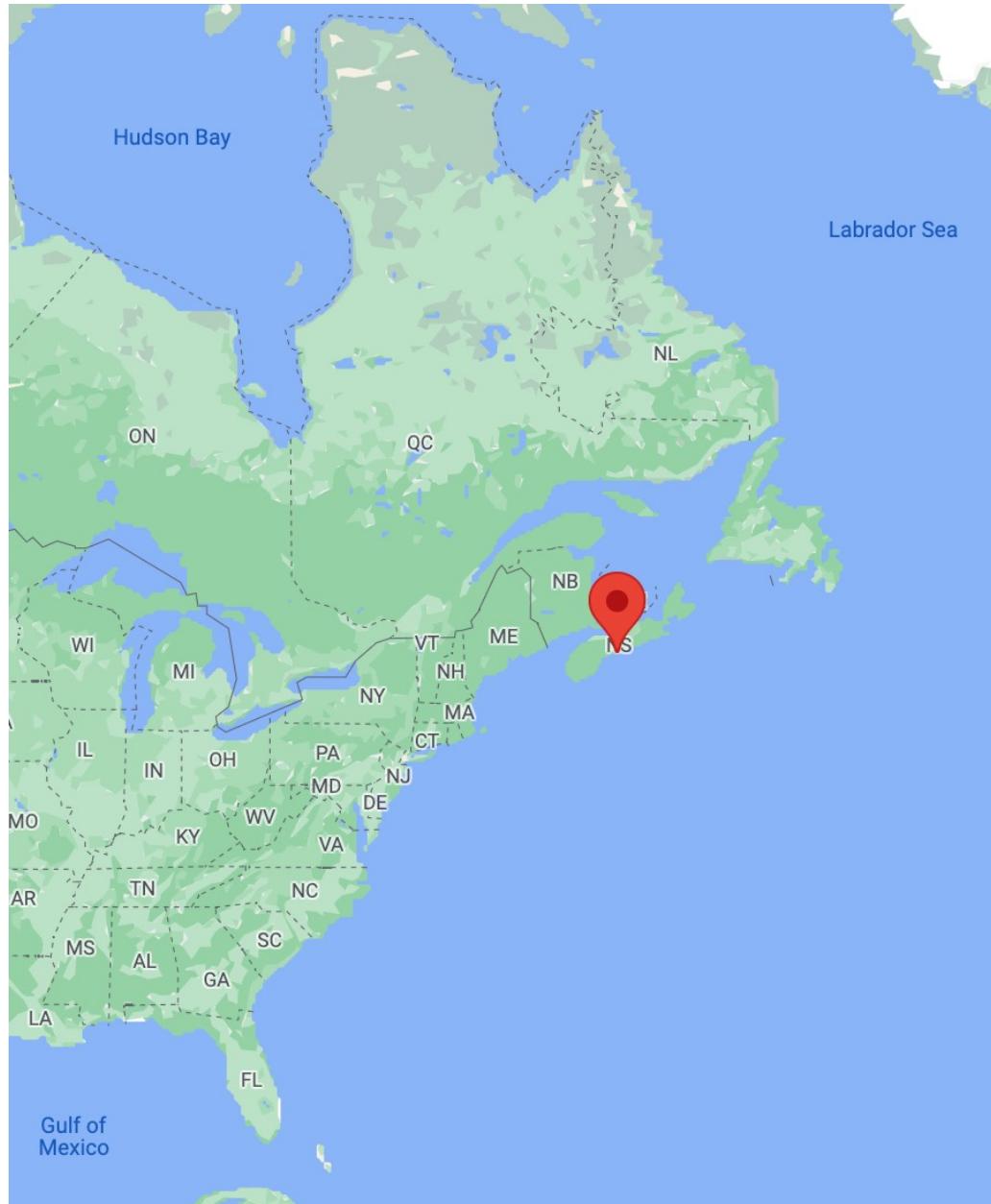
Hello child do my  
field work for me



Sure! I'm 10 and I  
love unpaid and  
dangerous labour.



