BUTTERFLIES IN MY BACKYARD (BIMBY)

The Great B.C. Butterfly Search Report

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Contents

Introduction

British Columbia has the highest butterfly biodiversity in the country, but its size makes it difficult for any one person or small team to attempt to catalogue the state of this diversity.

Although insects around the world are rapidly disappearing because of habitat loss, urbanization, pesticide use and climate change, much can be done to reverse the alarming trend. The David Suzuki Foundation's Butterflyway Project is an excellent example of how people from all walks of life can positively affect butterfly populations by planting butterfly habitat. In addition to creating or restoring insect habitat, we also need a better understanding of where beneficial insects such as bees and butterflies are found, and which species may need extra conservation efforts.

The main goal of the Butterflies in My Backyard (BIMBY) — The Great B.C. Butterfly Search was to create a network of volunteers all over British Columbia who share the goal of documenting and photographing butterflies throughout the province. British Columbia has the highest butterfly biodiversity in the country, but its size makes it difficult for any one person or small team to attempt to catalogue the state of this diversity. BIMBY 2022 volunteers, affectionally nicknamed "seekers," took this task to heart and were overwhelmingly successful in inventorying B.C.'s butterflies. Seekers uploaded around 8,400 butterfly entries to iNaturalist and photographed species ranging from the common cabbage white to the highly endangered Johnson's hairstreak, as well as 116 other species throughout the province.

Photographing butterflies is not easy, and the BIMBY 2022 leadership team organized the initial training and monthly check-in Zoom meetings with the seekers. At these meetings we shared strategies for finding and photographing butterflies. For example, both seekers and the leadership team could help answer questions like what time of day was best, how to take a screen shot from a butterfly video and how to upload to iNaturalist. Seekers and the leadership team laughed and bonded over how exciting it was to photograph that elusive butterfly that they had missed on the previous outing, as well as how frustrating it was to see butterflies but not be able to get the photograph.

BIMBY seekers who were up for an extra challenge were invited to look for butterflies along transect routes. Transects are set paths of a specific distance. Seekers walk regularly (from once a week to once a month) along these routes at a comfortable walking pace. Any butterflies photographed on the transect are noted to be "transect butterflies." Transects are commonly used worldwide as a standardized method for documenting butterflies. The BIMBY leadership team, with input from the seekers, set up a series of transects throughout the province. Set transects could be walked by any seeker. Seekers were also invited to create personal transects. The most powerful aspect of transects comes when they are walked yearly for many years. Because we know the distance walked, and the speed of the seeker, if we see an increase in butterflies along that specific route year over year, we know it is because populations are increasing, and not because more people are looking for butterflies.

Along with seekers photographing butterflies throughout the province, BIMBY 2022 also included an interactive school program. The BIMBY Schools Bioblitz team helped teachers and their classes organize and participate in a nature Bioblitz. Students took photos of all living things around their school and uploaded them onto iNaturalist. A Bioblitz is a wonderful and easy way to get students of all ages to carefully observe nature around their schools.

BIMBY 2022 succeeded on several fronts. We mobilized and supported people from all corners of British Columbia to document butterflies. We engaged teachers and students to participate in the spring BioBlitz. In doing so, we helped seekers, teachers and students get acquainted or reacquainted with nature, we fostered a supportive community of people who all care passionately about the well-being of B.C.'s biodiversity and, last but not least, we created data that will be used by conservation biologists to create policy to protect the most vulnerable butterfly species.

BIMBY 2022 succeeded on several fronts. We mobilized and supported people from all corners of British Columbia to document butterflies. We engaged teachers and students to participate in the spring BioBlitz.

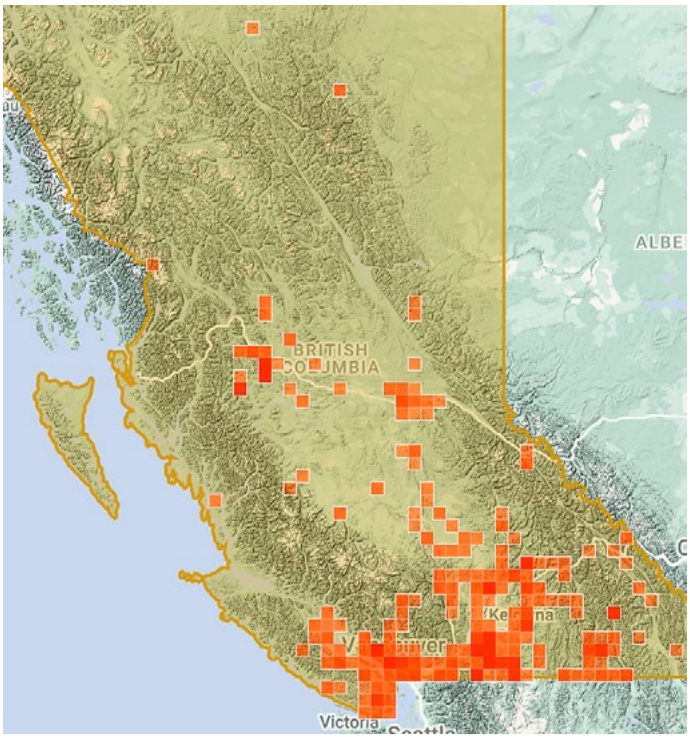
BIMBY Recruitment and Engagement

OVERVIEW

In spring 2022, the David Suzuki Foundation, in partnership with UBC zoologist Michelle Tseng and UBC Botanical Garden associate director Tara Moreau, invited residents of British Columbia to help find butterflies throughout the province. In March 2022, 306 volunteers from 94 B.C. communities joined the Butterflies in My Backyard citizen science project.

At the first BIMBY training on April 9, volunteers voted to call themselves BIMBY seekers, which was fitting as they would be seeking and documenting butterflies throughout British Columbia.

The six- month project ran from May to October. BIMBY seekers were tasked with taking photos of butterflies in their communities and submitting their findings to the BIMBY Project on iNaturalist.



INATURALIST BIMBY MAP

HIGHLIGHTS

1. By the time the 2022 BIMBY season came to a close in late October, **345 seekers** had joined on iNaturalist. Together, they made **around 8,400 observations and documented 118 different butterfly species in B.C.**

   According to John Reynolds, conservation ecologist at Simon Fraser University and past chair of the Committee on the Status of Endangered Wildlife in Canada, "the 8,400 BIMBY seeker observations (on iNaturalist BIMBY Project) account for about **21 per cent of all the butterfly observations that have EVER been made in British Columbia.** For one summer, this is quite amazing."

JEN MATHEWS

2. BIMBY seekers who opted to take on a greater challenge signed up to participate in **Transect Walks**. These transects were a combination of set (communal) transects and private transects that seekers were encouraged to walk at least once a month throughout the six-month period, from spring to fall of 2022.

   Michelle Tseng leads the BIMBY Transect Walks. She said the purpose is to gather accurate information about the number and diversity of butterflies in a specific area. The data comparison is conducted by transect seekers walking the same route year after year. In 2022, transect seekers walked 12 set and 31 private transects.

3. A key component of BIMBY was engaging students and teachers to participate in our annual BIMBY School Bioblitz. Alex Wong, a UBC science student and researcher who led the Bioblitz, enlisted 30 schools and 1,000 students to join the 10-day Bioblitz from late May to early June.

According to John Reynolds, a successful citizen science project should hit the following four points, and BIMBY met all four criteria:–

a. It is fun

b. It uses friendly and appropriate platforms like iNaturalist

c. It appeals to young people

d. It has conservation value

What do seekers' observations mean for public engagement?

ZOOM PHOTO

a. Enhanced awareness of the impact of climate change on species and habitat. (BIMBY seekers learned and experienced first-hand the **impact of climate change on species and habitat**. Seekers did not find butterflies in B.C. in June because of the unusually cold and wet weather. It was not until July that butterfly observations really took off.)

b. Increased knowledge about and interest in butterfly species in their "backyard" — the province.

c. Helped monitor the health of B.C. butterflies by identifying and tracking them.

d. Engaged family and friends to expand the circle of interest, awareness and action.

e. Enhanced knowledge about the connections between plants and butterflies.

f. Empowered through a community of people learning from each other and experts.

g. Encouraged by contributing 50 per cent of iNaturalist butterfly observations in B.C. and 21 per cent of all butterfly observations in the province.

h. Committed to learning more about butterflies and the habitats they rely on.

IN THEIR OWN WORDS

BIMBY seeker Sue Elwell from Princeton

"I really, really enjoyed the program this year. I could do more!!"

Sue made 2,455 observations of B.C. butterflies for the BIMBY project this year. It's an extraordinary achievement that made Sue the envy of other BIMBY seekers. Sue said she started slow but sped up when she formed a strategy to tackle this work:

1. Matched plants and butterflies.
2. Search iNaturalist past observations.

SUE ELWELL

"I learned that knowing the habitat is important. To know where the flowers and plants are and follow the nectar plants."

