

Budworm Tracker: A Community Science Program



Program Update and Instructions
2019

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We thank you for your time and for choosing to be a part of the program.
Welcome to the 2019 Budworm Tracker team and happy tracking!



The Budworm Tracker

A Community Science Program

Annual Program Update

budwormtracker.ca

Hi Budworm Trackers,

First and foremost, we want to thank you for being a part of the Budworm Tracker program. If you are returning, welcome back and feel free to skip ahead to “What did we learn this year?”. If you are new to the program, welcome to the team and happy tracking!

Why should I be a Budworm Tracker?

Spruce budworm is a major insect pest throughout Canada that feeds on the new foliage of spruce and balsam fir trees. When outbreaks occur, it only takes 4-5 years of heavy defoliation to kill trees. Budworm outbreaks are part of a natural cycle that takes about 25-40 years to complete. Fossil evidence suggests that these outbreak cycles have been ongoing in our forests for thousands of years. The previous outbreak between 1970 and the early 1990s caused defoliation to over 50 million hectares (or 123 million acres) in eastern Canada. To put this into perspective, the province of New Brunswick is about 7 millions hectares in size. The most recent budworm outbreak began in Québec around 2008 and has so far expanded to ~8 million hectares (or 20 million acres) of forest.

Population monitoring – such as we do with the Budworm Tracker program – is a key component for deciding what areas might need to be managed for budworm. However, this type of data also helps us better understand outbreak patterns and why certain areas seem to be more susceptible than others to damage. Our Budworm Trackers are essential partners in the effort to collect this data!

One of the most poorly understood aspects of budworm outbreaks is the tendency of moths to undergo mass dispersal and to what extent these events drive outbreak spread. On rare occasions, these mass dispersal events can disperse moths 100’s of kilometers, spreading trillions of moths throughout the region. These events often catch the attention of the public as they can lead to huge numbers of moths settling in residential areas. Even with all we know about spruce budworm, we are still debating how much of a role mass dispersal plays in spreading outbreaks to new areas.

The Budworm Tracker program is one of the tools we use to detect mass dispersal events. It is also a tool we use to engage with community members to help us all understand the problem and, ideally, contribute to finding solutions. As Budworm Trackers, we ask you to check your traps throughout the moth flight season to provide us with moth samples and a unique dataset for monitoring budworm moth dispersal. Using regional climate data we can predict when the local moths should be flying in your area and when your traps happen to collect moths outside of that expected flight period we become suspicious that those moths might be immigrants coming from other regions.

For example, because of the colder climate in QC, any moths that are dispersing from QC into NB, are going to arrive later than the local NB flight period. In this case we would end up with two peaks in moth

flights with the second peak being immigrants from QC. Adding to this, we can use your moths to take body measurements to see how healthy they are or send them away for DNA analyses to further confirm where they came from (sort of like Ancestry.ca for budworm families!).

One of the best ways that you can get the most valuable from your trap is to check it as often as possible. The more often you sample, the more likely we are going to detect the multiple peaks that suggest a mass dispersal event has occurred with moth immigration into your area. While we ask you to do at least one trap check per week, it is incredibly valuable when you are able to check your traps more often (every couple of days or even daily). By the way, if you catch nothing in your trap, that is also great! *Knowing where budworm are is just as important to us as knowing where they are not: zeros count!*

What did we learn this year?

Although budworm trap catches have been gradually rising since the outbreak began in 2008, we saw a dip in pheromone trap catches in most regions in 2018. Both the provincial and budworm tracker monitoring program noted this dip in their annual trap catches. Except for a few traps in QC, this trend was generally consistent across the board in 2018 in Eastern Canada and Maine.

To explain this decline: year-to-year population fluctuations is common during the rise and spread of an outbreak. Although in most years budworm trap catches increase during outbreak rise, a variety of factors can conspire to briefly drop populations. For example, during the previous outbreak from 1970 to 1990, moth catches increased almost every year but managers did see a dip in trap catches between ~1974 and 1976. However, budworm population bounced back immediately after that temporary dip. We tend to consider these brief fluctuations with caution...we expect it to bounce back.