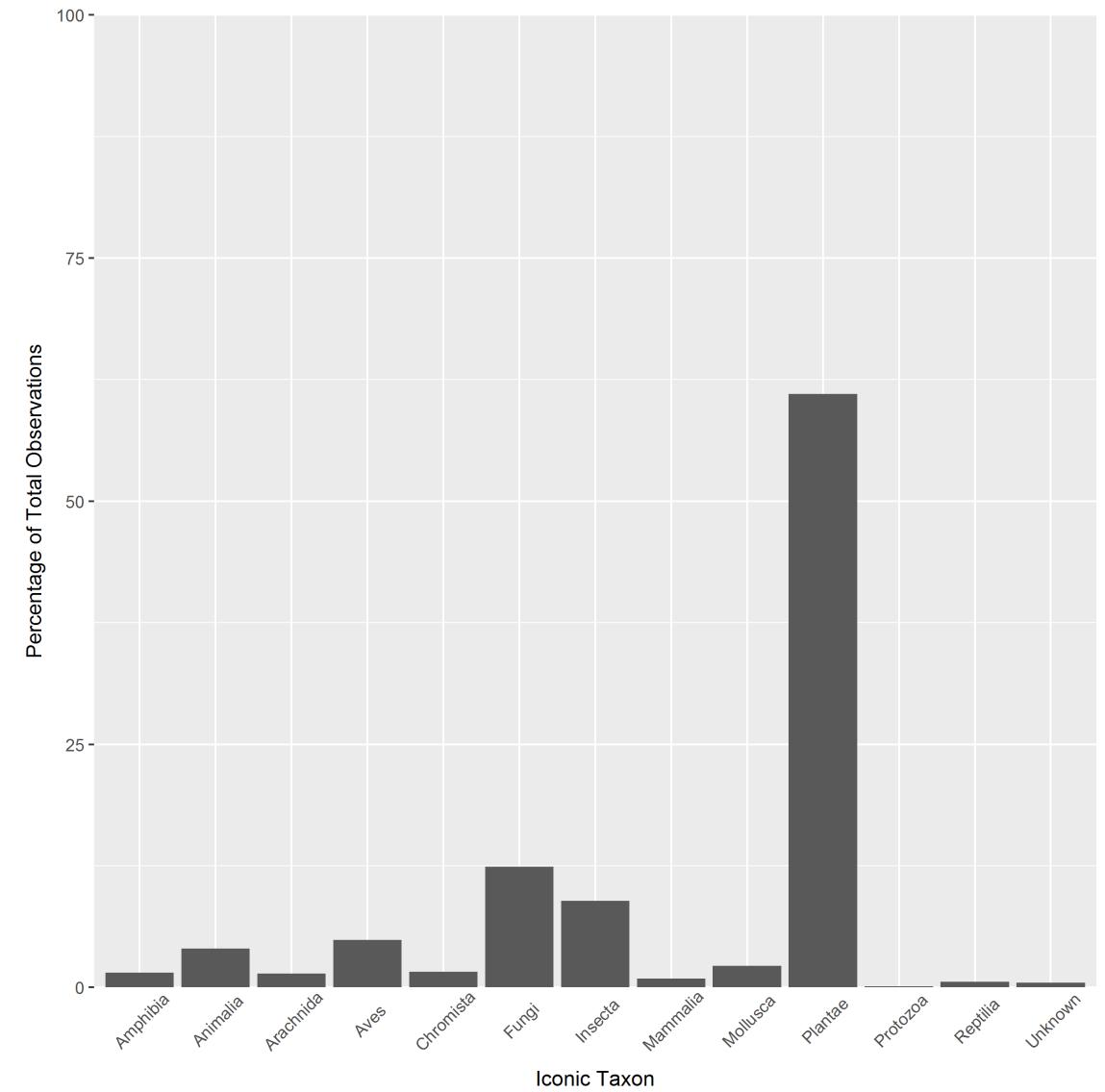
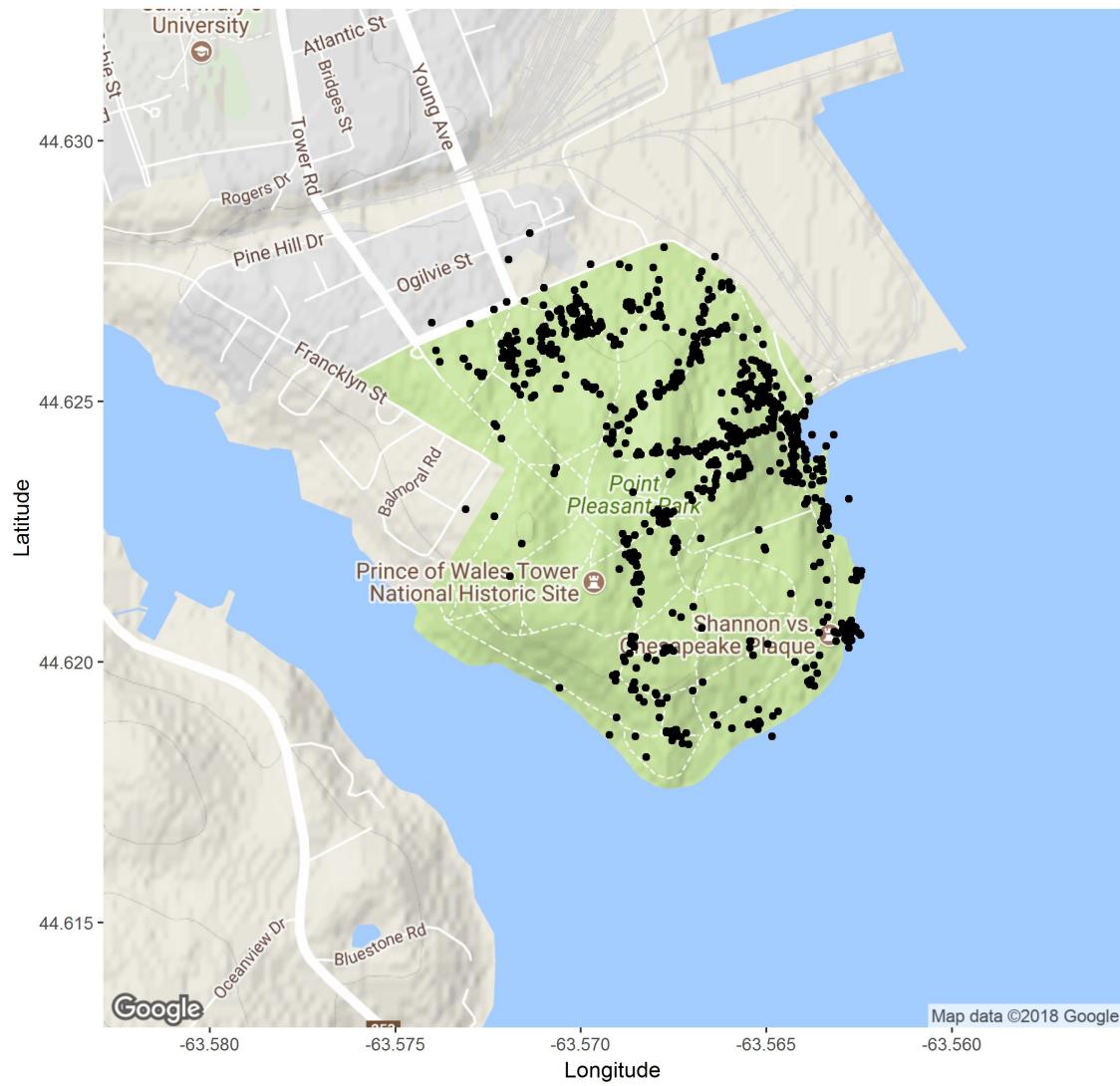
Instagram:  
@uclueletaquarium



