Driving Ecological Solutions for a Better Living

Ecological Impacts of Mosquito Control Programs

Ontario Vector Control Association

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Facts and figures

35 YEARS

35 years of experience

300+ employees

40+ municipal clients

200 vehicles for our operations

Emerald Ash Borer

Biting Insects

Invasive Plants/ Noxious Weeds

Spruce Bud Worm

Biological control of biting insects

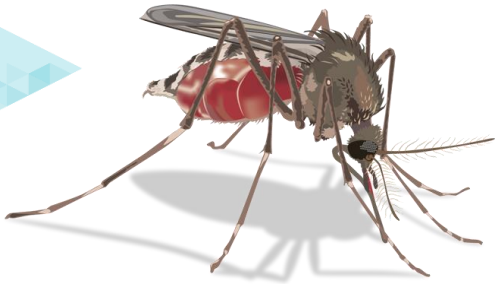
Questions on the Ecological Impact of Mosquito Programs?

- What is Bti?
- How does it work?
- Why is it so specific?
- What impact does it have on the Food Web?
- Does it have any affect on chironomid populations?

Biological control of biting insects

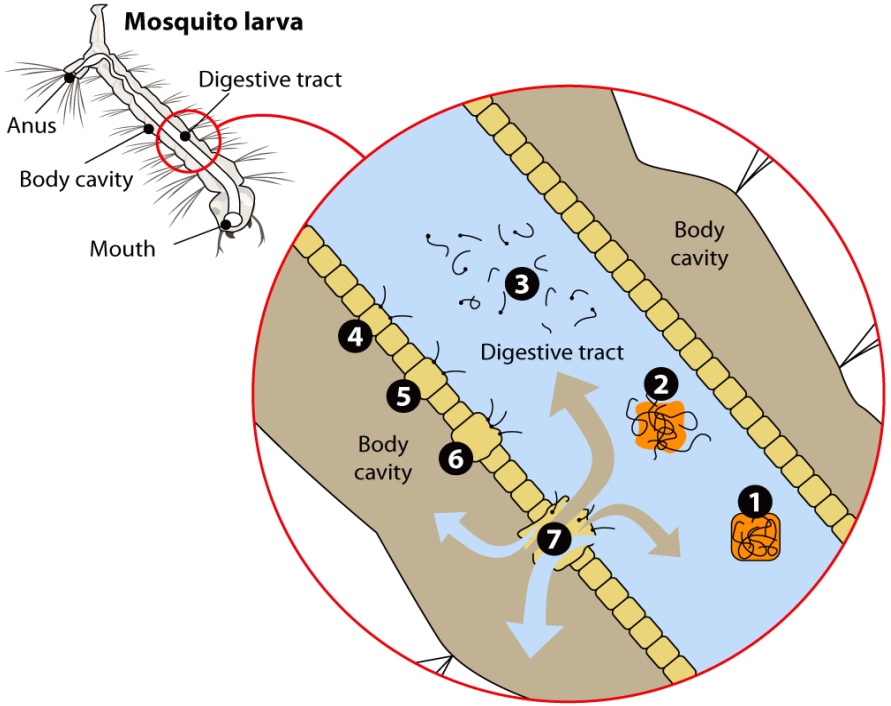
What is Bti?

- Natural bacterium found naturally in soils
- Used in Canada since 1980
- Used in stagnant or running waters (where larvae development occurs)
- Bti is specific to mosquito and black fly larvae / when ingested
- Plants and fruits cannot absorb Bti
- No effect on humans or on domestic animals
- Does NOT harm bees
- Does NOT harm fishes or any wildlife animals
- Approved and used worldwide