We appreciate you being part of the program and understand that sometimes “life happens”! If you’ve participated in this program in previous years and have struggled to commit to checking your trap on a regular basis, we encourage you to still participate. Having consistent annual data from traps set up in the same area is very valuable.

So, what is the moral of this story? Your data is now more valuable than ever and the more often you check your traps, the better data we have to determine if the moths you capture are immigrants. If you’d like to learn more, please visit our website (healthyforestpartnership.ca) or reach out to us!

On behalf of the entire team,

Emily Owens
Project Manager
1 (506) 292-5861

Based at Natural Resources Canada – Canadian Forest Service
1350 Regent St. Fredericton, New Brunswick, CA, E3B 5P7
t 506.452.3507 info@budwormtracker.ca

Budworm Tracker Program Contacts

BUDWORM TRACKER CORE TEAM

Lead Scientists: Dr. Rob Johns¹ and Dr. Deepa Pureswaran¹

Program Manager: Emily Owens¹

PROVINCIAL LEADS

Maine: Allison Kanoti⁴

Newfoundland: Heather Spicer¹ and Dr. Joe Bowden¹

New Brunswick: Emily Owens¹

Nova Scotia: Justin Smith²

Ontario: Dr. Chris MacQuarrie¹ and Jeff Fidgen¹

Prince Edward Island: David Carmichael³

Québec: Stéphane Bourassa¹ and Dr. Véronique Martel¹

TECHNICAL COLLABORATORS

GIS Mapping and Imagery: Ian DeMerchant¹

Software Development and Management: Evan Shanks¹

Communications: PAPMS⁵ Regional, and the HFP⁶

Public Outreach: Bernard Daigle¹ and Nairn Hay⁶

Translation: José Ouimet⁶

Kit Assembly: The HFP summer research team⁶

Website: budwormtracker.ca

Email: info@budwormtracker.ca

Phone: (506) 292-5861

NB, NS, PEI	NFLD	QC	ON	ME
<i>Emily Owens</i>	<i>Heather Spicer</i>	<i>Véronique Martel</i>	<i>Jeff Fidgen</i>	<i>Allison Kanoti</i>
1350 Regent St.	26 University Dr.	1055 PEPS	1219 Queen St.	168 State House STA
Fredericton	Corner Brook	Québec City	Sault Ste. Marie	Augusta
New Brunswick	Newfoundland	Québec	Ontario	Maine
E3B 5P7	A2H 6J3	G1V 4C7	P6A 2E5	04333-0168

¹Canadian Forest Service, ²Nova Scotia Department of Natural Resource, ³Prince Edward Island -Communities, Land and Environment, ⁴Maine Forest Service, ⁵Public Affairs and Portfolio Management Sector, ⁶Healthy Forest Partnership

Start-up Instructions

STEP 1: GETTING YOUR TRAP READY

Video of instructions available at: https://youtu.be/_cYb_6iMq7w

1. **Program duration:** June 16th - August 18th, 2019. Please set up your trap on or before June 16th.
2. **Trap Assembly:** Prepare your trap (pg. 9-12).
3. **Participant information:** Fill out the 'Contact Information' sheet (pg. 13).
4. **Hanging your trap:** Choose a location that is convenient for you to visit. Ideally, this would be near your home, or woodlot and on an accessible lower branch of a spruce or fir tree (pg. 11).
5. **Registering your trap (optional):**
 - You may register on our website or download the Budworm Tracker App on your Android or Apple device. If you would like to check in as you visit your trap, the QR code on your trap will take you directly to your account on the website.
 - If you participated last year and were registered online, you can use your same login information. If you are new to the program you will be prompted to enter your trap information then set-up a new account.
 - In previous years, we've had issues with some participant's having difficulty logging into their account. Throughout winter, our software developer has worked diligently to try to fix this issue. We apologize for any inconveniences this issue may have caused and thank-you for your patience. Last fall, our lab technicians verified all online data entries to eliminate the chance of any technical errors and for those of you that had log-in issues, we manually entered your data for you. Once again, we apologize for the inconvenience.