BIMBY seeker Shirley Morrison from Princeton

"When it comes to biodiversity we have here, you just need to stop, stand still and look. I am amazed how much is out here and the link they all have is teaching me we keep everything to KEEP EVERYTHING."

Shirley is one of the top BIMBY seekers from Princeton. Shirley observed 395 butterflies from 56 species. She had the advantage of meeting Sue Elwell and Yvonne Beckett (585 observations and 53 species) from the same region and the three supported each other.

BIMBY seeker Karen England from Creston

"Chasing butterflies allowed me moments of childish abandon — dropping whatever I was doing to simply watch, follow and score a great photo if I was lucky and patient enough! Thanks for providing this opportunity to have fun and contribute to a valuable database at the same time."

Karen lives in British Columbia but spends long hours commuting between Calgary and her hobby farm near Creston. *"The BIMBY project as it was structured this year was a perfect volunteer opportunity for me and one I hope to continue for years to come,"* she said. *"The ability to engage with the BIMBY project simply by watching for butterflies while wandering around our Creston orchard performing all the seasonal chores was a perfect fit! Walking a personal transect provided a great excuse to wander a beautiful path near our property with lots of native flowers and shrubs. In the years I have been walking the path, I've come to look forward to the seasonal floral displays. Now I can also look forward to watching the butterflies I was able to document this year."*

BIMBY seeker Anne Mowat from Glade, West Kootenays

"At our training session, I recall that Winnie emphasized we should just go out there and have some FUN. This encouraged me, a neophyte, to just do it! This helped me feel I could post a butterfly image that was imperfect, fuzzy, not ready for National Geographic, and wait for our Identifiers to correct or confirm my ID. Later in the season, as I became more familiar with specific species, I felt even I could support our community and confirm the observations made by other seekers (only a few times). In May, I knew next to nothing about butterflies.

After just a few months, I can now recognize and name several local butterfly species. Moreover, I have become familiar with concepts like puddling."

Just like that, Anne Mowat, a retired public relations executive, became one of the top 25 BIMBY seekers on iNaturalist. Anne has a lot of good things to share about how the project has transformed her life. *"One day, I was just ambling along my personal transect route with my dog, Charlotte ("Charlie"), and out of the corner of my eye, in the waving grasses off the road allowance, I caught a small spot of darkness and stopped. Slowly, I eased over to the spot, and there she was, a lovely common wood nymph alighting on a single blade of long grass. Six months ago, I would have missed the wonder of that moment. In short, I am enjoying my journey along this learning curve."*

Anne also feels good because she is contributing to a greater good and her work is making a difference.

"Providing my observations was both educational and satisfying, as I feel I'm contributing to a provincewide project in support of fundamental research that may help us understand how butterfly populations are evolving. ***It is a great experience to feel I'm contributing to fundamental research that may help us take action to preserve habitats for our endangered butterfly species."***

These days, Anne is enjoying her newfound knowledge about local butterflies with her partner Susan in their home near Kootenay River. Anne said when they are not kayaking on the river, they will be chasing butterflies nearby.

ANNE MOWAT

BIMBY seeker Cori Dixon from Kamloops

"I need to share how surprisingly emotional it felt to observe a monarch. I have not seen one since 1980 (when I was privileged to observe hundreds amassed near Clearwater)."

Cori is not the only seeker who has not seen a western monarch in B.C. for a long time. But the fact that she spotted one this year, with all the climate-related events like the atmospheric river and wildfire in Kamloops, makes it even more special. Apart from the monarch, Cori observed 453 butterflies this season and found 34 species.

"I needed to get some exercise, and the air quality index was unsafe for running but was safe for walking, so off I went after work to walk the Kamloops set transect. Sure enough, there was almost no butterfly action, but I did come across gumweed buzzing with bees, so I decided to capture some iNaturalist observations of these other pollinators just for fun. As I finished, a nearby rabbitbrush caught my eye… a butterfly… a very large butterfly… omg a monarch! I crept up to it ever so slowly and was able to get excellent video as it fed on the rabbitbrush flowers. It was so exciting and unexpected, and I still get a feeling of awe and wonder when I think of it."

CORI DIXON

BIMBY seeker Ellen Scott from Celista on the north shore of Shuswap Lake in Thomson Okanagan

"Volunteering with BIMBY seekers has brought out my inner scientist. Newly retired, I am helping with important research that BIMBY and the David Suzuki Foundation are doing to increase our understanding about the habitat and food requirements of butterflies and how human activities and climate change impact these beautiful pollinators. ***By identifying and tracking butterfly populations in B.C., BIMBY seekers are helping to monitor the health of B.C. butterflies.****"*

Ellen occupied the number 7 spot for most observations on the BIMBY iNaturalist project. She made 388 observations this season, logging 37 species. Not bad for a newbie retiree who recently moved from Port Moody in the Lower Mainland to her 160 acres of mostly forested land in the Northern Okanagan.

BIMBY seekers Dee McRae and Carlie Kearns from Houston

"I was aware of several citizen science projects but had not participated in any previously. And of butterflies? I knew nothing! My attraction to BIMBY was the line — BIMBY is expanding to the rest of the province. My response was that is me. I fit 'the rest of the province.' And I can be a beginner because there will not be too many BIMBY seekers from here. I forwarded the application to a friend, who was acceptedbefore me, and we became the BIMBY bimbos."

As it turns out, Dee did not only become one of the two BIMBY bimbos in her region, she became the third most prolific BIMBY seeker this season — 506 observations and 22 species. As for the other half of the BIMBY bimbos, Carlie Kearns, she made 427 observations and beat Dee by an additional three species — a total of 25 this season.

For Carlie, it also became a family project as her husband would call her when there were butterfly activities.

BIMBY seeker Vicki Smith from Prince George

"The favourite part about BIMBY for me is sharing what I found with my family. One day, I took my two-year-old nephew along for my observation. He decided to be my assistant. On another day, I took my cousin's six-year-old daughter who was visiting from Vernon.... Prior to joining the BIMBY project, I did not know much about butterflies in the Prince George area. I learned so much by participating in the project over the summer and was delighted by the diversity of butterflies in my area. I had fun sharing my observations and survey experiences with my family and friends."

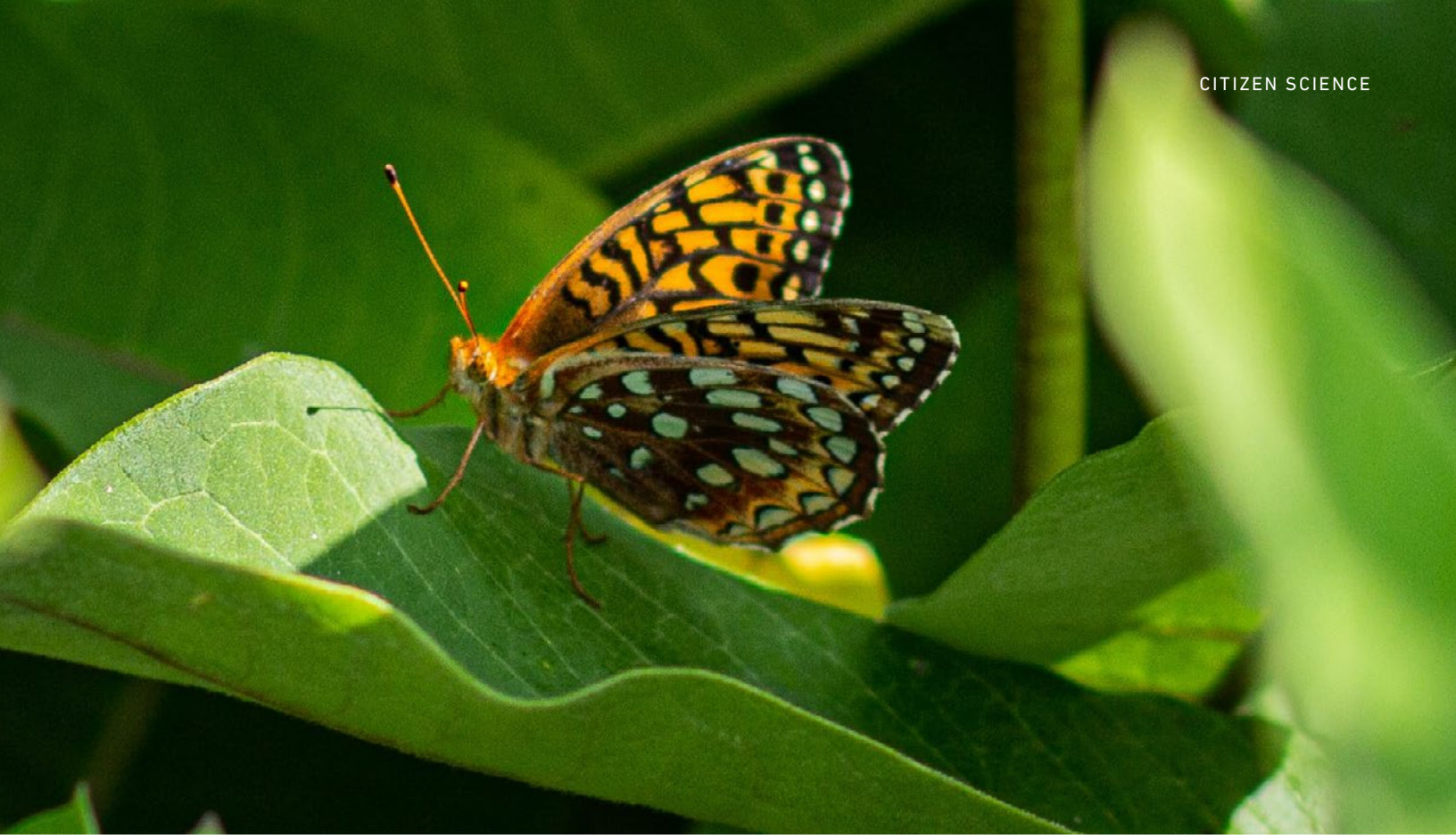
Vicki is a biologist who specializes in terrestrial science. She finds submitting her butterfly photos to iNaturalist also helped her learn more about the species' diversity.

