

Living Lab Program for Climate Change and Conservation - Final Report



BC Parks

Project title. The BC Parks iNaturalist project: biodiversity across the BC Parks system

Research findings

[Please include key quantitative and qualitative research accomplishments. Indicate any negative or positive results that were not anticipated. Bullets are acceptable]

- 272,700 observations of 6,690 species by 4,731 people verified by 4,572 people (Contrast with last year's numbers: 120,000 observations of 5,034 species by 2,550 people verified by 2,800 people. The project has grown by more than 250,000 observations since its start in May 2019 [<https://www.inaturalist.org/projects/bc-parks>])
- Huge increase in taxonomic breadth and number of observations since the beginning of the project. (Figs. 1 & 2). Many observations of at risk or invasive species (e.g., Fig. 3), and no indication that we are reaching a saturation point in observations of species (e.g., Figs. 4 & 5). The iNaturalist project is, however, doing an excellent job of deeply surveying species across the province (Fig. 6).

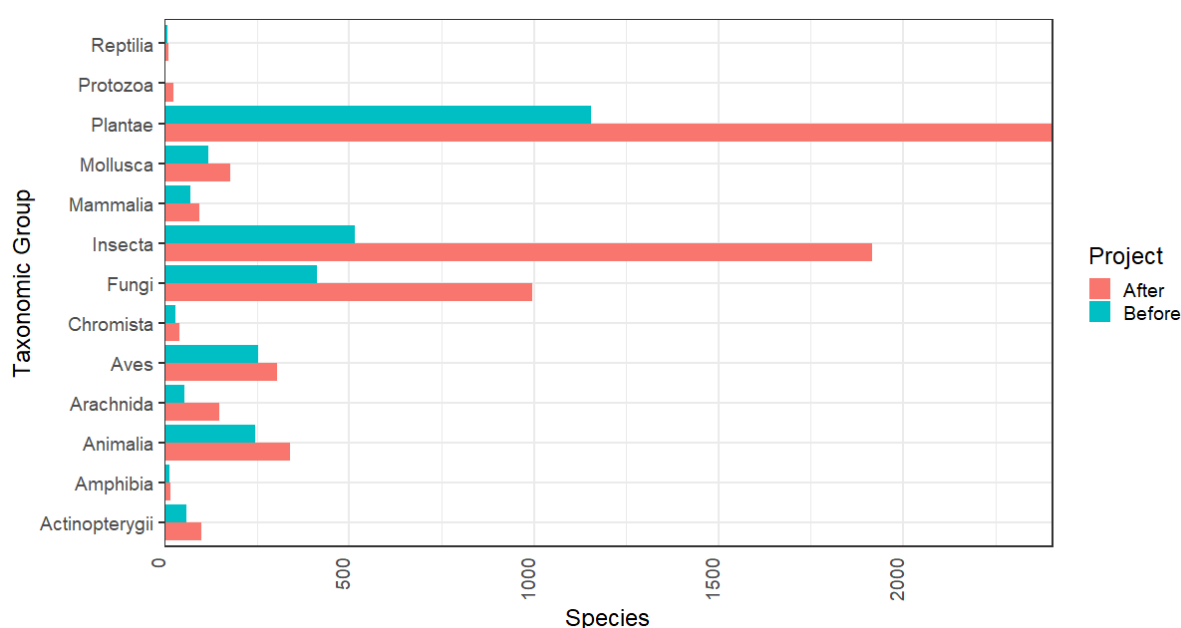


Fig 1. Species observed on the BC Parks project to end Summer, 2020. (Created by Pat Hanly, Michigan State University)