STEP 2: CHECKING YOUR TRAP

Video of instructions available at: <https://youtu.be/kQinproalBI>

1. **Checking Traps:** To get the most value from your trap, please do your best to adhere to your chosen trap-checking schedule and keep it consistent. At least once per week is the minimum; however, the more frequently you check, the more interesting your data will be!
2. **Collections:** If there are moths in your trap, please clearly fill in the label on one of the paper bags provided and place all the trapped insects inside. Place the bag into a freezer immediately so you can preserve them (their DNA breaks down if they are left in warm conditions).
3. **Reporting:** Once you finish checking your trap, fill in the data sheets provided (pg. 13-18). If you feel so inclined, we encourage you to count your moths, or you can just put a check mark to confirm you checked the trap on a given day. It's important that we know when you checked and whether or not you found moths. Zeros count and can indicate where budworm population are either low or non-existent! If you are reporting via website or the app, please still write your information on the provided data sheets, just to be sure the information doesn't get lost.
4. **Remember:** Zeros count and are extremely valuable data! For us, knowing when there are no moths in your trap is just as important as knowing when they are there.

STEP 3: SENDING YOUR SAMPLES BACK TO US

Video of instructions available at: <https://youtu.be/RZ2UhviGop0>

1. In the pre-labelled mailing envelope add:
 - Your 'Contact Information' sheet
 - Your 'Record of Samples' data sheets
 - The sealed Ziploc bag with all of your collected samples
2. Drop off your pre-labelled mailing envelope at your community's nearby post office

STEP 4: STORING YOUR TRAP

Video of instructions available at: <https://youtu.be/mUNFazmBR4M>

1. If you are participating again next year 😊:
 - Throw your pheromone lure in the garbage.
 - Wash your trap with warm soapy water and store in a cool and dry place until next year (we will send you a refill kit in June the following year).
2. Alternatively, if you decide that you will not participate again ☹️:
 - We will cover the return mailing costs for your kit. All you have to do is put everything (including trap, data sheets, and samples) into the original box and put the return address sticker on the outside.
 - Drop this off at the nearest Canada Post and use a Cash On Delivery (COD) method, which will be refunded to you by Canada Post once we receive the samples.

Important Notes:

- Every trap counts, whether it is full of moths or completely empty throughout the season!
- We will not provide your contact information to any outside agency. It will be used only to help us pinpoint where your trap was placed and to contact you about the project.
- If you can't put your trap up this season but have received it, please let us know.
- If you can't check your trap during a particular week, see if a neighbour, family member, or friend can check it for you. The data is important!
- If you caught zero moths all season, we still want your paperwork (especially when and how often you sampled)!
- Your trap ID number is unique and is found on the QR code on the trap itself (see image below). This number identifies your trap's data, so always make sure to completely fill in your information on the paper bags with the correct trap number.



Kit Checklist

FULL KIT	
<input type="checkbox"/>	Contact information sheet and record of samples
<input type="checkbox"/>	Budworm Trap
<input type="checkbox"/>	Pheromone lure
<input type="checkbox"/>	Gloves
<input type="checkbox"/>	Wax to seal trap holes
<input type="checkbox"/>	Beaker
<input type="checkbox"/>	Dish soap vials (3)
<input type="checkbox"/>	Strainer for moth removal
<input type="checkbox"/>	Wooden stick to remove moths
<input type="checkbox"/>	Brown sample bags (40)
<input type="checkbox"/>	Pen
<input type="checkbox"/>	Ziploc freezer bag
<input type="checkbox"/>	Return envelope (with pre-paid shipping label)

REFILL KIT	
<input type="checkbox"/>	Contact information sheet and record of samples
<input type="checkbox"/>	Pheromone lure
<input type="checkbox"/>	Gloves
<input type="checkbox"/>	Wax to seal trap holes
<input type="checkbox"/>	Beaker
<input type="checkbox"/>	Dish soap vials (3)
<input type="checkbox"/>	Strainer for moth removal
<input type="checkbox"/>	Wooden stick to remove moths
<input type="checkbox"/>	Brown sample bags (40)
<input type="checkbox"/>	Pen
<input type="checkbox"/>	Ziploc freezer bag
<input type="checkbox"/>	Return envelope (with pre-paid shipping label)

Trap Assembly

STEP 1: PHEROMONE LURE

With gloves, place the pheromone lure in the lure basket. Carefully put the cap on, the basket is fragile. Snap the lure basket onto the lid of the trap. Do not touch the pheromone with bare hands as it can decrease the lure's effectiveness. You can take your gloves off and throw them out now!