"I recommend the BIMBY project to anyone who is interested in learning about the natural world around them. The more we learn about and understand the creatures and landscapes around us, the more we are motivated to care about and conserve them."

ANNE MOWAT

There is so much to learn and share from our BIMBY seekers that this report will not have enough space. To learn about our seekers' findings, please visit our iNaturalist Butterflies in My Backyard (BIMBY) project.

https://www.inaturalist.org/projects/butterflies-in-my-backyard-bimby-project?tab=observers



Citizen science

WHAT IS CITIZEN SCIENCE?

Participating and contributing to scientific research can be difficult, especially if you have never been a part of the scientific community. With growing global concerns about climate change and biodiversity loss, it can be difficult to deal with the anxiety associated with these issues. However, citizen science is a low-barrier entry for interested people to get involved in science and take action.

As the name implies, citizen science is the collaboration between trained scientists and the general amateur. There are two main purposes: research and education. Although scientists create and uncover knowledge from their research, there is sometimes a lack of knowledge transfer from the scientific community to the general public. Citizen science projects such as the BIMBY project help facilitate knowledge sharing while also collecting valuable data to help address pressing issues. It is a win-win!

citizen science is a low-barrier entry for interested people to get involved in science and take action.

iNaturalist observations and identifications

INTRODUCTION

Data were collected from iNaturalist for this report between January 1, 2022, and October 31, 2022, and include all observations of butterflies (superfamily Papilionoidea) and their caterpillars in the province of British Columbia, Canada. In addition, comparisons are made between the total number of observations in B.C. and those made by the David Suzuki Foundation's BIMBY seekers.

*** Please note that the numbers of observations will continue to rise as observers upload their data to iNaturalist over the weeks and months.**

Overall, the BIMBY seekers

- observed **8,392** butterflies in 2022 out of a total of 16,662
- a **50.55 per cent** contribution overall for the year
- and an increase from **615** observations in 2021
- **118** "verified" species were identified throughout this period by **153** BIMBY seekers
- BIMBY seekers this year alone contributed about **20 per cent** of **ALL** iNaturalist butterfly observations in B.C. This is a huge achievement and gives scientists access to quality data to better understand the impacts of climate, vegetation and human activities on butterflies.

	COUNT OF	
USERS	OBSERVATIONS	PERCENTAGES
BIMBY Seekers	8,382	50.55%
Others	8,270	49.45%
GRAND TOTAL	16,662	100.00%

TOTAL OBSERVATIONS 2022

According to John Reynolds, former chair of COSEWIC, conservation ecologist at Simon Fraser University, "the 8400 BIMBY seeker observations (on iNaturalist BIMBY Project) account for about 21% of all the butterfly observations that have EVER been made in British Columbia. For one summer, this is quite amazing."

QUALITY GRADE

iNaturalist uses quality grades, rating initial observations as "casual" or "verifiable." Verifiable observations become "research grade" when they have "been reviewed and the community is in agreement on the ID." For the purpose of this report, only "verifiable" and "research grade" data were used. A verifiable observation has

- a valid date
- a photo (or sound)
- a location
- is not captive or cultivated

A few "casual" observations were not included in this analysis; however, we do not want to deter volunteer BIMBY seekers from uploading observations, and we encourage and support all observations. Verifiable data starts as "needs id" and reaches "research grade" if enough experts agree.

OBSERVATIONS				
RESEARCH GRADE	BIMBY SEEKERS	OTHERS	GRAND TOTAL	% OF TOTALS
needs_id	2,352.00	2,351.00	4,703.00	28%
research	6,040.00	5,919.00	11,959.00	72%
GRAND TOTAL	**8,392.00**	**8,270.00**	**16,662.00**	**100%**

Total observations by Quality Grade

A total of **28 per cent** of the observations are "needs id." Verifiable observations are labelled as "needs id" until they either attain "research grade" status or are voted to "casual" via the Data Quality Assessment.

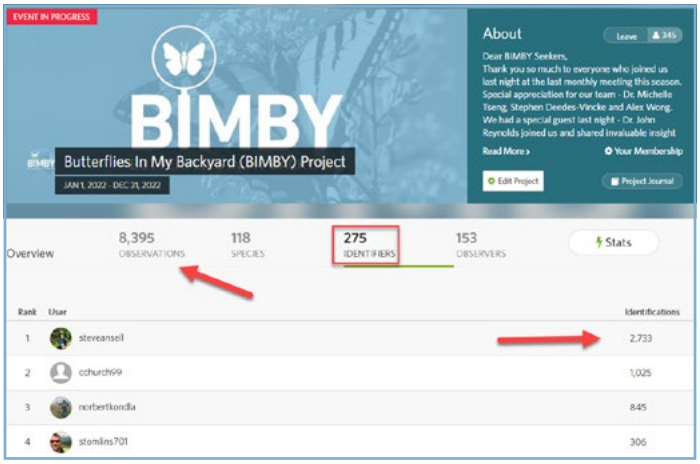
WESTERN TIGER SWALLOWTAIL: PAPILIO RUTULUS / © ERIC HABISCH

A total of **11,959** "research grade" observations were recorded (72 per cent of the grand total), of which **6,040** were contributed by BIMBY seekers. Observations become "research grade" when the community agrees on species-level ID, i.e., when more than two-thirds of identifiers agree on a taxon.

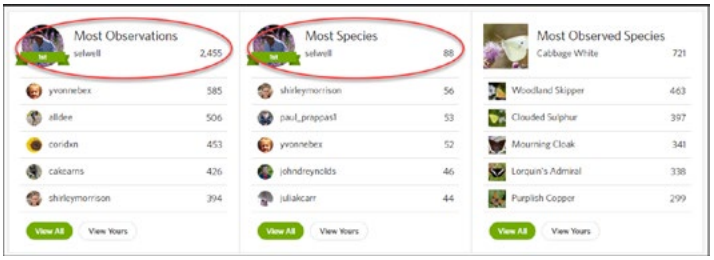
IDENTIFIERS

Identifiers are keen naturalist volunteers who review the iNaturalist observations to either confirm or suggest an alternative species. Without the help of the identifiers there would be no "research quality" grade observations. We would like to recognize and thank the identifiers who provided their insights to the DSF BIMBY observations. In particular, Steve Ansell who identified 33 per cent of all BIMBY seeker observations in 2022. The DSF BIMBY project encourages all members to try identifying butterflies and contribute to the quality grade of "research" status for B.C. butterflies.

BIMBY SEEKERS



As mentioned, the BIMBY seekers observed **8,392** butterflies throughout the year. A special mention should go to the **13** BIMBY seekers who contributed over **100** observations each and, in particular, Sue Elwell, who observed **2,455** butterflies from **88** species. This is an extraordinary effort, making up **30 per cent** of all the BIMBY seekers' observations and appreciated by everyone involved.