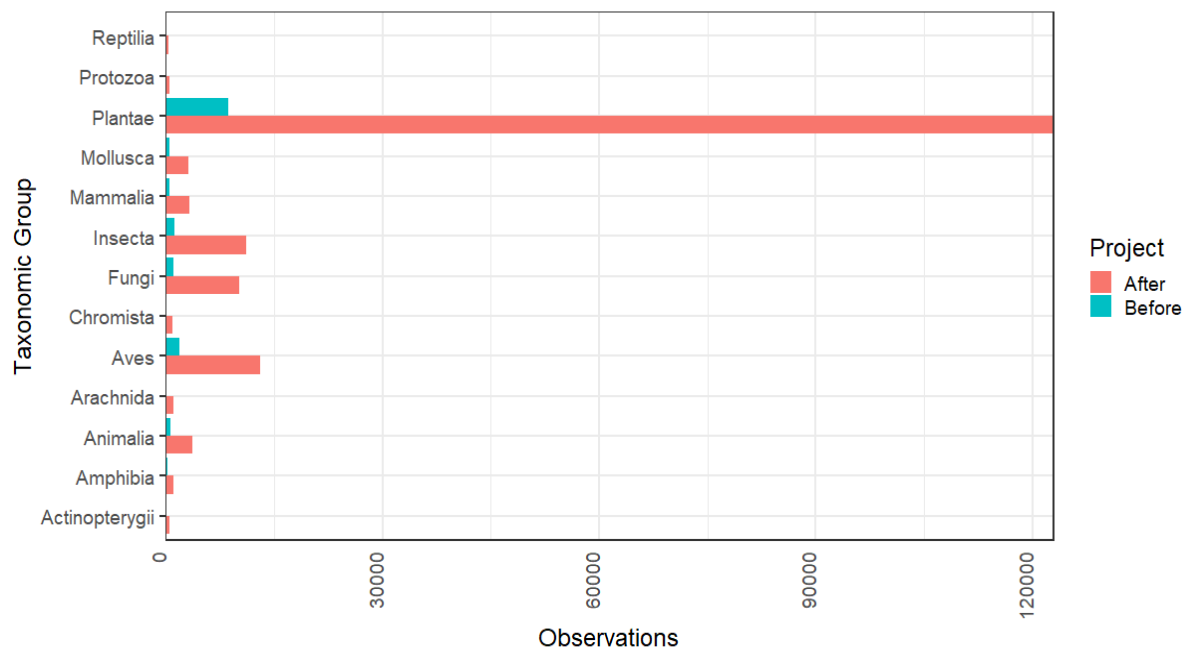


Fig 2. Number of observations across key taxonomic groups observed on the BC Parks project to end Summer, 2020. (Created by Pat Hanly, Michigan State University)

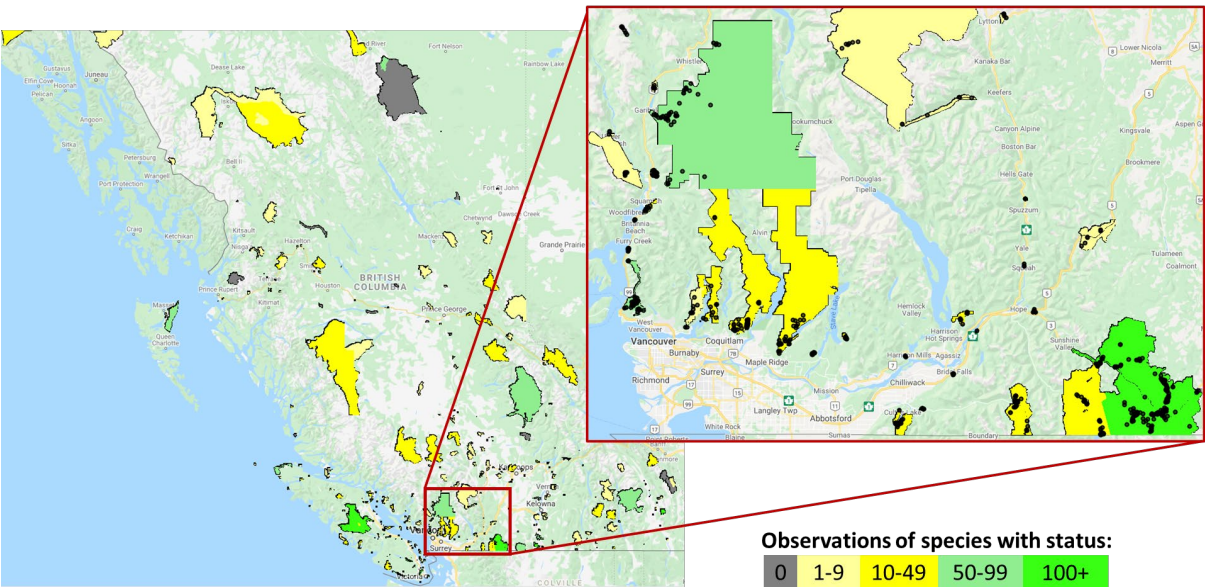


Fig 3. Example of the sorts of analyses that can be performed to highlight observations of rare and threatened species in the BC Parks system. (Created by Pat Hanly, Michigan State University)