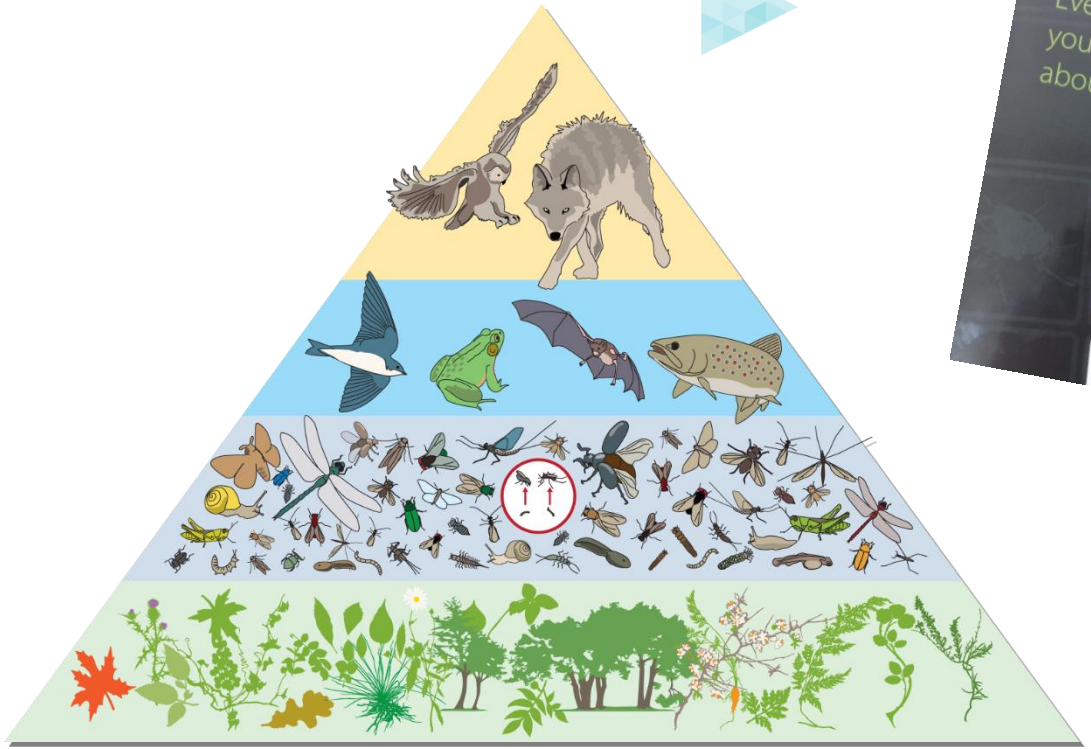
Biological control of biting insects

How does Bti work? Why is it so specific?



Biological control of biting insects

Impact on the Food web?



Biological control of biting insects

Does *Bti* Affect Honeybees?

- *Bti* is non-toxic to honeybees and does not affect hive activities (Aletru 2012).
- No loss of foragers, no excess mortality in workers, no behaviour abnormalities and no development of diseases in broods or adults.

Photo: Jerzy Strzelecki

Biological control of biting insects

Does *Bti* affect directly or indirectly amphibians?

- No direct effects from *Bti* have been observed in Amphibians (Glare & O'Callaghan 1998).
- Multiple studies have found that treatments have no impact, since mosquitoes appear to be a negligible food source for amphibians..
- Treatments occur in the 2nd and 3rd instar stages, leaving early larvae available for consumption.

Red-backed Salamander • *Brian Gratwicke*

Biological control of biting insects

Does *Bti* affect chironomids?

- At application rates above specified label directives, chironomid populations can be affected by *Bti* (Poulin 2012).
- *Bti* is not harmful to chironomids at recommended application rates for the control of mosquitoes or biting flies (Lagadic 2013).


Chironomidae larvae • *Erin Hayes-Pontius*

Biological control of biting insects

How does it work?

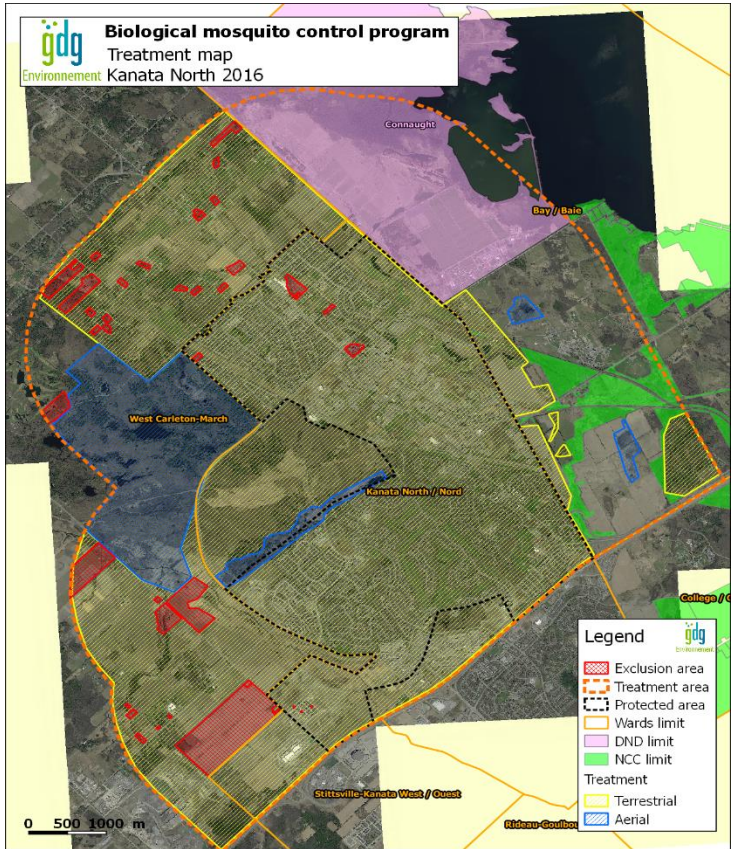
Our program in 4 easy steps :

Monitoring Communication Treatment Analysis

Biological control of biting insects

How does it work?