DALHOUSIE  
UNIVERSITY









© Rory Macklin



© Rory Macklin



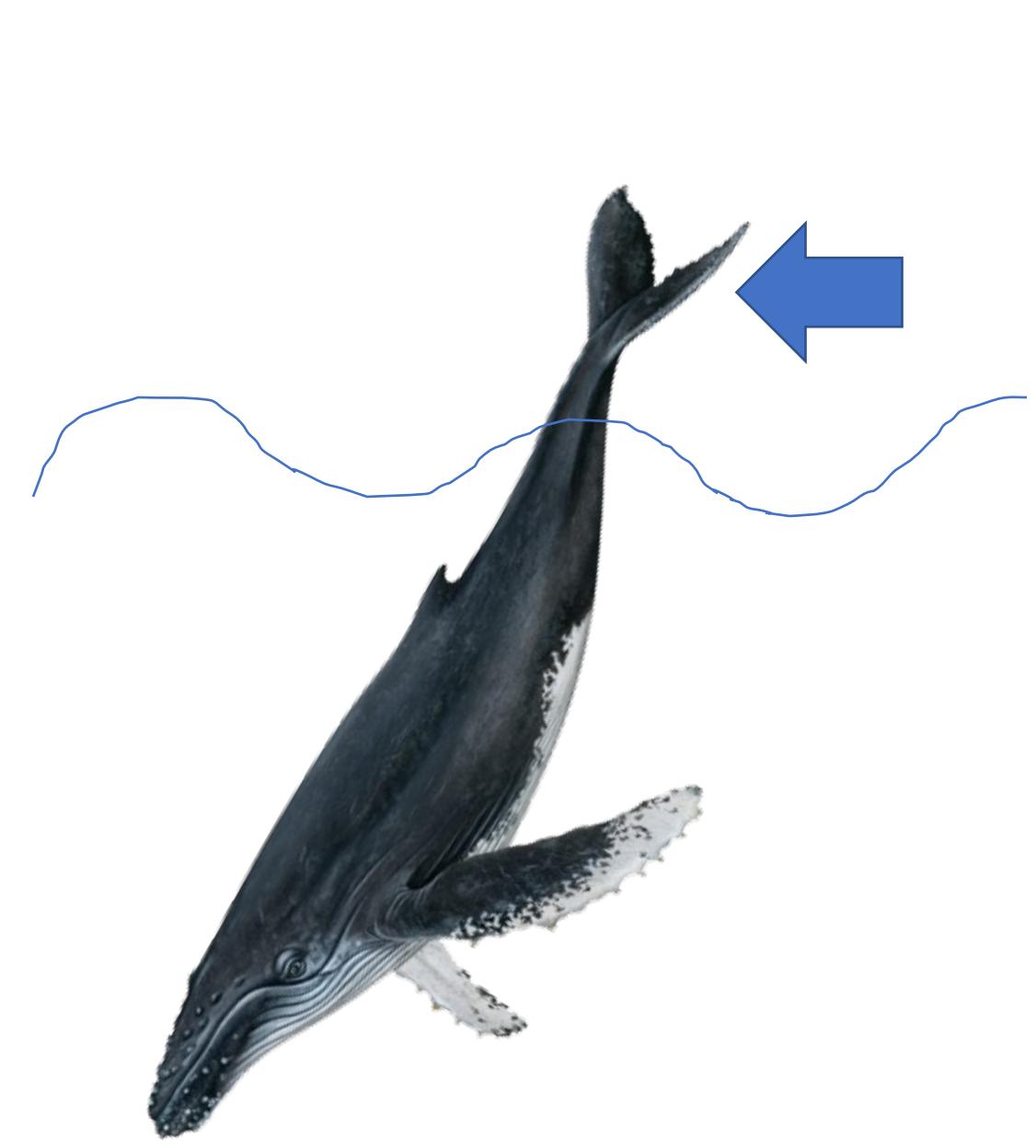
© Rory Macklin



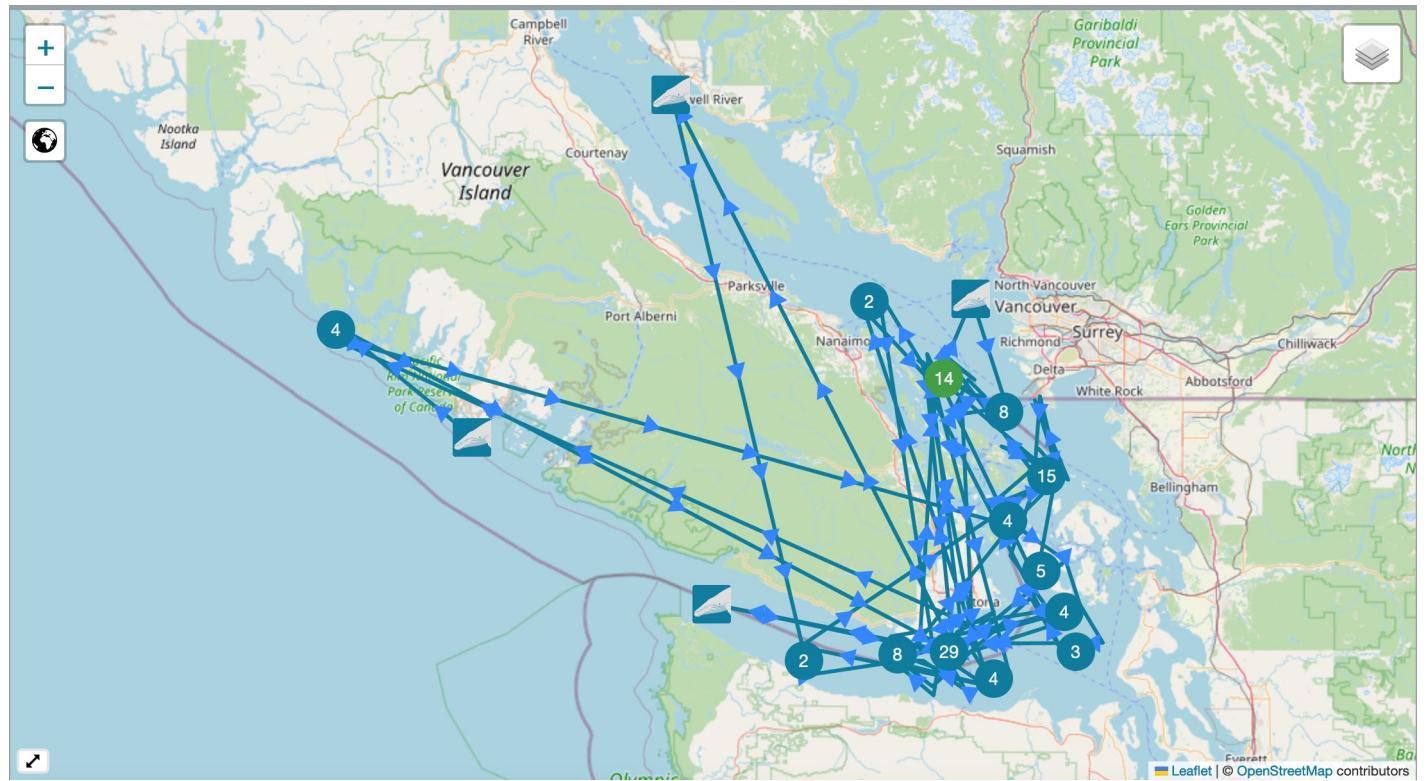
© Rory Macklin



© Rory Macklin



# BCX1251 “Orion”



Canadian Technical Report of  
Fisheries and Aquatic Sciences 3519

2023

SPATIAL PATTERNS IN THE MIGRATORY DESTINATIONS OF HUMPBACK WHALES  
(*MEGAPTERA NOVAEANGLIAE*) ENCOUNTERED IN CANADIAN PACIFIC WATERS, BASED ON  
PHOTO-IDENTIFICATION DATA AND OCEAN BASIN-WIDE COLLABORATION