E.C. Manning Provincial Park – Species Accumulation Curves

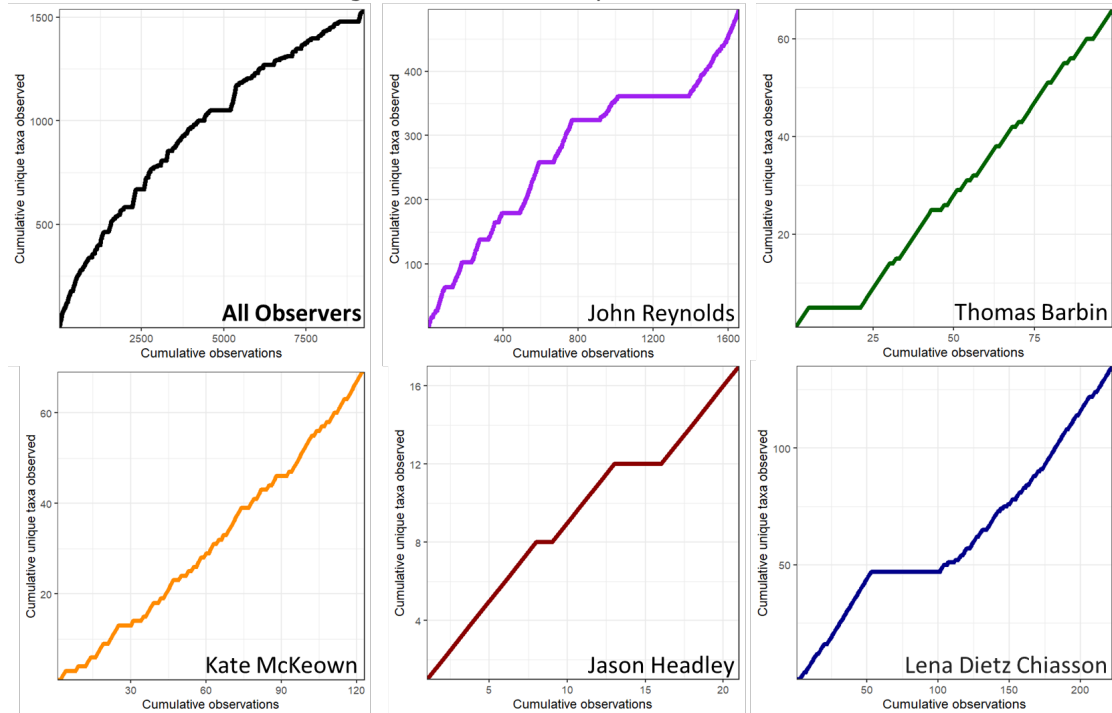


Fig 4. Species accumulation curves for multiple observers in E.C. Manning Provincial Park. Note that there is little indication of saturation (i.e., ending of finding new species), and that the steps represent moving to new locations within the park. (Created by Pat Hanly, Michigan State University)