Mapping the work

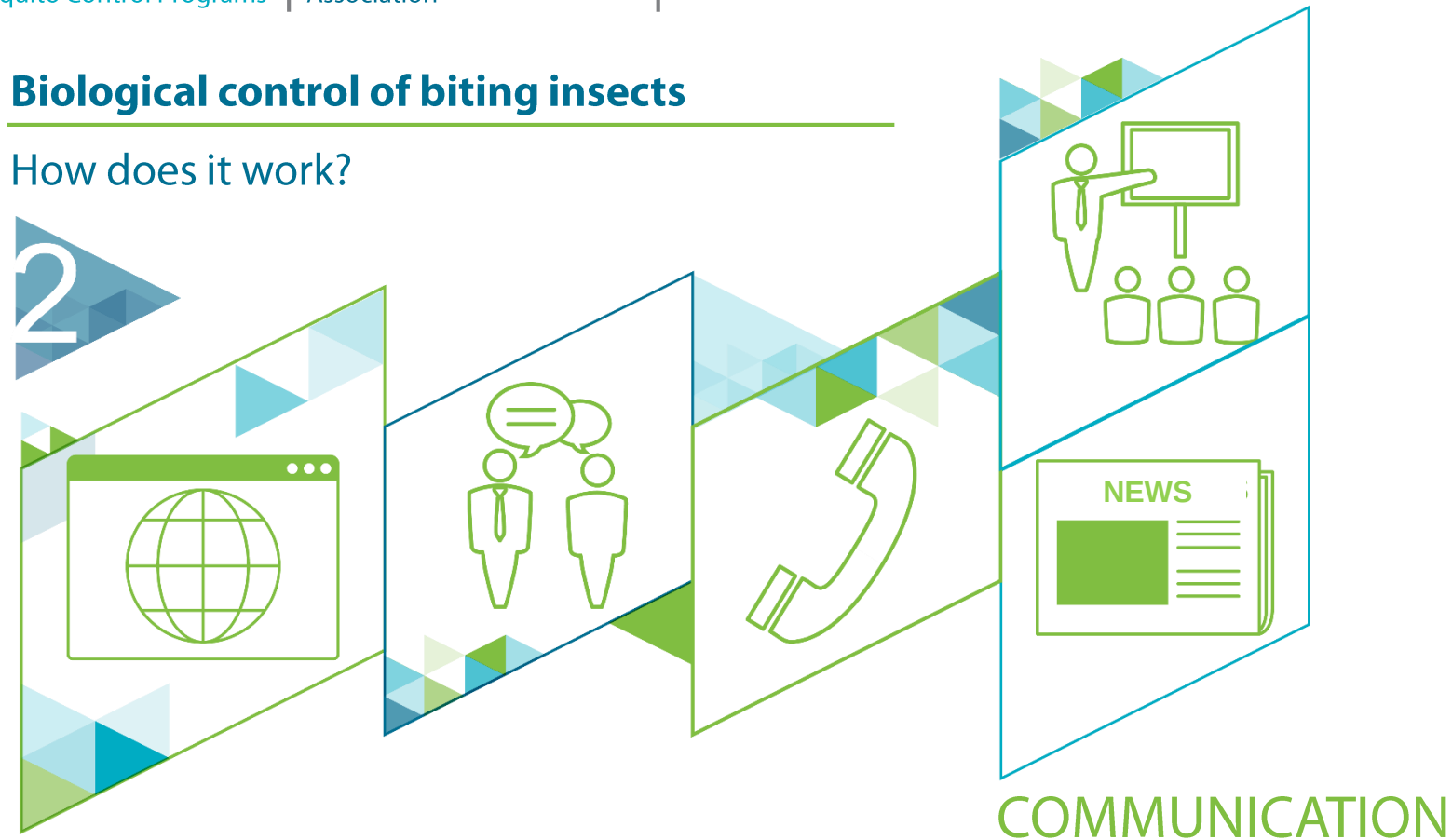


Assessing the starting of operations

Observations of mosquito larvae in a dipper

Biological control of biting insects

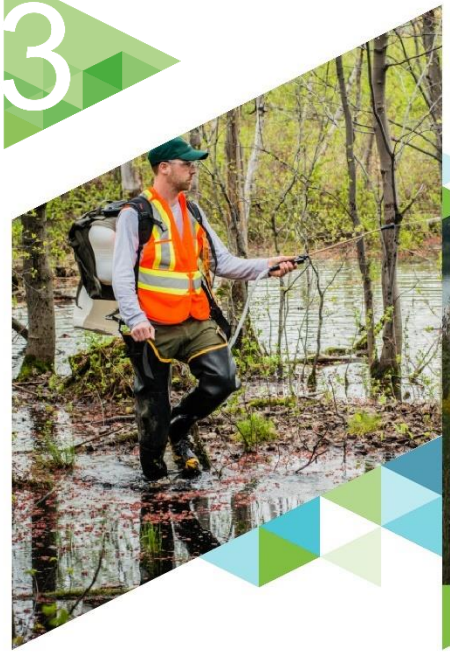
How does it work?