by

Christie J. McMillan<sup>1,2</sup>, John K.B. Ford<sup>1</sup>, Ted Cheeseman<sup>3</sup>, John Calambokidis<sup>4</sup>, Katherina Audley<sup>5</sup>,  
Caitlin Birdsall<sup>2,6</sup>, Josie K. Byington<sup>7</sup>, Jens Currie<sup>8</sup>, James D. Darling<sup>7</sup>, Joëlle De Weerdt<sup>9</sup>, Nicole Doe<sup>2</sup>,  
Thomas Doniol-Valcroze<sup>1</sup>, Karina Dracott<sup>6</sup>, Rachel Finn<sup>10</sup>, Astrid Frisch-Jordán<sup>11</sup>, Christine Gabriele<sup>12</sup>,  
Beth Goodwin<sup>13</sup>, Jackie Hildering<sup>2</sup>, Meagan Jones<sup>14</sup>, Edward Lyman<sup>10</sup>, Mark Malleson<sup>15</sup>, Pamela  
Martinez Loustalot<sup>16</sup>, Adam A. Pack<sup>17</sup>, Ester Quintana-Rizzo<sup>18</sup>, Nicola Ransome<sup>19</sup>, Tasli J.H. Shaw<sup>15</sup>,  
Stephanie Stack<sup>8</sup>, Jorge Urbán Ramirez<sup>16</sup>, Janie Wray<sup>20</sup>, Brianna M. Wright<sup>1</sup>, and Kymberly M. Yano<sup>21</sup>

Sandhill Crane, Delta, BC



© Rory Macklin



Marbled Godwit, Dartmouth, NS

Common Raven, North Vancouver, BC



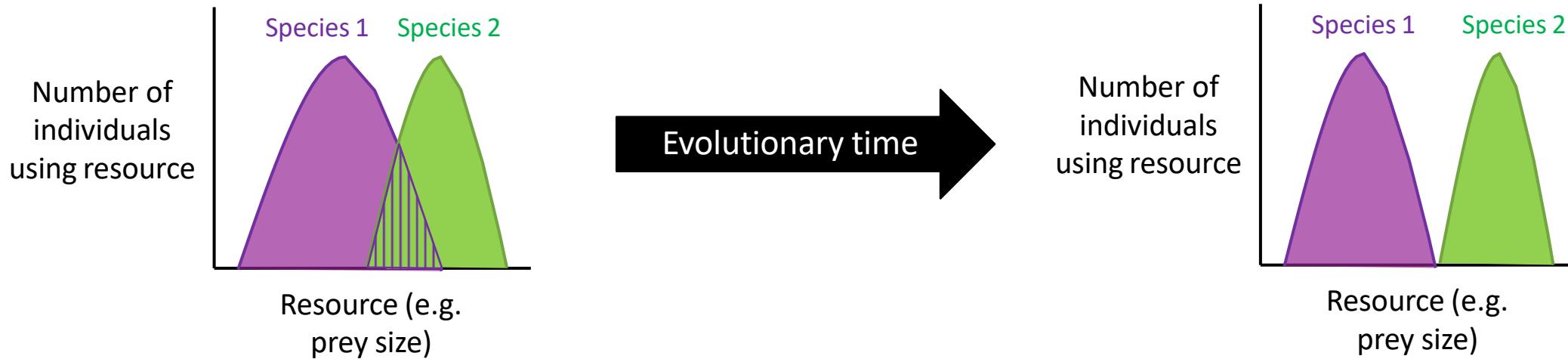
© Rory Macklin



Steller's Jay, North Vancouver, BC

© Rory Macklin

# Competition over time can lead to evolutionary change



Competition can lead to negative outcomes for reproductive success for individuals of a species. Over time, selection favours individuals that use resources outside of the area of overlap with a competitor.

This can lead to niche partitioning, where a species fundamental niche has shifted to avoid a potential competitor's fundamental niche.

© Rory Macklin



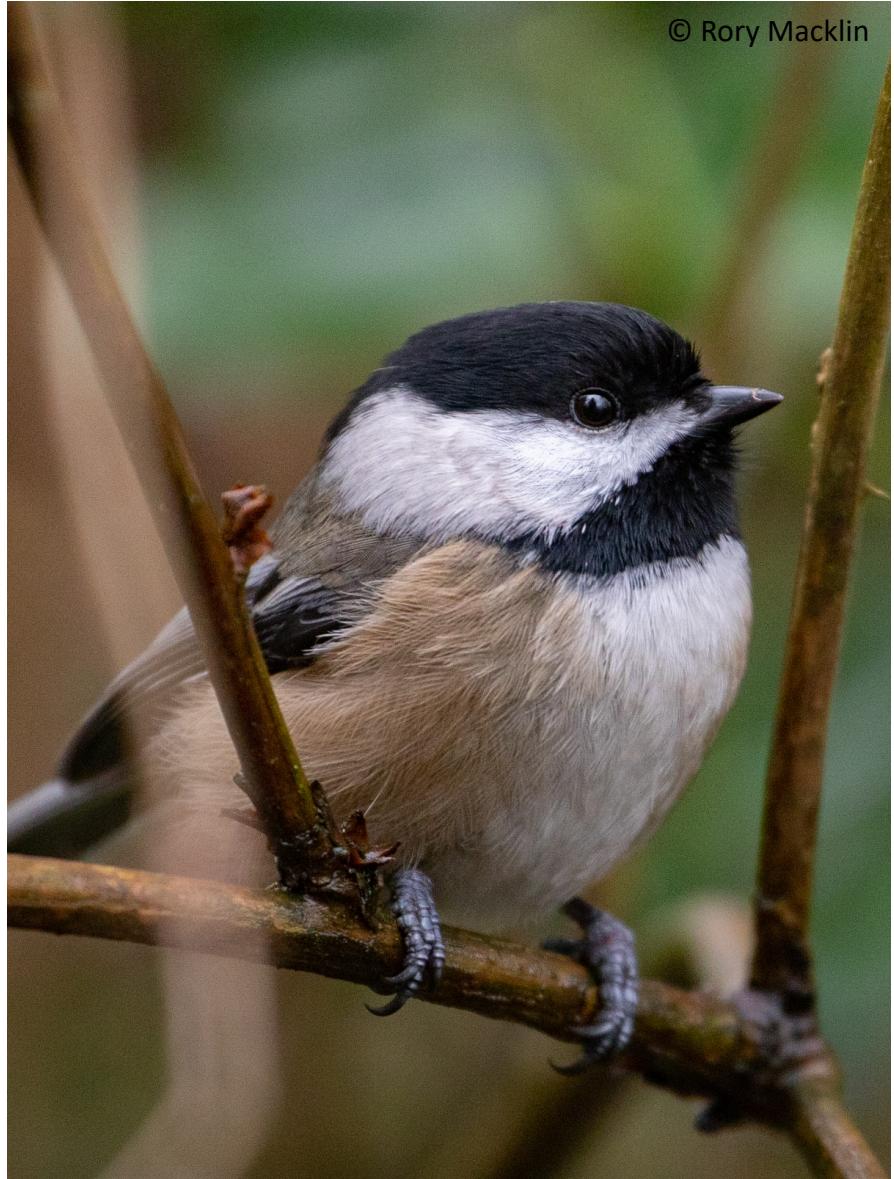
Chestnut-backed Chickadee  
(CBCH; *Poecile rufescens*)