STEP 2: WAX

If you have holes in the bottom of your trap, plug up the holes using the wax. With your hands, mould the wax into a "wax ball" and use it to plug the holes in the bottom of your trap. We don't want the new soapy water to leak out!



STEP 3: SOAPY WATER SOLUTION

Fill the provided beaker with 1 cup of water (250ml), dump it into the trap and add one vial of dish soap into the water in the trap. Try not to spill it as you hang it up! You will need to make a new soapy water solution once per month to keep the water clear. We have included 3 vials of soap in your kit, one for June, one for July, and one for August!



STEP 4: TRAP

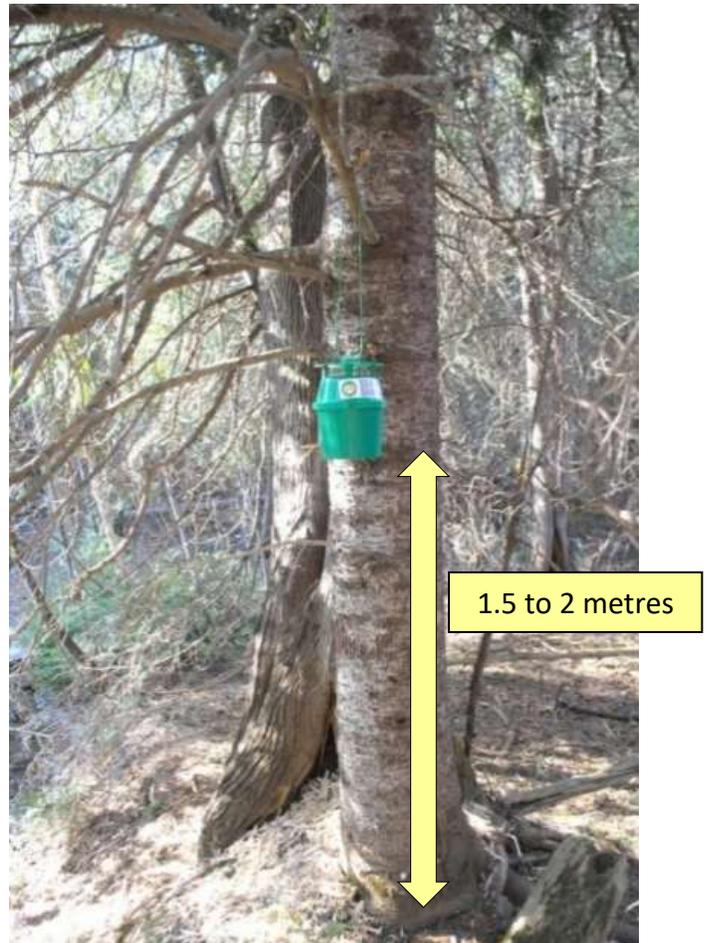
Connect the top part and the bottom part of the trap together with a twist.



STEP 5: HANGING TRAP

Hang the trap up in a convenient location, ideally:

- In a wooded area
- On a lower crown tree branch around eye level
- Somewhere you can easily visit repeatedly during the trapping period
- Away from bright lights that might draw away moths during the night



STEP 6: STRAINING OUT YOUR TRAP CATCHES

Checking your trap:

- Dump the soapy water and moths through the strainer into the beaker
- Place the moths into your labelled paper bag
- Pour the water back into the trap and if you spill some of the soapy water solution, add water or soap as needed (try to keep at least 1 cup of the soapy water in your trap)!
- Don't forget to replace the old soapy water solution with new solution each month!



Contact Information

Name	
Your Organization (if applicable)	
Trap ID	
Telephone Number	
Email	
Mailing Address	
Trap Address (if different from above)	
Set-up Date	
Tear-down Date	
Do you wish to participate next year?	Yes No (Circle Answer)
General Comments (feel free to add any questions, concerns, or comments here!)	