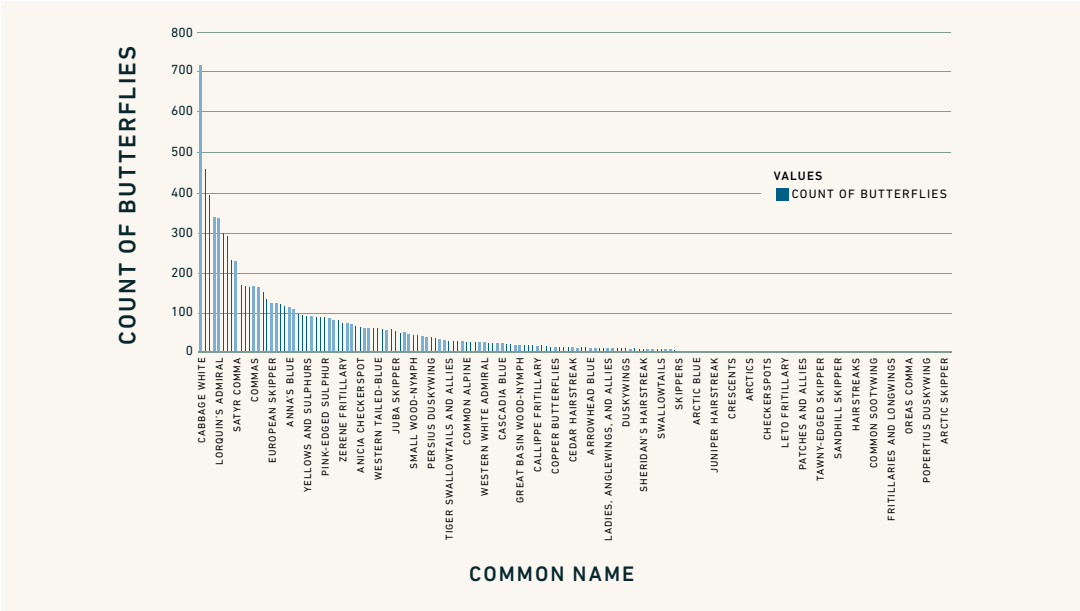
BIMBY SEEKER	COUNT OF BUTTERFLIES	%
selwell	2455	29.10%
yvonnebex	585	7.10%
alldee	506	6.17%
coridxn	453	5.39%
cakearns	426	5.12%
shirleymorrison	394	4.88%
ellensc	388	4.64%
pumakit	372	4.41%
johndreynolds	227	2.60%
erichabisch	181	2.13%
juliakcarr	165	2.08%
paul_prappas1	136	1.55%
marlenejohnston	135	1.62%

PURPLISH COPPER THARSALEA HELLOIDES / © SELWELL

OVERVIEW OF 2022 OBSERVATIONS

Out of **8,392 butterfly observations**, the most common was of the cabbage white, followed by the woodland skipper, clouded sulphur, mourning cloak and Lorquin's admiral. Note that the number of observations does not show actual population numbers but simply the presence of the species. Some inference can be made about which species are more abundant than others, but caution must be made in drawing conclusions in terms of sheer numbers. For example, more cabbage whites might be encountered more often than recorded because they are an "introduced," common species, and observers tend to ignore them.

COMMON NAME	COUNT OF BUTTERFLIES	%
Cabbage White	721	8.61%
Woodland Skipper	463	5.66%
Clouded Sulphur	394	4.85%
Morning Cloak	340	3.97%
Lorquin's Admiral	338	4.04%
Purplish Copper	299	3.61%
Green Comma	292	3.49%
Western Tiger Swallowtail	234	2.74%
Satyr Comma	230	2.72%
Pale Swallowtail	170	1.97%
Boisduval's Blue	169	1.93%
Orange Sulphur	165	2.05%
Commas	165	2.00%
Hoary Comma	165	2.03%
Western White	152	1.85%
Hydaspe Fritillary	131	1.59%
European Skipper	125	1.48%
Melissa Blue	125	1.47%
Clouded Yellows	124	1.52%
Milbert's Tortoiseshell	116	1.41%
Anna's Blue	115	1.38%
Common Wood-Nymph	111	1.34%



LORQUIN'S ADMIRAL LIMENITIS LORQUINI / © ERIC HABISCH

The data collected also allow for seasonal variances to be observed, as well as a possible connection to changes in temperature and climate change. For example, 5.67 per cent of butterflies were observed in **May 2022**, compared to **2021**, when **20 per cent** of all observations were in May. May 2022 was colder and wetter than average. (Vancouver weather: Was May one of the coldest? What about summer? | Vancouver Sun),

As the Vancouver Sun reported on June 1, 2022: *"Meteorologist Derek Lee, who is based in the weather agency's Vancouver office, says, "May was definitely on the cooler side." Lee says the mean temperature for the month was 11.5 C, more than a degree cooler than the 12.8 C average.*

That's "nothing to write home about" in terms of record cold, notes Lee, but it does rank as the 29th coldest May on record for Vancouver. (All of Environment Canada's monthly averages are based on data from the Vancouver airport, so they reflect the cooler coastal climate compared with inland.)

Did it seem unusually wet too? You're also right on that count. Just over 92 millimetres of rain fell at the airport in May. That's 142 per cent of the average for May, when 65 mm are expected to fall in a typical year."

The data on butterfly observations tends to reflect this with a lower number of observations than the previous year. The table below reflects this information as well as providing valuable information about when to expect which species throughout the year. This may provide insight into climate change impacts on the various species found in British Columbia.

The first butterfly recorded in 2022 was a mourning cloak, on February 6. This butterfly was also observed toward the end of October as well as other times during the year. It was the fourth most common butterfly uploaded through iNaturalist.

MONTHS 2022	COUNT %
FEB	0.01%
MAR	0.15%
APR	2.19%
MAY	5.67%
JUN	14.67%
JUL	25.68%
AUG	27.28%
SEP	21.77%
OCT	2.57%
GRAND TOTAL	**100.00%**

MONTHS 2022	COUNT OF ID
FEB	
06-FEB	**1**
MOURNING CLOAK	**1**
MAR	**13**
APR	**184**
MAY	**476**
JUN	**1231**
JUL	**2155**
AUG	**2289**
SEP	**1827**
OCT	**216**
GRAND TOTAL	**8392**

INATURALIST DATA 2022

MONTHS 2021	COUNT OF ID
APR	5.53%
MAY	20.98%
JUN	34.63%
JUL	22.76%
AUG	12.68%
SEP	3.09%
OCT	0.33%
GRAND TOTAL	**100.00%**

INATURALIST DATA 2021

MOURNING CLOAK NYMPHALIS ANTIOPA / © BOB STEVENTON

B.C. CONSERVATION DATA

BIMBY project iNaturalist data has been cross-referenced with the B.C. government's Conservation Data Centre list of species to better understand the current status of at-risk butterflies.

B.C. Conservation Data Centre - Province of British Columbia (gov.bc.ca)

Data categorizations are based on a provincial list, a B.C. list and a global list. This report uses the B.C. list codes, which categorize species and ecosystems as "red," "blue" or "yellow," with two additional categories, "exotic" and "accidental." BIMBY seekers observed butterflies in all five categories. The categories are as follows:

- **RED**
  - Any species or ecosystem that is at risk of being lost (extirpated, endangered or threatened)
- **BLUE**
  - Any species or ecosystem that is of special concern
- **YELLOW**
  - Any species or ecosystem that is apparently secure or secure (least risk of being lost)
- **EXOTIC**
  - Species that have been moved beyond their natural range as a result of human activity. Exotic species are also known as alien species, foreign species, introduced species, non-indigenous species and non-native species. Exotic species are excluded from the red, blue and yellow lists as a provincial conservation status rank is not applicable
- **ACCIDENTAL**
  - Species occurring infrequently and unpredictably, outside their usual range. Accidental species are excluded from the red, blue and yellow Lists as a provincial conservation status rank is not applicable

Overall, there was an **82 per cent** match between the CDC data and the iNaturalist observations. **Eighteen per cent** of butterfly observations did not have corresponding match. However, the number improves to a 92 per cent match with the CDC data if the quality grade selected in iNaturalist is "research grade" only and "needs id" is ignored. The percentages if just the BIMBY seekers are selected is similar.

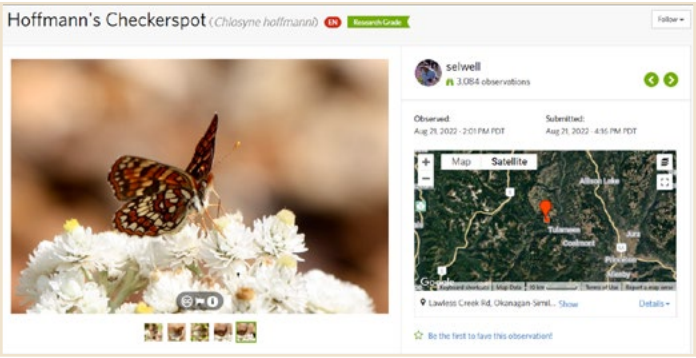
QUALITY-GRADE BIMBY SEEKER	RESEARCH BIMBY SEEKER		
CDC CATEGORIES	# OF BUTTERFLIES	%	% MATCHING
ACCIDENTAL	2.00	0.03%	92%
BLUE	21.00	0.35%	
EXOTIC	749.00	12.46%	
RED	17.00	0.28%	
YELLOW	4,767.00	78.85%	
#N/A	484.00	8.02%	8%
GRAND TOTAL	6,040.00	100.00%	100.00%

RED

From a total of **6,040** research grade butterfly observations, **17** are categorized as "red." **Nine** BIMBY seekers identified **six** of the 17 as follows:

RED BUTTERFLY	COUNT OF ID
HOFFMANN'S CHECKERSPOT	2
SELWELL	1
SHIRLEYMORRISON	1
JOHNSON'S HAIRSTRAK	7
PUMAKIT	7
MONARCH	2
CORIDXN	1
KIRSTYSIEMENS	1
MORMON METALMARK	4
SELWELL	3
SHIRLEYMORRISON	1
MOSS' ELFIN	1
BSTARZOMSKI	1
SANDHILL SKIPPER	1
JENMATTHEWS	1
GRAN TOTAL	17

Sue Elwell and Shirley Morrison captured some beautiful photographs of the Hoffmann's checkerspot. An example from iNaturalist and Sue's observation is illustrated below.