- Very strongly tied to temperate rainforest
- In Vancouver, only in patches of old forest (Stanley Park, Pacific Spirit), not in the city, not in deciduous forests.



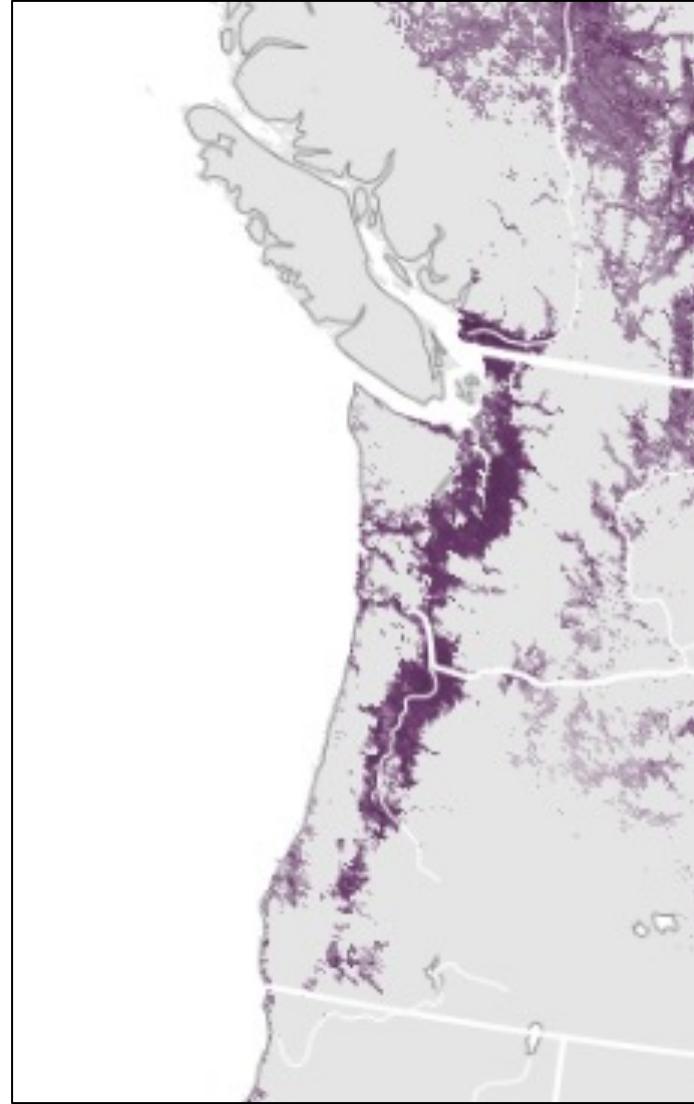
On Vancouver Island, I saw them everywhere.





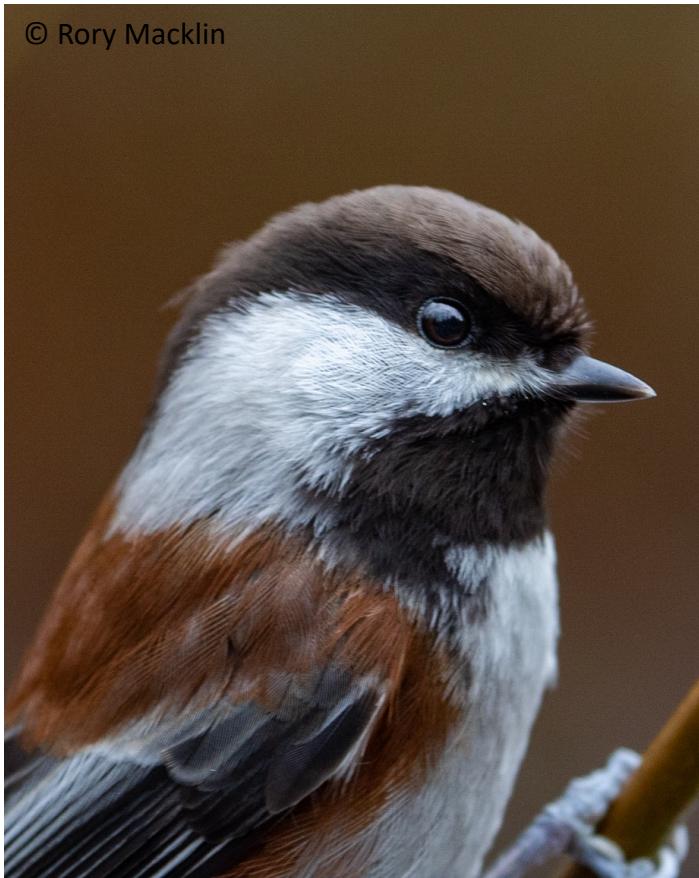
© Rory Macklin

Black-capped Chickadee  
(BCCH; *Poecile atricapillus*)