South Okanagan Grasslands Protected Area – Species Accumulation Curves

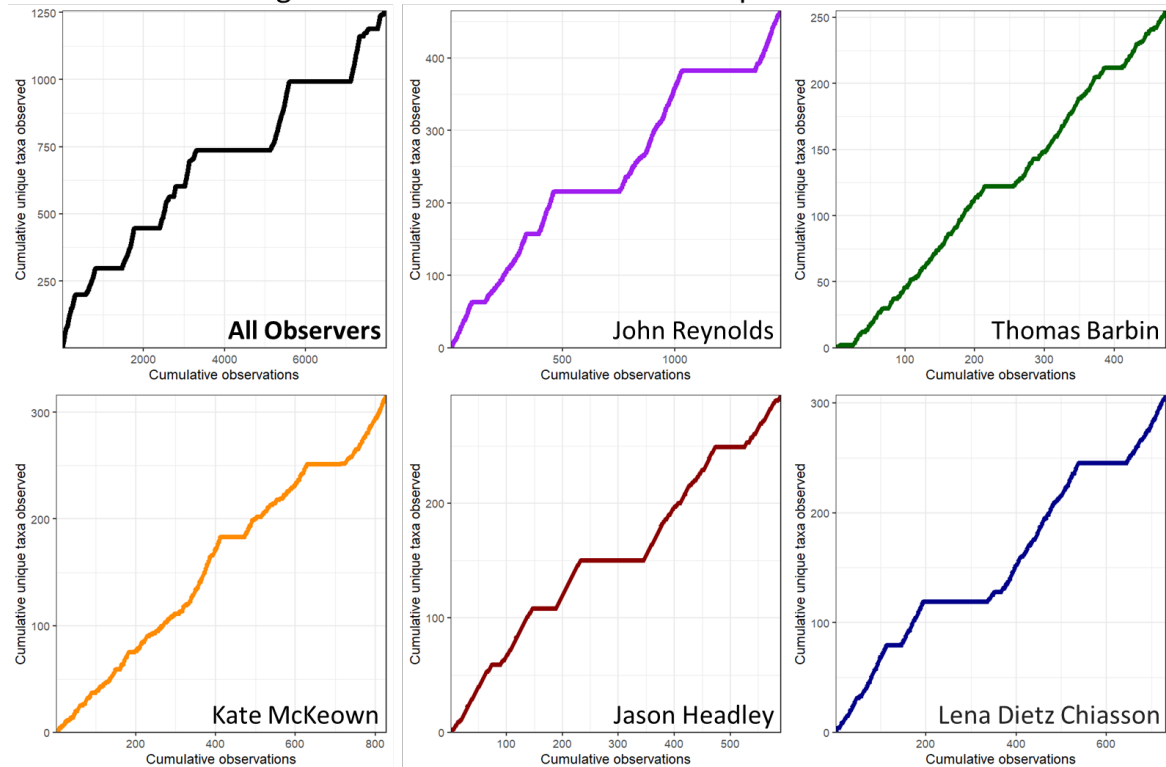


Fig 5. Species accumulation curves for multiple observers in South Okanagan Grasslands Protected Area. Note that there is little indication of saturation (i.e., ending of finding new species), and that the steps represent moving to new locations within the park. (Created by Pat Hanly, Michigan State University)

BC Parks – Species Accumulation by Major Taxonomic Group

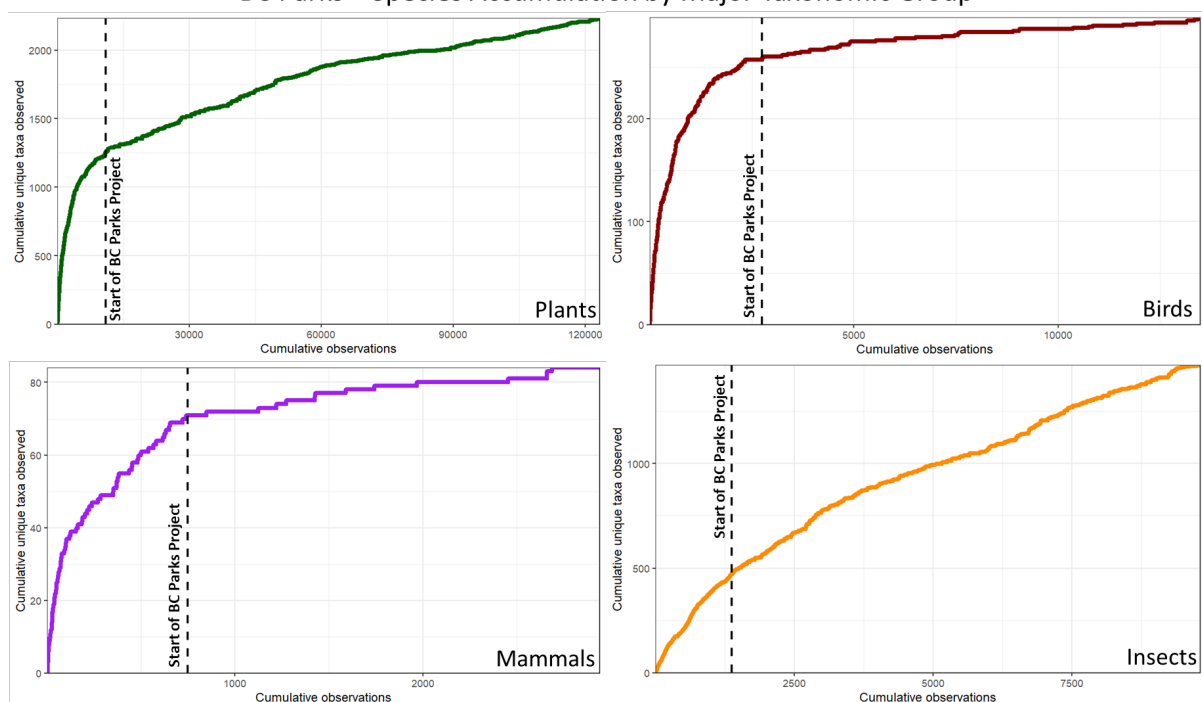


Fig 6. Species accumulation curves for various taxa across all protected areas in British Columbia. Estimates for the total number of species in each group are: Plants: about 3500 native and non-native plant species in BC; Birds: about 320 breeding/suspected breeding birds in BC, up to 500 if vagrants are included; Mammals: about 142 mammal species in BC; Insects: 35,000+ insect species in BC. (Created by Pat Hanly, Michigan State University)