Biological control of biting insects

How does it work?

3



TREATMENT

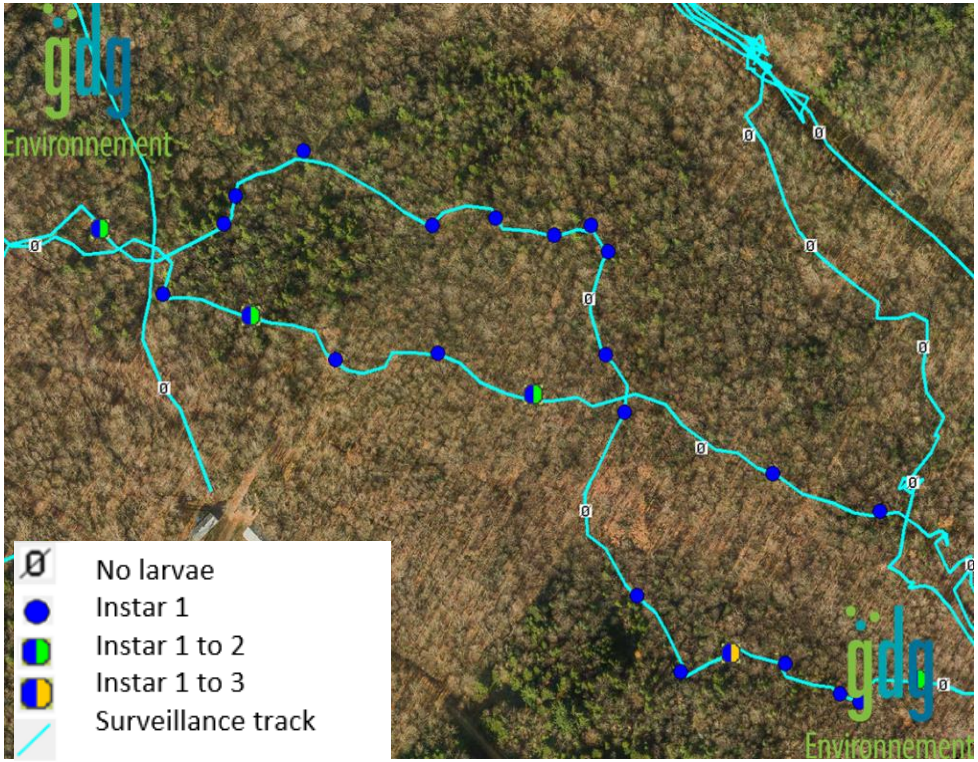
Biological control of biting insects

How does it work?