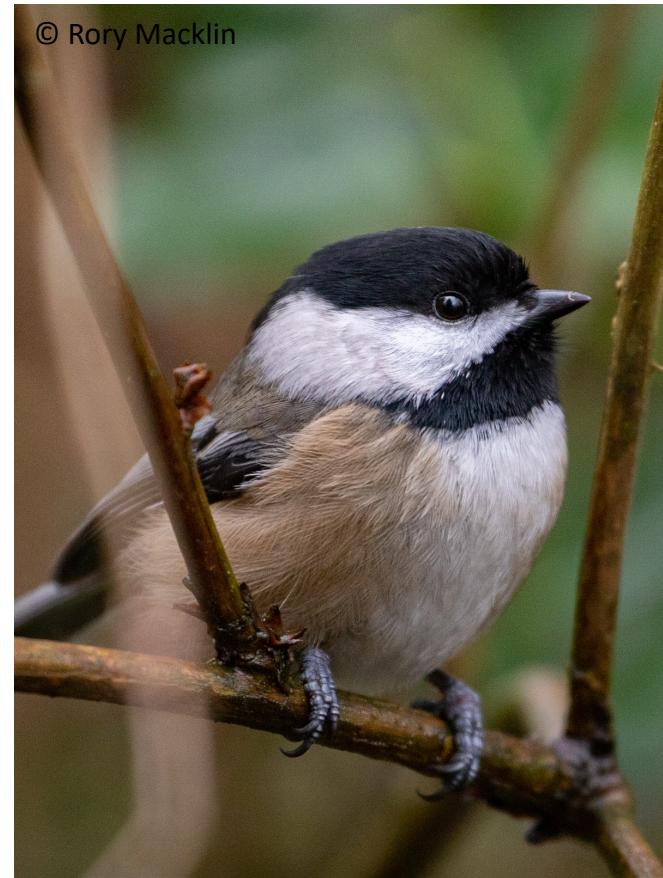


Fink et al. (2022)

# Have CBCH on the mainland restricted their range to temperate rainforest to avoid BCCH (niche partitioning)?



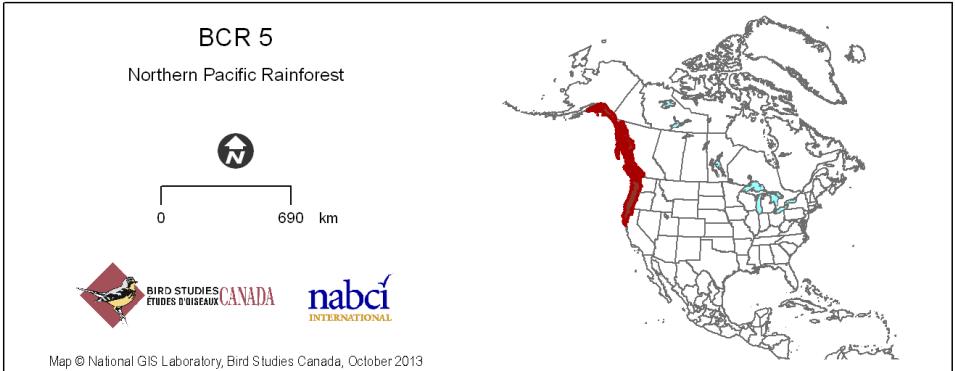
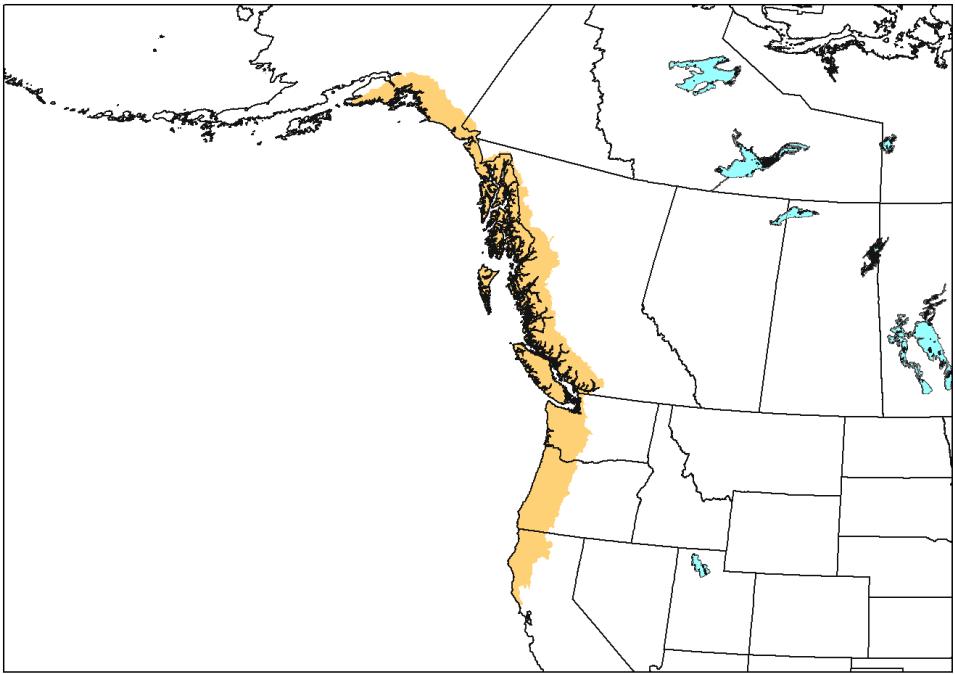
Chestnut-backed Chickadee  
(*Poecile rufescens*)



Black-capped Chickadee  
(*Poecile atricapillus*)

# To answer my question I need:

1. Multiple counts of Chestnut-backed Chickadees at sites inside and outside of the range of Black-capped Chickadees.
2. Information about the habitat at those sites (i.e. is it urban? Is it a coniferous forest? Is it a deciduous or mixed forest?)



# eBird

1. Multiple counts of Chestnut-backed Chickadees at sites inside and outside of the range of Black-capped Chickadees.
2. Information about the habitat at those sites (i.e. is it urban? Is it a coniferous forest? Is it a deciduous or mixed forest?)

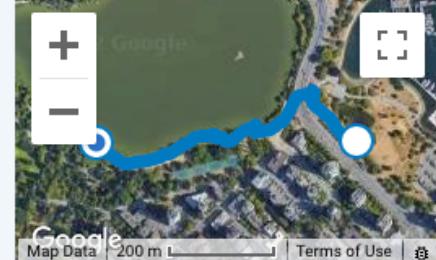
CHECKLIST S76257646

Wed 19 Feb 2020 2:15 PM [Edit date and effort](#)

Stanley Park--Lost Lagoon  Metro Vancouver District, British Columbia, Canada [Edit location](#)

Rory Macklin [Share](#)

Traveling Complete  2 14 min 0.665 km



 eBird Mobile Tracks

Submitted from eBird for iOS, version 2.3.7 [Edit comments](#)

SUBMIT ANOTHER FOR...