Methods summary

- We had previously created iNaturalist projects for all 1,034 provincial parks, conservancies, ecological reserves, protected areas
- 6 summer students hired to survey parks (e.g., Figs. 7, 8)
- A group of “SuperNats” was also supported to target remote areas and specific taxa
- Training and working with naturalist groups, summer rangers, student rangers program
- Production of promotional video
- Creation of photo guide (https://starzomski.weebly.com/uploads/2/5/7/8/25785777/inaturalist_photo_guide-starzomski.pdf), training videos, many presentations on the project delivered (e.g., Friends of Ecological reserves, many naturalist groups, Royal BC Museum)
- Partnership with Royal BC Museum, BC Parks Foundation, BC Parks in the creation of a Pocket Gallery at the RBCM (Collaborating for Conservation, which runs from February 2 – June 2, 2021, after which it will move to Science World: <https://royalbcmuseum.bc.ca/visit/exhibitions/pocket-gallery>)

iNaturalist Field Assistant 2020

Provincial Parks, Ecological Reserves,
and Protected Areas visited: **64**

Days in the field: **75**

Km travelled while iNatting: **388**

Hours iNatting: **390**

Hours preparing photos and
uploading: **~175**

Observations during the 2020 field
season: **17,553**

Observations during the 2020 field
season which are captured under the BC Parks Project: **15,825**

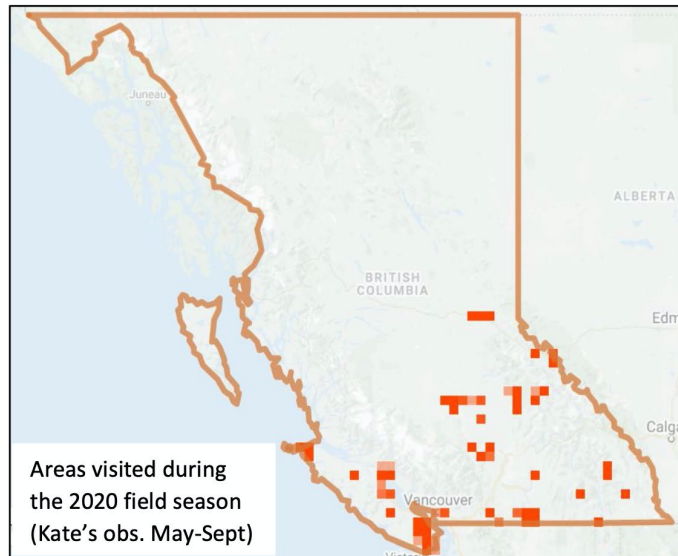


Fig 7. A summer in the life of a BC Parks iNaturalist Project member: Kate McKeown. Orange squares represent where observations were made.

Key outcomes for BC Parks

[e.g., what are the consequences of your research for park values/resources?, bullets are acceptable]

- Excellent survey coverage across the province and first estimates of biodiversity for most of the parks that were surveyed (e.g., Fig. 9)
- approximately 6,300 observations of 417 threatened species
- more than 14,000 observations of over 535 introduced species
- Several first iNaturalist records for Canada, several were probably new species for Canada
- Development of many training materials (e.g., handbooks, presentations, training of key staff)