MONARCH

Monarchs have always captured the public's imagination, but they are rarely seen in B.C. and are listed as "red." This year, BIMBY seekers observed two monarchs (research grade). This is fantastic news and it will be interesting to see what 2023 brings. One was observed in Penticton and the other in Kamloops.

MONARCH DANAUS PLEXIPPUS / © CORI DIXON

JOHNSON'S HAIRSTREAK

The Johnson's Hairstreak is also listed as "red" by the B.C. government's Conservation Data Centre, and as an "S2? (2020)" under provincial conservation status rankings.

- The **S** indicates a "subnational ranking assigned and maintained by the B.C. Conservation Data Centre. Some species can be designated as **N**, for "national ranking assigned by national and international conservation authorities, or **G**, for global rankings assigned by national and international conservation authorities.
- The **2** means "imperiled."
- The **?** denotes "inexact" or "uncertain" numeric rank.

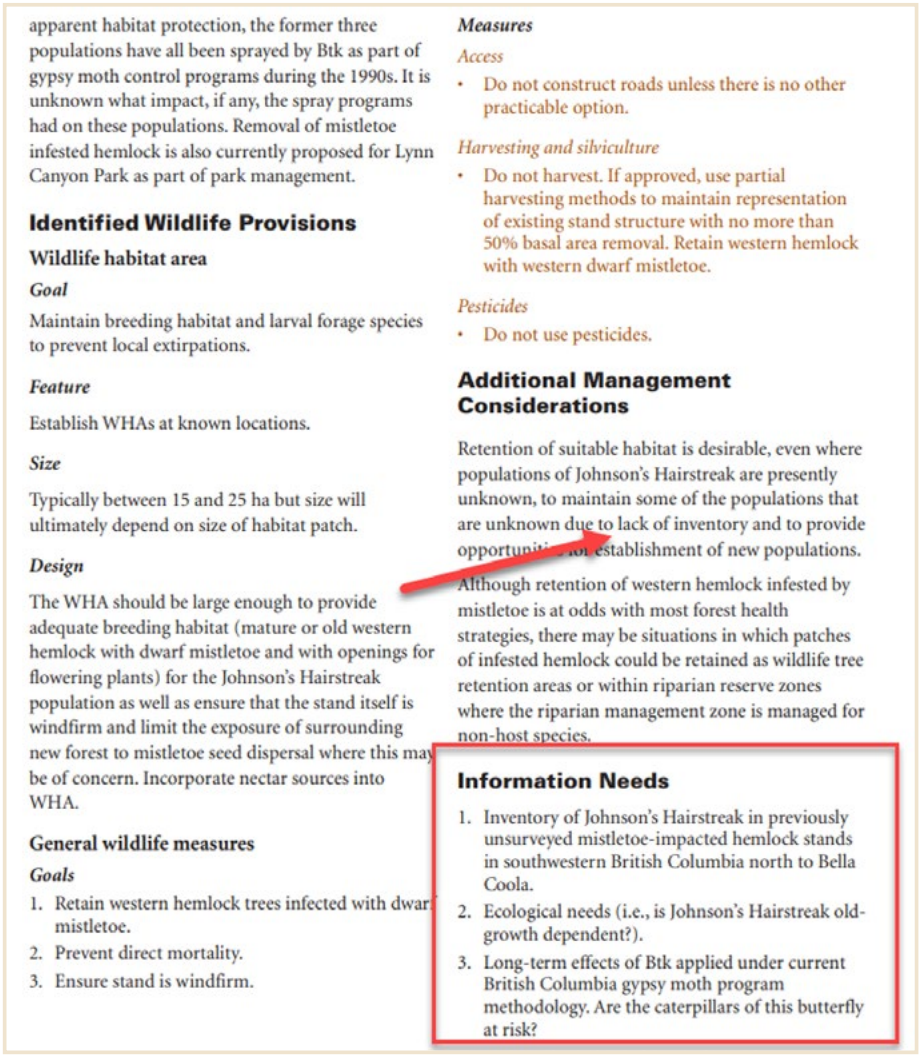
The monarch in B.C. is categorized as "**S1?B**" or "critically imperilled."

BIMBY seeker "pumakit" observed **seven** Johnson's hairstreaks on the Sunshine Coast near Sechelt. It is possible that one may be a duplicate (the same butterfly); however, these findings are critical to helping us understand this butterfly's status.

JOHNSON'S HAIRSTREAK CALLOPHRYS JOHNSONI / (C) PUMAKIT

The Johnson's hairstreak depends on hemlock dwarf mistletoe, which typically occurs on old growth western hemlock. These old growth forests have been severely reduced over the past century, putting these butterflies on the "imperilled" and "red" lists. In addition, wildfires and changes in forest health and species composition due to climate change have further reduced the population. More information is needed, and BIMBY seekers have a great opportunity to contribute to this research regarding numbers, geographical location, impact of spraying insecticides, relationship to the dwarf mistletoe as a larval host plan and the types of nectar plants butterflies use.

Information from an article by by R.J. Cannings (2004).



apparent habitat protection, the former three populations have all been sprayed by Btk as part of gypsy moth control programs during the 1990s. It is unknown what impact, if any, the spray programs had on these populations. Removal of mistletoe infested hemlock is also currently proposed for Lynn Canyon Park as part of park management.

Identified Wildlife Provisions

Wildlife habitat area

Goal

Maintain breeding habitat and larval forage species to prevent local extirpations.

Feature

Establish WHAs at known locations.

Size

Typically between 15 and 25 ha but size will ultimately depend on size of habitat patch.

Design

The WHA should be large enough to provide adequate breeding habitat (mature or old western hemlock with dwarf mistletoe and with openings for flowering plants) for the Johnson's Hairstreak population as well as ensure that the stand itself is windfirm and limit the exposure of surrounding new forest to mistletoe seed dispersal where this may be of concern. Incorporate nectar sources into WHA.

General wildlife measures

Goals

1. Retain western hemlock trees infected with dwarf mistletoe.
2. Prevent direct mortality.
3. Ensure stand is windfirm.

Measures

Access

- Do not construct roads unless there is no other practicable option.

Harvesting and silviculture

- Do not harvest. If approved, use partial harvesting methods to maintain representation of existing stand structure with no more than 50% basal area removal. Retain western hemlock with western dwarf mistletoe.

Pesticides

- Do not use pesticides.

Additional Management Considerations

Retention of suitable habitat is desirable, even where populations of Johnson's Hairstreak are presently unknown, to maintain some of the populations that are unknown due to lack of inventory and to provide opportunities for establishment of new populations.

Although retention of western hemlock infested by mistletoe is at odds with most forest health strategies, there may be situations in which patches of infested hemlock could be retained as wildlife tree retention areas or within riparian reserve zones where the riparian management zone is managed for non-host species.

Information Needs

1. Inventory of Johnson's Hairstreak in previously unsurveyed mistletoe-impacted hemlock stands in southwestern British Columbia north to Bella Coola.
2. Ecological needs (i.e., is Johnson's Hairstreak old-growth dependent?).
3. Long-term effects of Btk applied under current British Columbia gypsy moth program methodology. Are the caterpillars of this butterfly at risk?

The Johnson's hairstreak butterfly is difficult to observe as the larvae live in the forest canopy and the adults are rarely seen.

At the BIMBY seekers' year-end meeting in October 2022, John Reynolds, former chair of the Committee on the Status of Endangered Wildlife in Canada, highlighted the importance of observations on iNaturalist and citizen science work. He said that one of the first things the committee does when reviewing the status of a species is to turn to the data from iNaturalist. This spring COSEWIC assessed the Johnson's hairstreak as a "species of special concern" at the federal level, which means a "wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats."

As Reynolds stated, "COSEWIC assessed the Johnson's hairstreak this spring. This is a committee appointed by the federal government to provide independent reports on the status of plants and animals across the country. So, 180 scientists across the country support the process of soliciting and reviewing status reports of species, and then deciding the status of species based on those reports. The federal government then decides whether to protect them under the federal Species at Risk Act (SARA)."