Same location and date  
Stanley Park--Lost Lagoon, Metro Vancouver District, British Columbia, CA on Wed Feb 19, 2020

Same location  
Stanley Park--Lost Lagoon, Metro Vancouver District, British Columbia, CA

Same area and date  
Another location near Stanley Park--Lost Lagoon, Metro Vancouver District, British Columbia, CA on Wed Feb 19, 2020

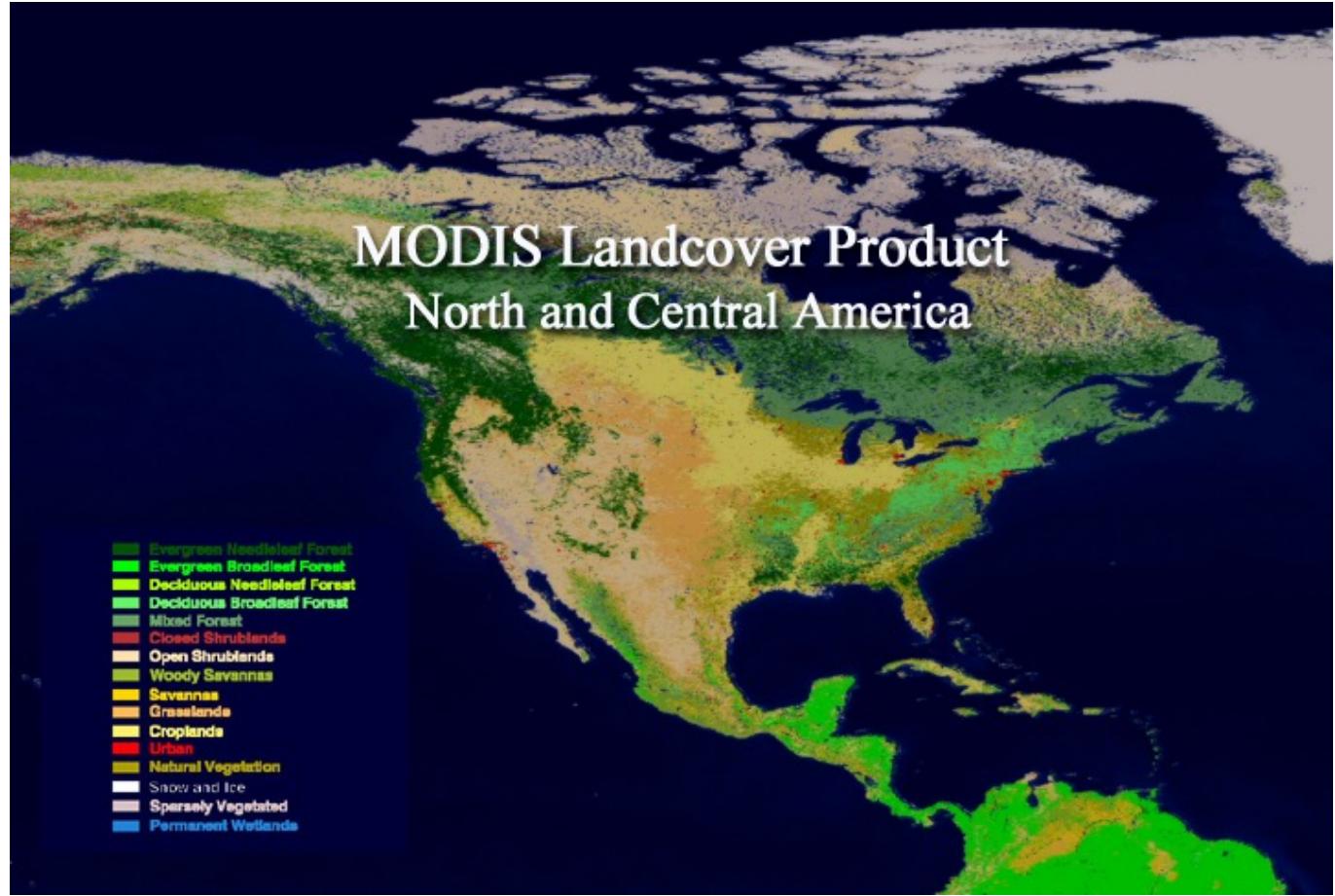
Same area  
Another location near Stanley Park--Lost Lagoon, Metro Vancouver District, British Columbia, CA

Same date  
Wed Feb 19, 2020

 15 Species observed 225 individuals

7	<a href="#">Canada Goose</a>
22	<a href="#">Wood Duck</a>
117	<a href="#">American Wigeon</a>
16	<a href="#">Mallard</a>
1	<a href="#">Lesser Scaup</a>
2	<a href="#">Hooded Merganser</a>
5	<a href="#">Common Merganser</a>
2	<a href="#">American Coot</a>
14	<a href="#">Glaucous-winged Gull</a>
1	<a href="#">Bald Eagle</a>
2	<a href="#">Northern Flicker (Red-shafted)</a>
5	<a href="#">American Crow</a>
26	<a href="#">European Starling</a> *
3	<a href="#">American Robin</a>
2	<a href="#">Song Sparrow</a>

1. Multiple counts of Chestnut-backed Chickadees at sites inside and outside of the range of Black-capped Chickadees.
2. Information about the habitat at those sites (i.e. is it urban? Is it a coniferous forest? Is it a deciduous or mixed forest?)