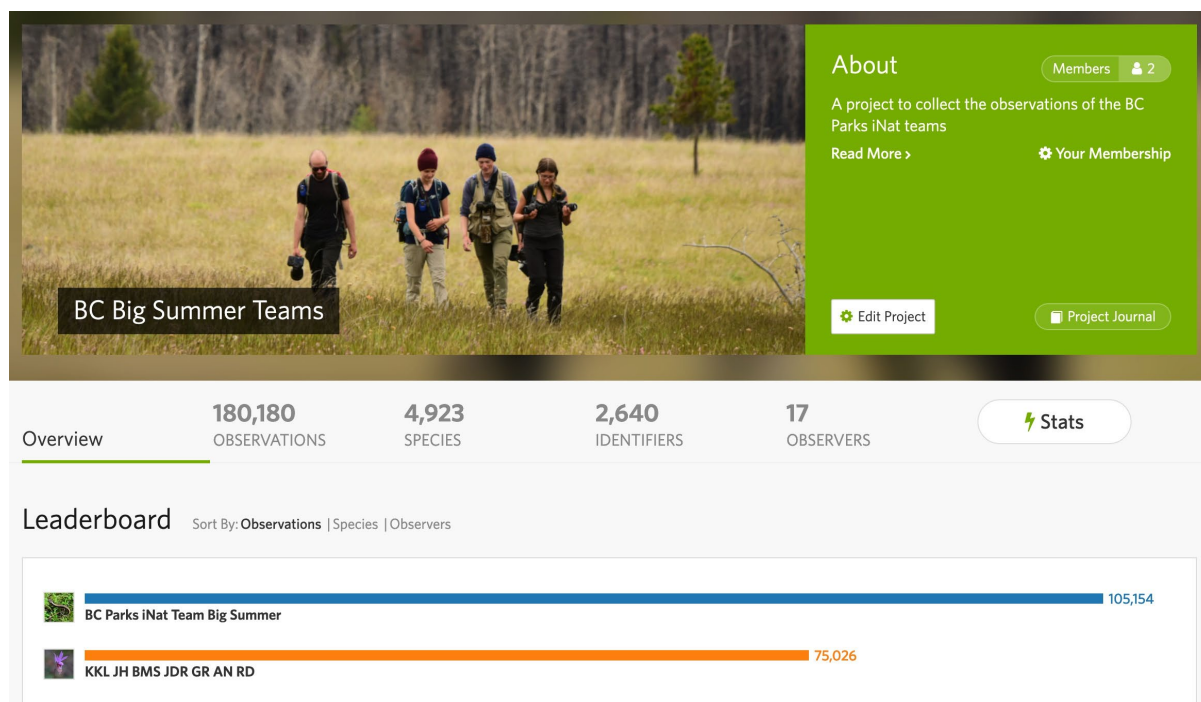


Fig. 8. A listing of observations made by BC Parks iNaturalist project staff in 2019 and 2020. [<https://inaturalist.ca/projects/bc-big-summer-teams>]

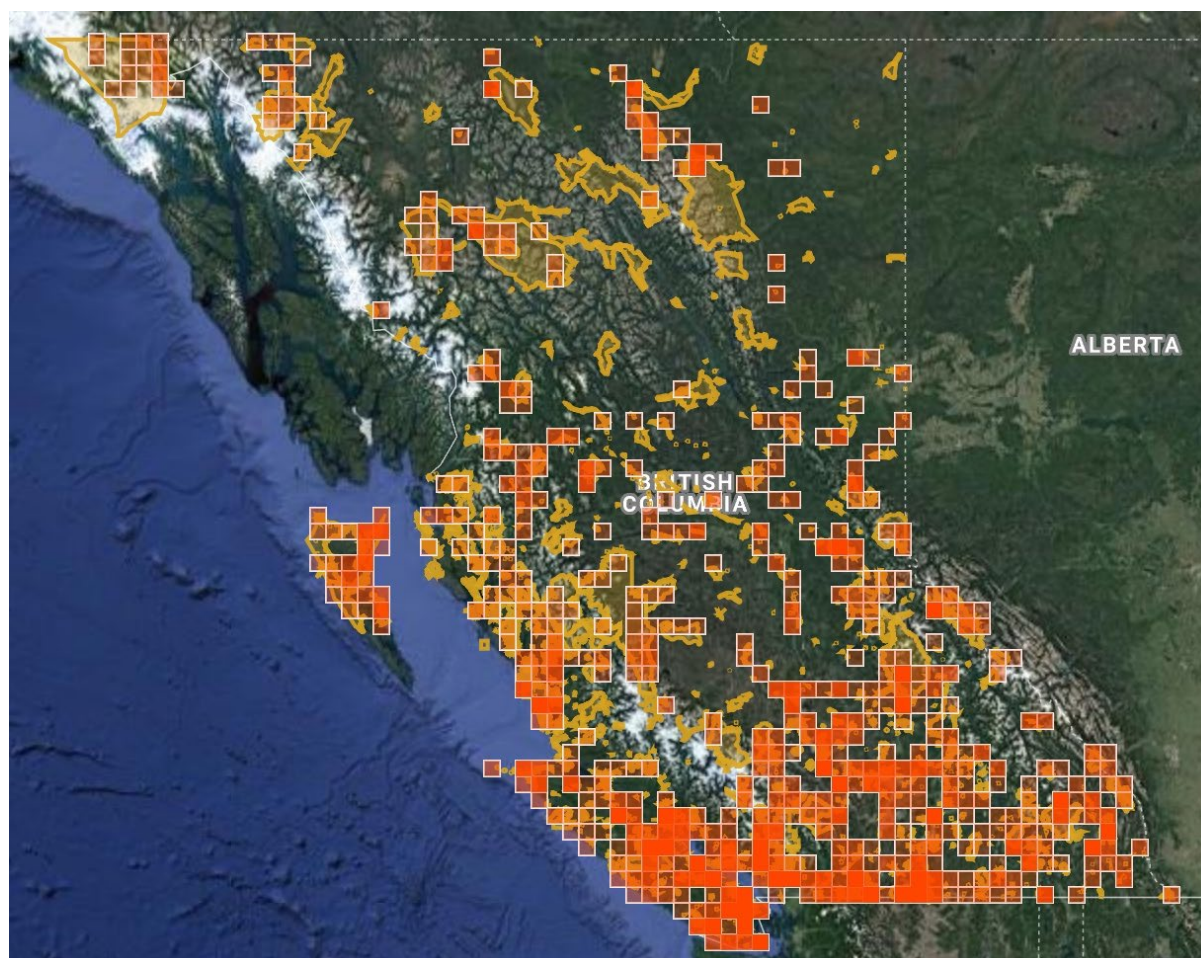


Fig. 9. Current spatial coverage of iNaturalist observations across the BC Parks system of protected areas. Protected areas are outlined in orange, dark orange squares represent the locations of iNaturalist observations. Currently over 650 protected areas have observations.