Source:

Johnson's Hairstreak | Species at Risk, South Coast British Columbia, Canada (sccp.ca)

JOHNSON'S HAIRSTREAK Loranthomitoura johnsoni (gov.bc.ca)

In Search of the Elusive Johnson's Hairstreak | Xerces Society

Cosewic / Cosepac - Status reports

Species at risk public registry - Canada.ca

BLUE AND YELLOW

There were **21 (0.35 per cent)** "blue" category or "special concern" observations by BIMBY seekers this year. One was the beautiful variegated fritillary observed by Marlene Johnston in Central Kootenay. We need more data to track them and we hope that next year butterfly observations will increase or, if not, we can use the data to alert scientists like Reynolds to get their status highlighted and correctly documented at the provincial and federal levels.

BUTTERFLY	COUNT
COMMON SOOTYWING	**1**
SELWELL	1
SILVER-SPOTTED SKIPPER	**3**
JODILAURA	1
LEANNESTACY	1
PAUL_PRAPPAS1	1
SONORAN SKIPPER	**9**
SELWELL	9
VARIEGATED FRITILLARY	**1**
MARLENEJOHNSTON	1
WESTERN GREEN HAIRSTREAK	**1**
JOHNDREYNOLDS	1
OREAS ANGLEWING	**6**
SELWELL	6
GRAND TOTAL	**21**

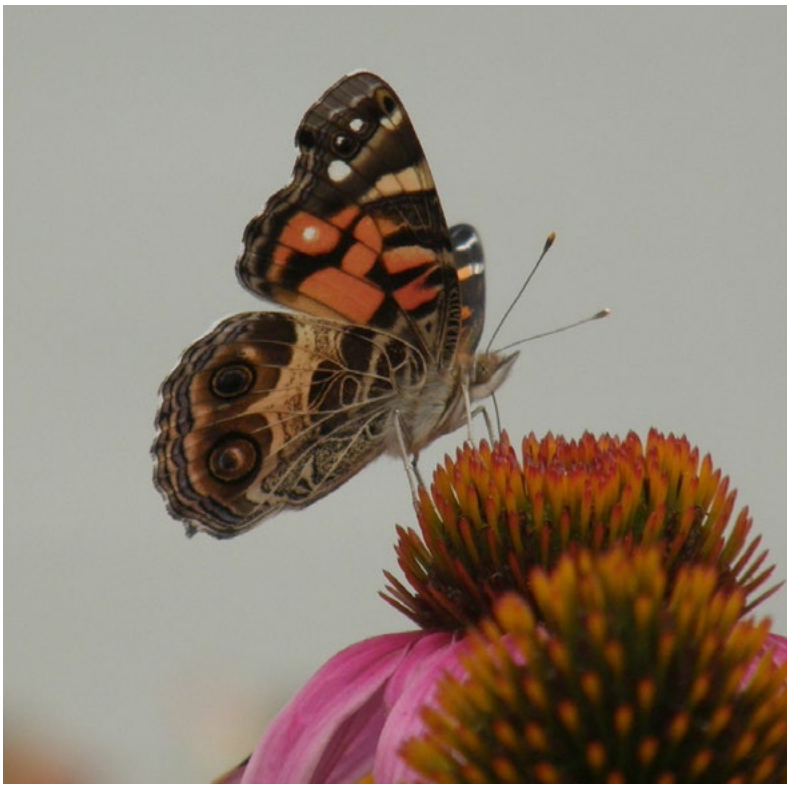
VARIEGATED FRITILLARY EUPTOIETA CLAUDIA
/ © MARLENEJOHNSTON

The "yellow" or "secure" designation encompassed **79 per cent** of butterflies observed, including common butterflies such as the western tiger swallowtail.

EXOTIC AND ACCIDENTAL

The remaining observations fall into the "exotic" and "accidental" categories.

- **Two** butterflies, **0.03 per cent** of all observations, were classified as "accidental" — species occurring infrequently and unpredictably, outside their usual range. Both were observed by Marlene Johnston and were of the beautiful American lady. As Steve Ansell said, "They often stray further north at the end of the year, so a good tail wind will certainly help!"



AMERICAN LADY VANESSA VIRGINIENSIS
/ © MARLENEJOHNSTON

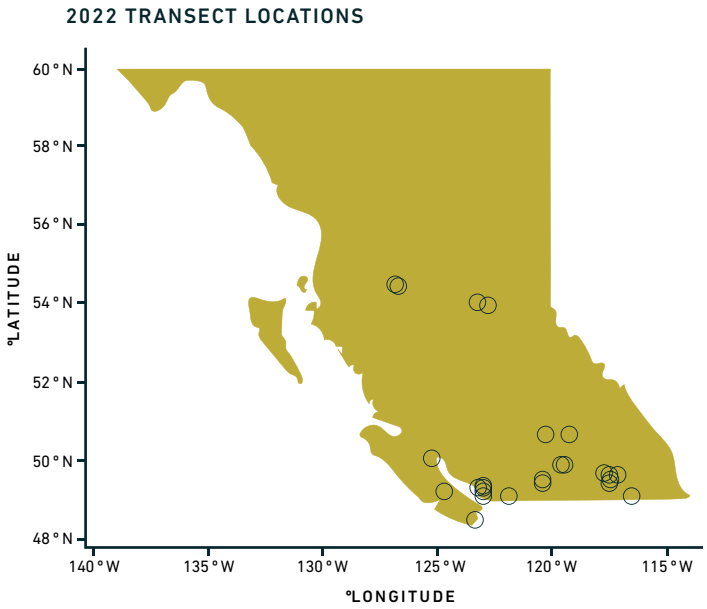
- The last category, the "exotics," includes **749** butterflies (12 per cent) These are "Species that have been moved beyond their natural range as a result of human activity. Exotic species are also known as alien species, foreign species, introduced species, non-indigenous species and non-native species."
  - Out of the **749** butterflies, BIMBY seekers observed only two species, the cabbage white **(636)** and the European skipper **(113)**.

Transect findings summary

In 2022, we had 12 "set" transects and 31 "personal" transects. Seekers and the BIMBY leadership team worked together to pick locations and routes for the former. Set transects were in Vancouver, West Vancouver, North Vancouver, Richmond, Kelowna, Victoria, Burnaby, Delta, Prince George, Kamloops and Houston. Locations and routes of the 31 "personal" transects were chosen by individual seekers. The goal with transect walks is to find a route that is easy and convenient to walk, and that is in a location butterflies visit.

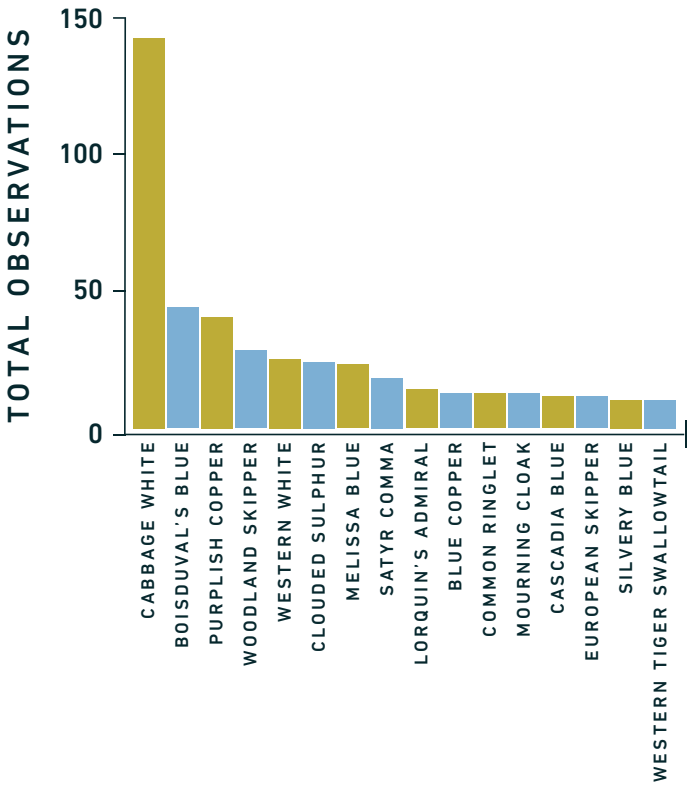
BIMBY seekers walked the12 set transects 80 times total, for an average of 80/12 walks per transect. and personal transects 165 times in total. Transects were approximately one kilometre long, so BIMBY seekers walked about 245 kilometres between May and October 2022!