<https://svs.gsfc.nasa.gov/vis/a000000/a002200/a002265/index.html>

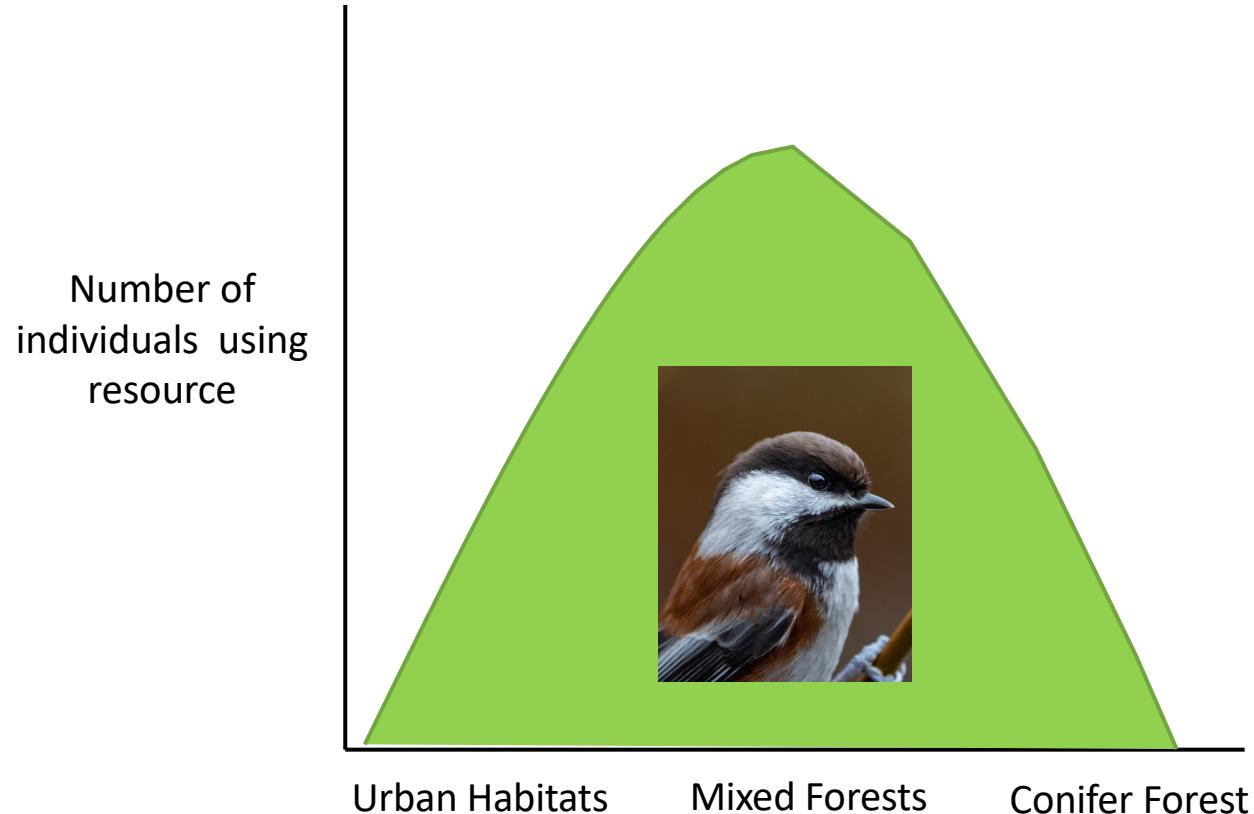
# No Black-capped Chickadee (i.e. Vancouver Island)



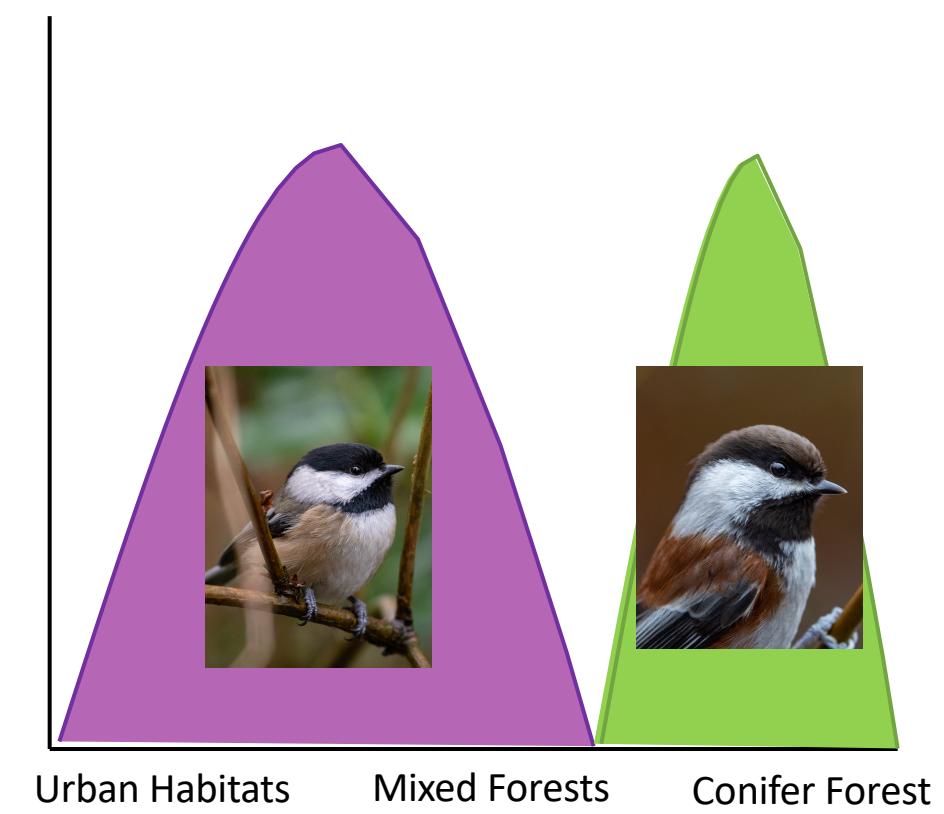
# Black-capped Chickadee (i.e. Vancouver)



No Black-capped Chickadee (i.e.  
Vancouver Island)



Black-capped Chickadee  
(i.e. Vancouver)



Wow! Different habitat relationships inside and outside of the range of the Black-capped Chickadee

Very in-line with my experience growing up

Competition from the BCCH has made CBCH adapt different habitat preferences to avoid them!

All from community science!

# Unsolicited advice

- You can do science whenever – none of what I have done required me to be associated with a lab or an NGO or even a university.
- Feel like going out and collecting data on a particular thing? There's probably a community science project for it (i.e. Stanley Park Ecology Society).
- Feel like getting your hands on some data and doing whatever analysis? There's probably a community science project for it (I'll help!).
- If you are Professor Oak, make sure your work benefits the Ash Ketchums!
- Learn some level of computer skills (coding).
- Don't be afraid for the plan to change!

# That's it! Thank you!



An intraspecific competitor coming to competitively exclude the Clark's Nutcracker on my hand thus reducing its realized hand-holding niche.



# Occupancy Modeling      ( $y = mx+b$ but more)

- Modeling: a mathematical way of relating 1 or more explanatory variable (the “x”) to a response variable (the “y”).
- The response variable (the “y”) here is occupancy probability
  - Ranges from 0 (totally absent) to 1 (should be there every time you visit)
- Explanatory variables (the “x’s”) were the proportion cover of 4 habitat types in the area surrounding each site, and whether or not the site was in the range of the Black-capped Chickadee
  - Proportion cover of habitat type ranges from 0 (none of this habitat in the area) to 1 (the entire area is this habitat).

Very simplified version:  $y = m_1x_1 + m_2x_2 + \dots + b$

$x_1$  = proportion cover of urban habitat

$x_2$  = proportion cover of evergreen forest