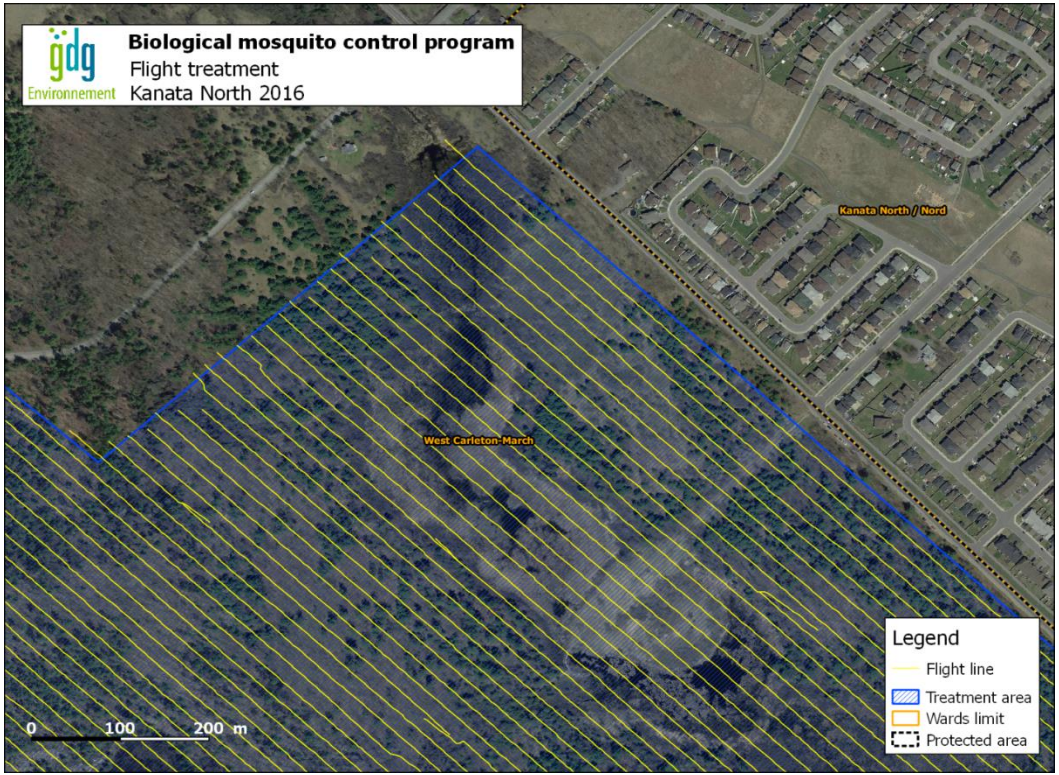
4

ANALYSIS

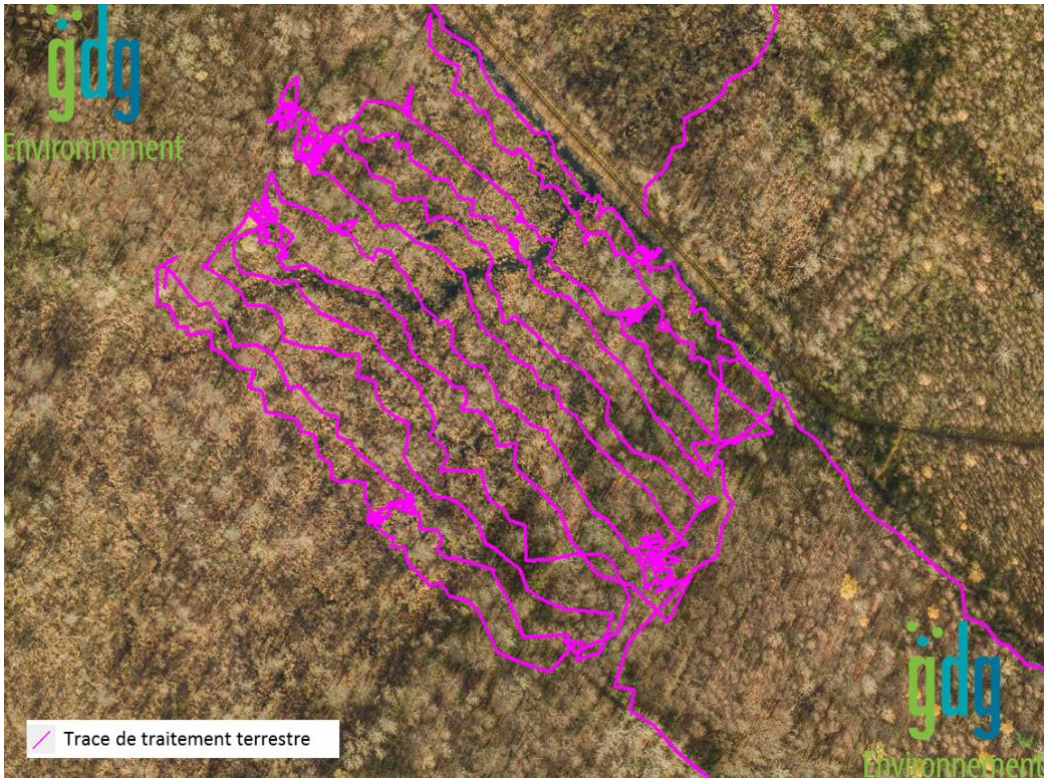
Quality Control Pre-Treatment Monitoring