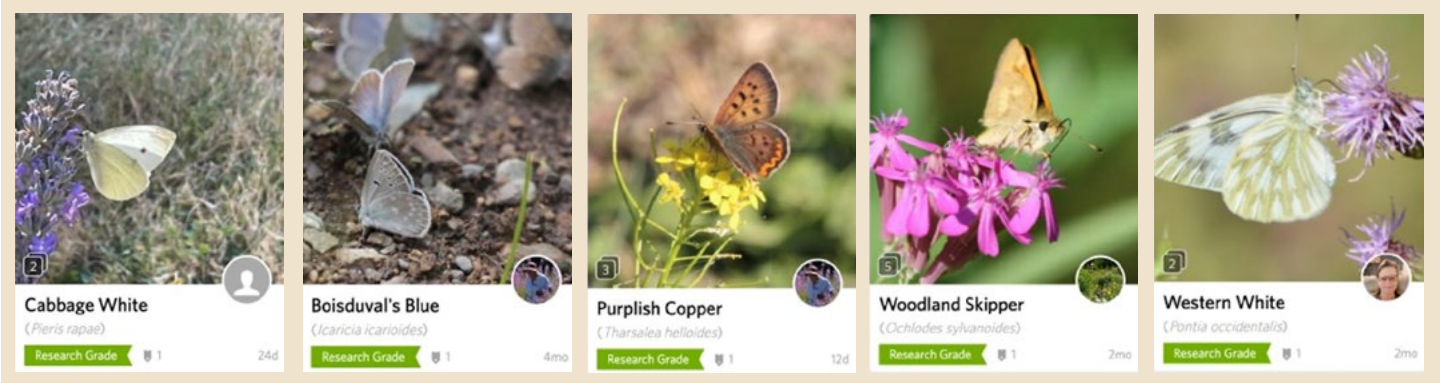
FIGURE 1: 2022 SET AND PERSONAL TRANSECT LOCATIONS (BLACK CIRCLES).



BIMBY seekers who walked the transects uploaded over 850 butterfly observations from 50 species onto iNaturalist. The most common photographed were the cabbage white, Boisduval's blue and purplish copper.

FIGURE 2: THE MOST COMMON BUTTERFLY SPECIES OBSERVED BY 2022 BIMBY TRANSECT SEEKERS





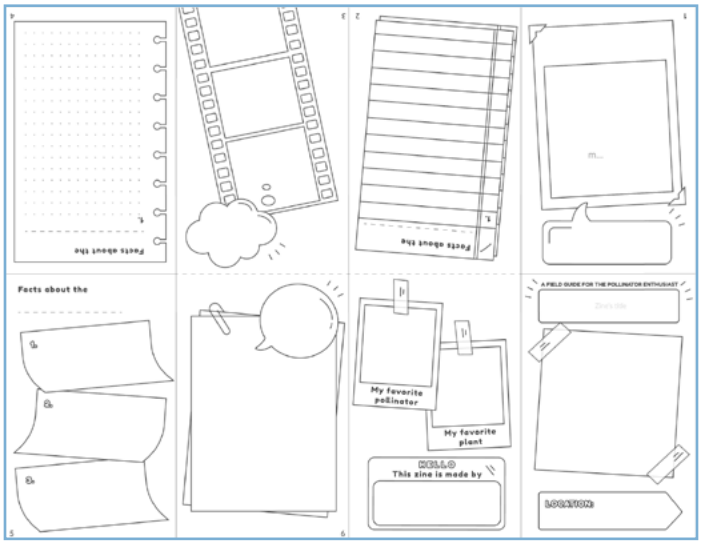
BIMBY School BioBlitz

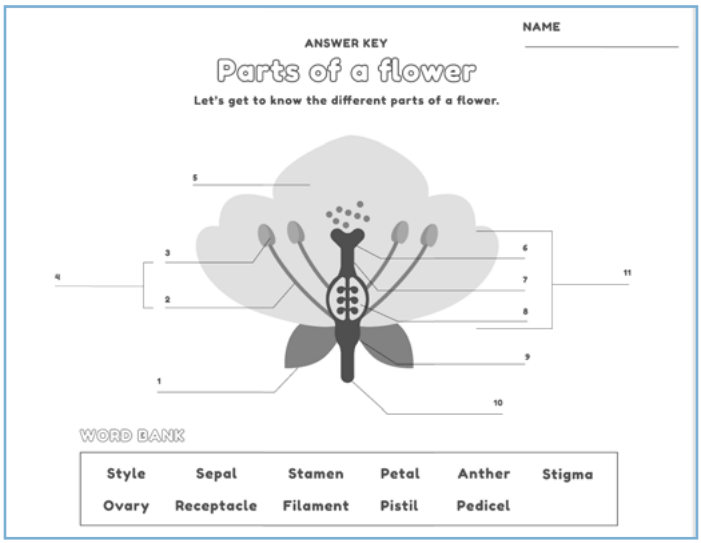
OVERVIEW

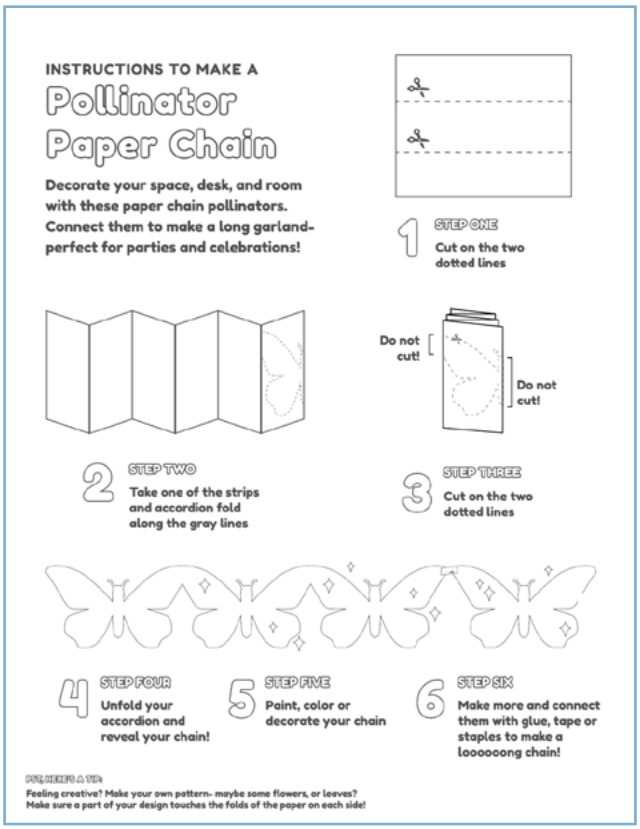
The BIMBY School Bioblitz is a two-week event aimed at engaging students throughout the province in the BIMBY project. As a citizen science project, the school portion focuses on education and aims to inspire the younger generation by empowering them with observation skills.

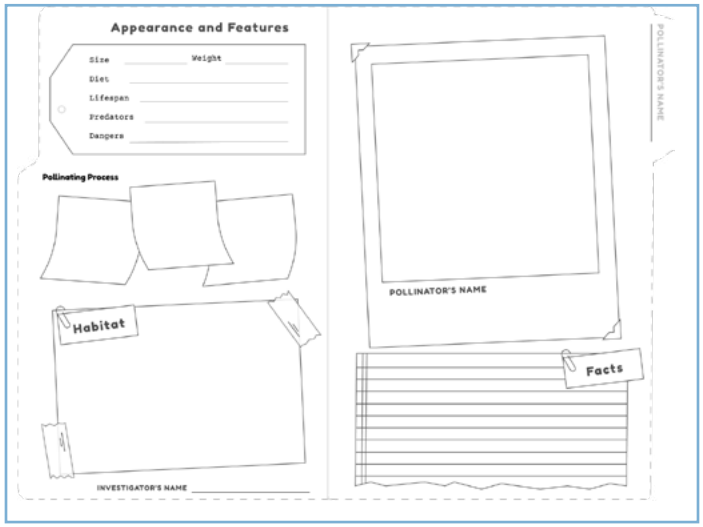
The project consisted of two main parts. The first week started with a live Zoom kickoff with schools from all around the province coming together to celebrate the start of the Bioblitz. In classes, teachers trained their students on iNaturalist and conducted classroom activities using our printable sheets. Teachers were given access to a toolkit designed by the school team that contained Bioblitz instructions, training materials and printable activities to help supplement their curriculum.

The second week required classes to go outside at least once on a Bioblitz of their surrounding environment. Students and their teachers spent hours outside looking for different flora, fauna and fungi. Compared to the main BIMBY project, students were allowed to photograph any living organism and upload it to iNaturalist.









Most of the printable activities in our toolkit are designed by team member Michelle Chan. Our program theme this year was Colours in Nature, so many of our activities focused on colour science and plant-pollinator interactions found in nature.