Relevance to BC Parks management

[How should BC Parks incorporate your project's findings in our day to day management?]

- BC Parks now has mapped observations of rare and threatened species of plants and animals for protection.
- BC Parks now has baseline data for invasive species, which can be targeted strategically

In general, the main current management takeaways of the BC Parks iNaturalist Project are:

- BC Parks can expand the spatial, temporal, and number of observations of species
- BC Parks can find and record new locations for species
- BC Parks can track populations of endangered species
- BC Parks can rapidly assess whether species are at risk
- BC Parks can increase the observations of historically under-sampled species
- BC Parks can greatly increase the possibilities for secondary data collection (e.g., trophic interactions, body condition, some diseases, range-wide variation)
- BC Parks can document range expansions, range extensions, out of range species
- BC Parks can formulate new hypotheses from observations on platforms
- BC Parks can create dedicated projects for species of interest, to engage further observations
- BC Parks can use for early detection of invasive species

Some current limitations to data collection:

- 1) iNaturalist observations are biased toward roads. About 85% of observations are within 500m of roads in British Columbia (Fig. 11; this includes all observations from around the province, not just those within BC Parks).

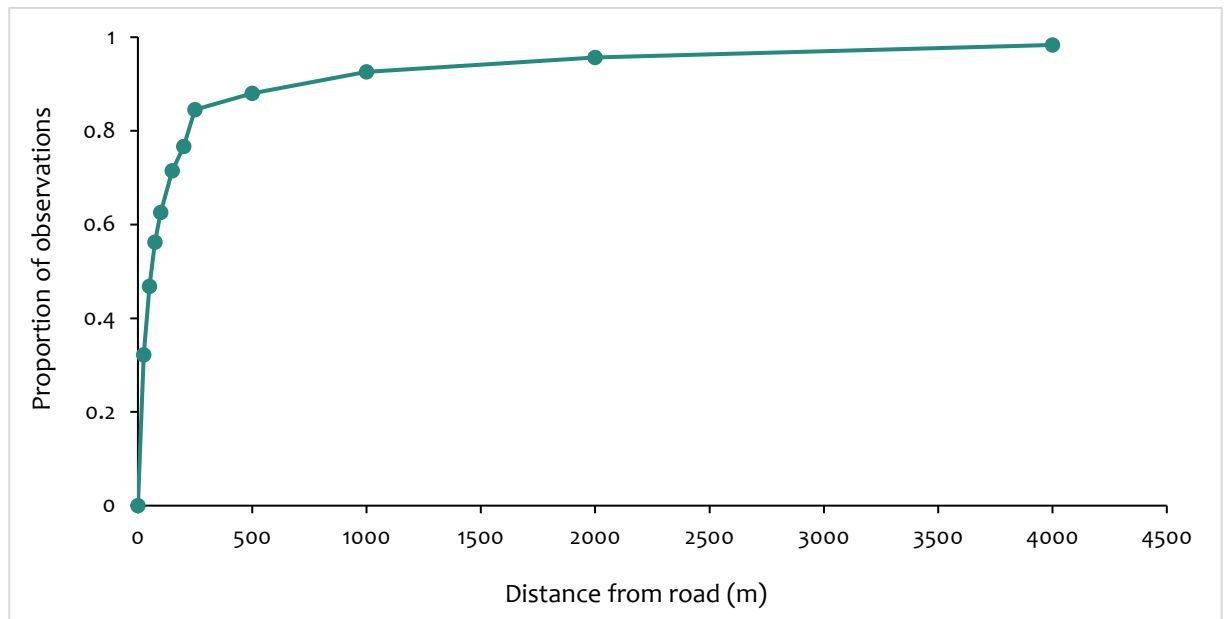


Fig. 11. Proportion of iNaturalist observations contained at different distances from roads in British Columbia. Roads include all surface types: paved, maintained gravel, unmaintained gravel/dirt, decommissioned, overgrown, unknown, and seasonal. Figure by Ellyne Geurts.