High precision



Quality Control Tracking ground treatments



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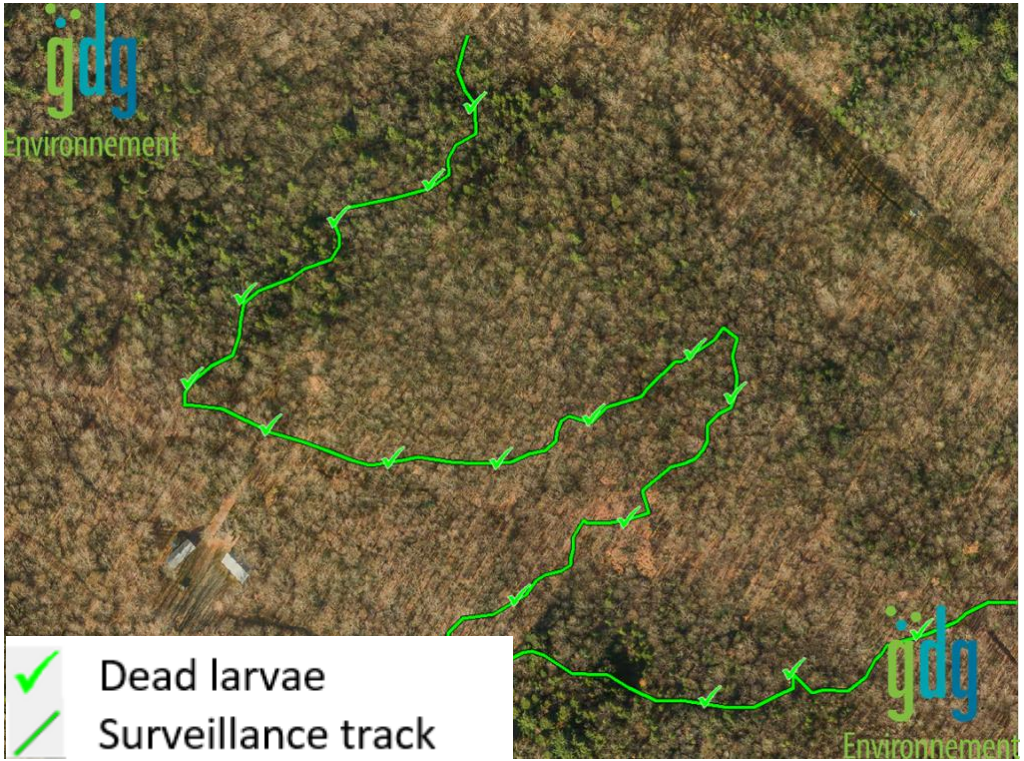

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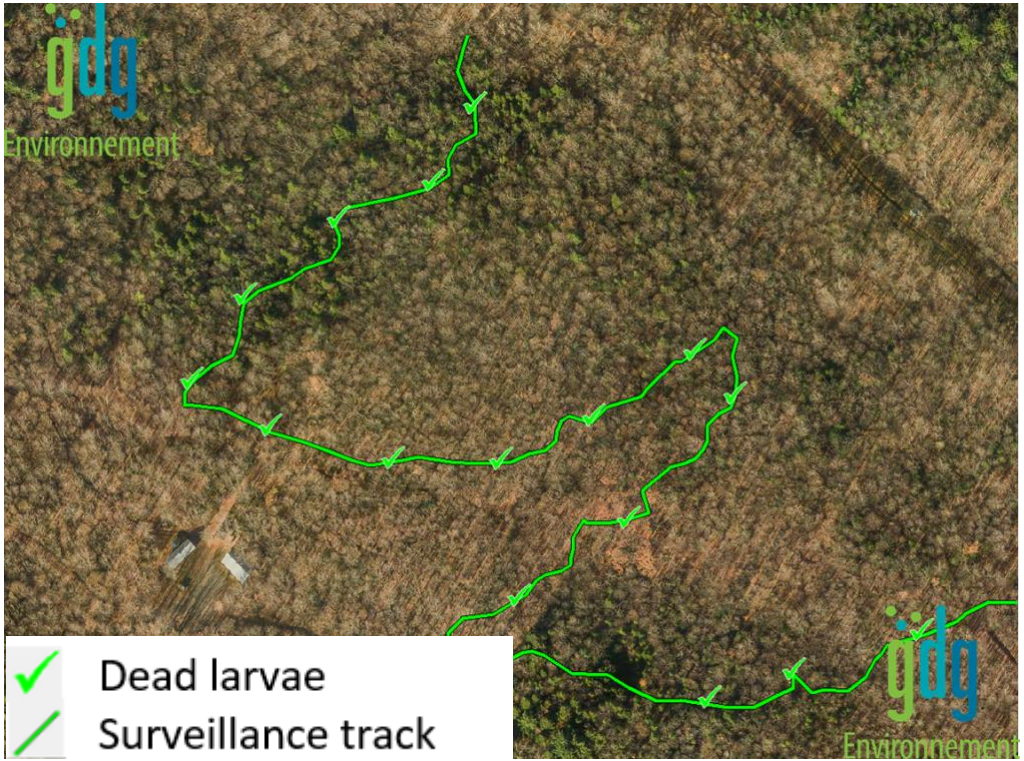