OBJECTIVES

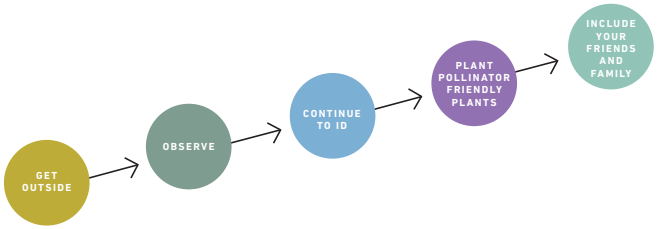
As a celebration of B.C.'s biodiversity, the Bioblitz is aimed at helping students learn about plants, pollinators and citizen science. We hope teachers and students will achieve the following objectives during participation in the project.

Teachers

1. Build capacity for applied learning and teaching with nature
2. Build confidence in conducting nature-based education
3. Incorporate citizen science and/or real-world issues into the curriculum

Students

1. Observe: students gain skills in observing nature and pollinators
2. Identify: students learn how to identify species using tools such as iNaturalist
3. Report: students learn how to record their observations and species identification

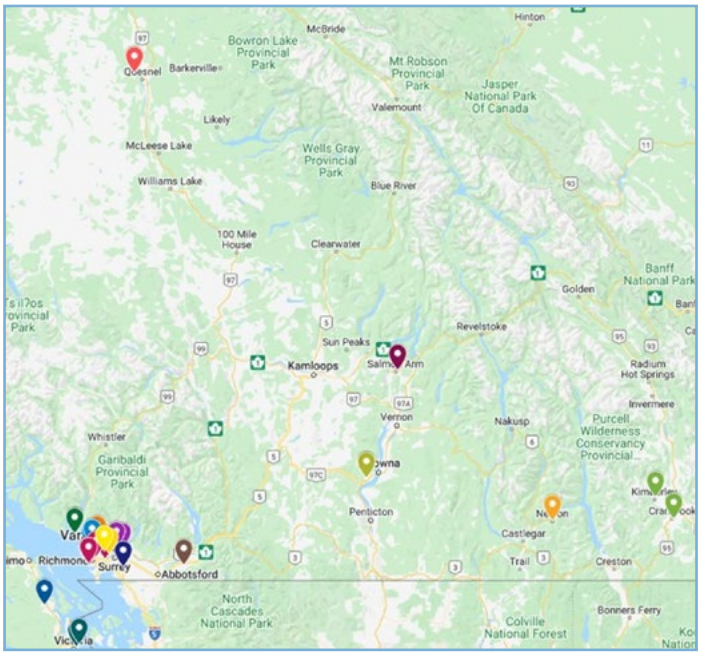


This goal ladder helps determine our program's success. Each rung represents a small goal, and we want students to climb higher as they become more involved in the program. We consider it a success if all the students are able to land on one of the rungs, even if it is the lowest one.

1. **Get outside** – As the most basic action, it is the first step that leads to the other goals.
2. **Observe** – We hope students can recognize the importance of nature and its different aspects.
3. **ID** – Even when the Bioblitz is over, we hope students will continue to identify butterflies and other organisms on iNaturalist.
4. **Plant pollinator-friendly plants** – Creating a pollinator-friendly garden with host plants can provide a habitat for pollinators to reproduce.
5. **Include friends and family** – We want students to spread the word about this program and involve their communities.

LOCATIONS

Schools throughout the province participated in the Bioblitz. Although most were in the Lower Mainland, some were from Vancouver Island, Kelowna, Salmon Arm, Quesnel and Cranbrook! This encompasses a large portion of British Columbia and its diversity, which was reflected in the iNaturalist findings!



BIMBY SCHOOL BIOBLITZ 2022 RESULTS

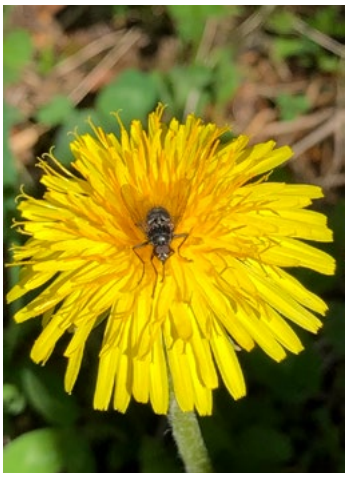
The BIMBY School Bioblitz 2022 was a success! With more than 30 schools participating, over 1,000 students were able to accomplish a lot during the week. In total, students had on iNaturalist:

- 253 observations
- 89 species observed
- 80 identifiers
- 29 observers

The theme Colours in Nature was well represented with the photos shown on iNaturalist!






Students from Mitchell Elementary go outside to learn about a local mason bee habitat.

Students from Anderson Elementary photographing flowers.

A class from École Mount Prevost created this beautiful mural!

A teacher from Terry Fox secondary created this amazing worksheet for students to fill out on their Bioblitz.

Journal #7 **Blakeburn Lagoon Pollinator BioBlitz** Enviro 12

Name:	Sample Site Observations
Location – Where is the sample site located on the map (label the map) → The date → Your name → Where you are → Time of day → The present weather conditions	

ABIOTIC	BIOTIC	BIOTIC
Identify each feature & label where they are located on the MAP!!	Identify as many of the animals as you can and label where you saw them on the MAP!!	Identify as many of the plants as you can and label where you saw them on the MAP!!
☐ Woody debris – provides shelter and habitat for aquatic species such as toads and frogs ☐ Habitat Islands – provide sage areas for birds and small mammals to forage and nest ☐ Ephemeral ponds – provide egg laying habitat for the invasive American bullfrog, drying up before they hatch to limit their population ☐ Gravel beaches – provide wildlife shore access and sunning areas for turtles ☐ Fences – keep dogs and people from disturbing wildlife ☐ Tree snags – serve as ideal hunting perches for hawks, eagles and owls ☐ Bat Boxes – provide shelter for bats that help control the mosquito population	☐ Canadian goose ☐ Goslings ☐ Eagle ☐ Heron ☐ Duck ☐ American bullfrog ☐ Crow ☐ Snake ☐ Snail ☐ Slug ☐ Hummingbird ☐ Squirrel ☐ Racoon Other:	☐ Dandelion ☐ Buttercup ☐ Daisy ☐ Grass field ☐ Pine Tree ☐ Willow Tree ☐ Cottonwood Tree ☐ Western Hemlock ☐ Western Red Cedar ☐ Salal ☐ Huckleberry ☐ Douglas Fir ☐ Salmonberry Bushes Other:

Pollinator BioBlitz: Insect Data Collection (take a picture of the pollinators you find and share on TEAMS)

INFO BOARDS: Find and collect the following information from the boards around the park.

1. INFO BOARD: CREATING A NATURE PRESERVE: What is the purpose of the park?

Questions:

What does a pollinator do?

List some examples of local pollinators.

What are the benefits of pollinators?

What would happen if the number of pollinators decreased or they disapeared?

FUTURE STEPS

As the end of the year approaches and winter settles in, the school team will be reworking the school program to better serve teachers and students. We presented at a science teachers' conference, in which we got valuable feedback from educators. Some changes we have in mind and that you can expect for 2023 are:

- Modularity – This change is geared for secondary school teachers who teach multiple blocks of classes. This will allow teachers to choose a module containing materials they wish to teach and supplement their curriculum.
- Multiple start dates – The climate varies considerably in the province. Northern regions tend to be colder and wetter until later in the year, which affects sightings of insects and pollinators. By having multiple start dates at different times of the year, teachers can bring their classes outside when there are more pollinators for them to find.
- French version of the toolkit – We would like to be as inclusive as possible with our program. We hope to engage some French-speaking schools with bilingual materials.

Conclusion

WHY DOES THE BIMBY CITIZEN SCIENCE PROJECT MATTER?

In 2022, 345 volunteers joined the Butterflies in My Backyard citizen science project. This collaboration between scientists and volunteers made significant contributions to science and to communities in B.C. The BIMBY community helped researchers collect data and share knowledge among each other and the people who visit the BIMBY project on iNaturalist.

The 2022 BIMBY season saw seekers documenting 118 butterfly species throughout B.C. But some walked and looked but did not find the butterflies they expected. Seekers Lee Larkin and Denis Knopp, experienced birders who know their butterflies and plants in the Fraser Valley, attributed part of the cause to the provincial aerial sprays to control the spongy moth (formerly known as Gypsy moth) population between May and June, and the unusually wet and cold spring.

We are in the midst of a climate and biodiversity emergency, which is bad news for nature and the species that depend on it. We're one of those species, so it's time for everyone to get involved. Every action we take contributes to resolving our environmental challenges. Kudos to all BIMBY seekers, iNaturalist identifiers and the BIMBY work committee for bringing this work forward. What can you do as a member of the public? You can share the report with your community or help someone upload an observation to iNaturalist.

To our BIMBY seekers: Without your participation — from photographing butterflies and walking transects to emailing the team with questions — this project would not have been a success this year! Thank you!

We are in the midst of a climate and biodiversity emergency, which is bad news for nature and the species that depend on it. We're one of those species, so it's time for everyone to get involved. Every action we take contributes to resolving our environmental challenges.