An annotated list of 10 management-relevant observations:

- 1) Louisiana Broomrape (*Aphyllon ludovicianum*). The only iNaturalist observation of this species in British Columbia, and the most northerly observation of the species. Detection of a rare and unusual species by the BC Parks iNaturalist team (Jason Headley: <https://inaturalist.ca/observations/64534178>)
- 2) Grappletail (*Octogomphus specularis*). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is considering Grappletail for listing under the Species at Risk Act. Biologists used iNaturalist to survey sites where the dragonfly had not been seen for over 40 years, including in two provincial parks (Davis Lake PP and Rolley Lake PP). (John Reynolds: <https://inaturalist.ca/observations/55569401>)
- 3) Observations of rare species like Northern Sanicle (*Sanicula graveolens*; <https://inaturalist.ca/observations/47699623>), Brown-spotted Range Grasshopper (*Psoloessa delicatula*;) etc. in provincial protected areas).
- 4) Pronghorn Clubtail (*Phanogomphus graslinellus*). One of BC's rarest dragonflies, the pronghorn Clubtail, observed by team member Thomas Barbin in Wasa Lake Provincial Park. One of only 2 iNaturalist observations of this species in British Columbia (Thomas Barbin: <https://inaturalist.ca/observations/58038596>)
- 5) Northern Pacific Rattlesnake (*Crotalus oreganus ssp. oreganus*). An observation of a rattlesnake seen crossing a park road after dark, submitted by iNaturalist user @andrewnedam, who also contacted the BC Parks iNaturalist Project to see how observations like this might help inform park management after he had observed many reptiles and

- amphibians using BC Parks roads in the north Okanagan/Thompson regions. (Andrew Nydam: <https://inaturalist.ca/observations/56369162>)
- 6) Texas Balloonwort (*Sphaerocarpos texanus*). An observation of a new species for BC Parks, and a new location for a rare and poorly known liverwort. (Brian Starzomski: <https://inaturalist.ca/observations/68186982>)
 - 7) Many observations of large mammals like caribou, moose, grizzly bear, wolverine, wolves.
 - 8) Many observations in remote protected areas: e.g.,
<https://www.inaturalist.org/projects/stone-mountain-provincial-park>,
<https://www.inaturalist.org/projects/tatshenshini-alsek-provincial-park>,
<https://www.inaturalist.org/projects/koeye-conservancy>
 - 9) Examples of rare or invasive species found when BC Parks staff have asked the BC Parks iNat team to look for them, or others (e.g., Invasive Species Council) have requested we look for them: e.g., Bowl Clover (*Trifolium cyathiferum*)- <https://www.inaturalist.org/observations/62567666>; Garlic Mustard (*Alliaria petiolata*)- <https://www.inaturalist.org/observations/26122004>
 - 10) The BC Parks iNaturalist team has recorded 129 species that are unique in BC, 66 of which are unique in Canada and 31 of which are unique on all iNaturalist.

List a challenge or opportunity (e.g., lesson learned) here.

- Don't underestimate the power of enthusiastic citizen scientists to document biodiversity. The project continues to double the number of observers each year, and the collective contributions of community scientists is rapidly increasing the amount of biodiversity data across the province.
- A challenge is to get visitors past the "wow" stage when introducing them to iNaturalist, and convert them to become power users
- Another (ongoing challenge) is dealing with the restrictions on travel, physical distancing, etc. due to COVID
- Camping has proven to be a major challenge as spaces fill up quickly on the reservation system and day-of-arrival sites are few

Conclusions

[Optional - List any final recommendations and suggestions for BC Parks]

This project is all about growing partnerships between local citizens, park visitors, park staff, and biologists from other agencies (like the Conservation Data Centre, Ministry of Forests, Lands, and Natural Resource Operations and Rural Development, etc.). By supporting and building these partnerships, BC Parks is providing key biodiversity data across the province and to multiple management agencies.

References and links

[Optional - Provide any other links or information related to the project, including existing blogs, related publications, or other media]

<https://inaturalist.ca/projects/bc-parks>

Contact info

[name(s) and email(s)]

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Checklist

- Have you submitted a blog for BC Parks' website? If not, a blog summarizing your project in no more than 400-600 words is due no later than 30 days after the end of the term of your agreement.
- Have you added any relevant Living Lab project data or reports to the BC Data warehouse and/or EcoCat? Please contact Jen Grant or Stephen Ban for assistance.
- As the fiscal year comes to a close, we will need an invoice from you for the final instalment of your Living Lab transfer agreement. Please provide an invoice that gives the university address, the Transfer Payment number (as per your agreement) and a one-line description of what the project is about. Tell us that it is the final payment and indicate the amount due (you may need to send this via your financial arm). The invoice should follow or accompany the completion of this final report template of which both are due on or before March 22nd, 2020. **If we do not receive an invoice from you by this date, we will not be able to issue your final payment.**