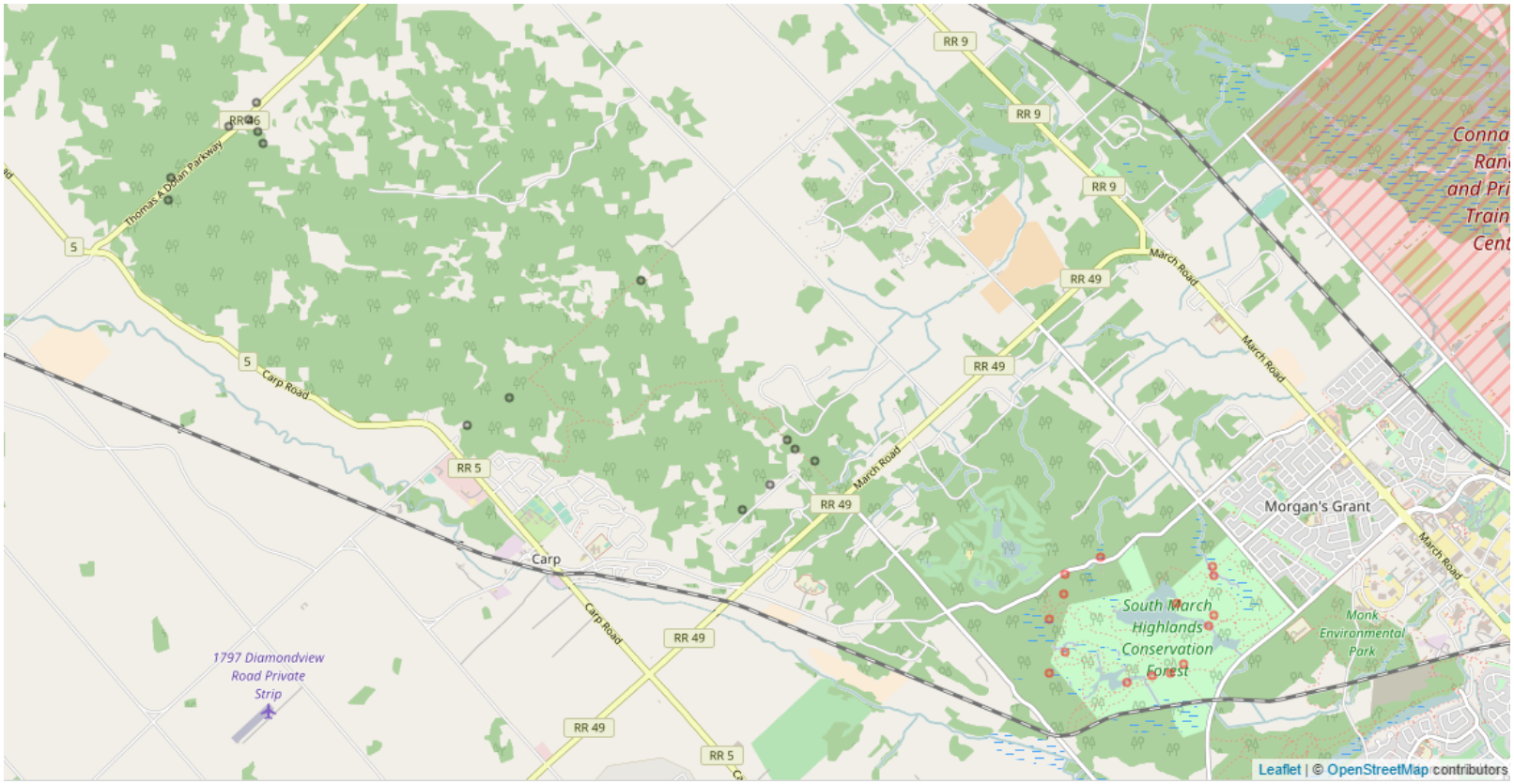
Kanata North - Adaptive Management Plan

- Dr. Antoine Morin and Liam Epp, University of Ottawa
- Monitor Chironomid populations
- Study the effects on the microbiota
- Study the long-term impact on non

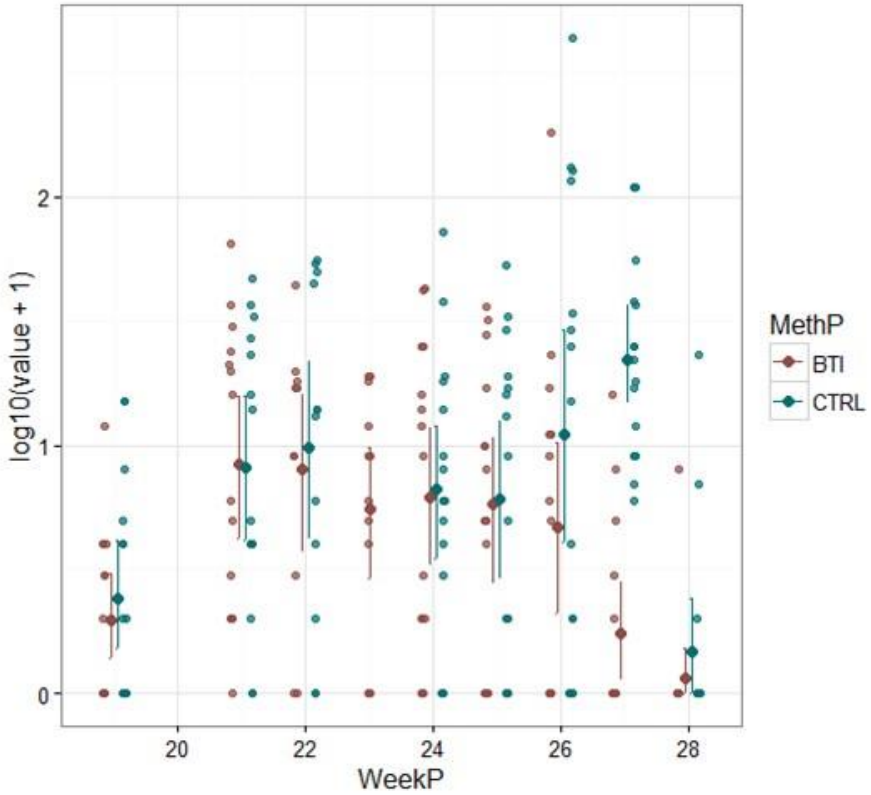
Kanata North – Adaptive Management Plan

- 15 control sites located outside the treatment area
- 15 treated sites located within the South-March Conservation Forest
- Sampled weekly from early April to end of August.
- Also collected the DO, DS, PH, temperature, conductivity and water depth.

Kanata North - Adaptive Management Plan



Kanata North - Adaptive Management Plan



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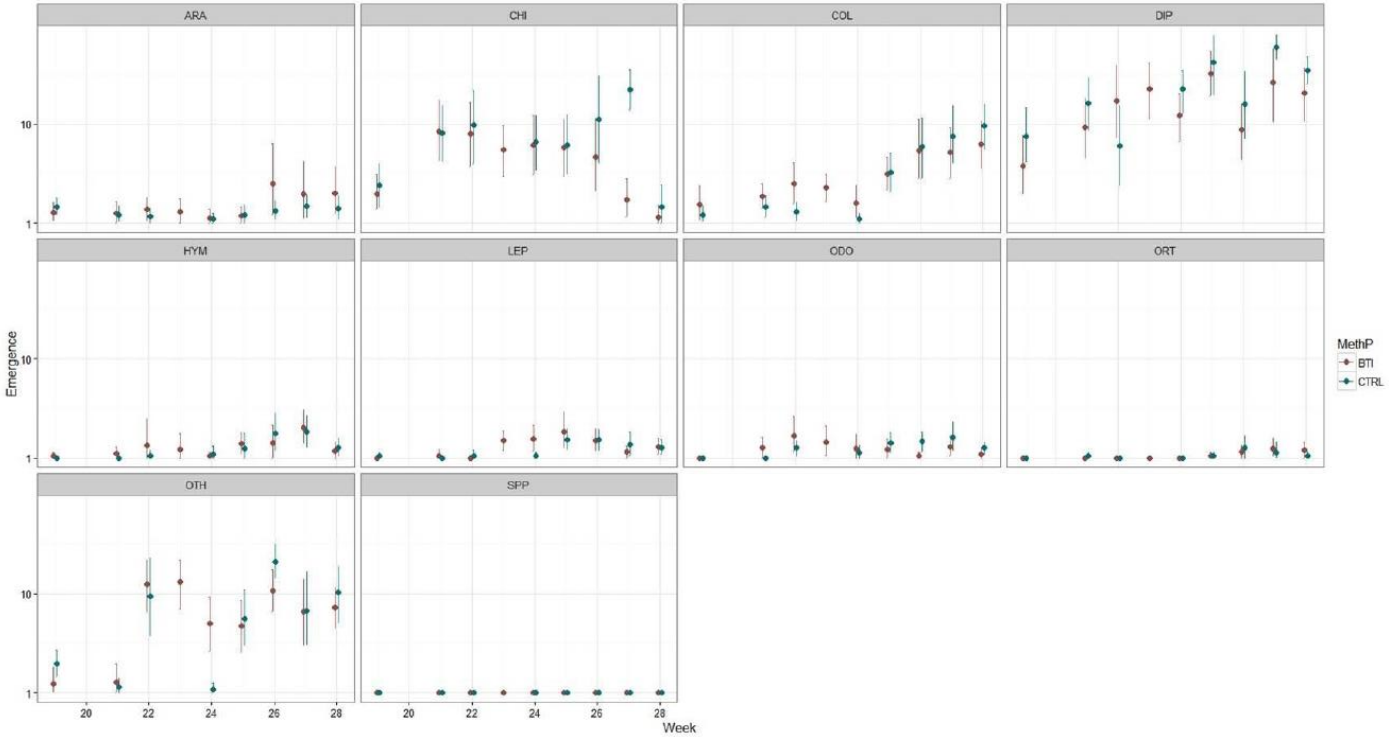

Kanata North – Adaptive Management Plan

Conclusion

- Given the dosages of Bti and B. sphaericus applied to the treatment sites, mosquito populations were noticeably reduced during April, May, June, July and August.
- There were no detectable disturbances to the abundances of Chironomidae or other non-target insects across *Bti*-treated and control sites.

Thank you!

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