Spruce Budworm in Maine

From Tracking to Action:
Why now is the time to respond.

What is Spruce Budworm?

The Eastern Spruce Budworm (**SBW**) is a native moth that causes extensive damage to balsam fir and spruce species in Maine. Although **SBW** is normally well controlled by natural enemies, outbreaks occur in Maine about every 40 years.

Why is it a threat?

- **SBW** is one of the most damaging forest pests in North America. Larvae feed on the buds and needles of spruce and fir. Unchecked feeding over multiple years can lead to tree mortality.
- Dead and dying trees fuel wildfires, reduce air and water quality and harm wildlife habitat.
- Healthy forests sustain Maine's heritage forest industry and thousands of jobs.

What are the potential economic impacts of not responding to building Spruce Budworm populations?

The costs of doing nothing – or of acting too slowly – can be significant. A severe **SBW** outbreak in Maine could impact routghly **494,000** cords of annual wood supply. This is projected to cause:

A loss of **3,865** direct and indirect jobs – **12%** forest industry-related employment.

A **10% contraction** of Maine's $8.3 billion forest economy

$794 million of annual economic losses.

What are the environmental impacts and risks of doing nothing?

An uncontrolled **SBW** outbreak has the potential to damage millions of trees in Maine. Trees can only withstand a few years of defoliation before it results in mortality. During the outbreak in the 1970s and 1980s, the mortality rate of untreated spruce trees was between **30-66%** and of untreated balsam fir trees was **84-97%**. More than **7 million acres** of spruce and fir were destroyed or damaged.

Standing dead forests degrade wildlife habitats, diminish water conditions, and pose significant wildfire risk.

What can we do to stop it?

- Early Intervention Strategy (**EIS**) is an integrated pest management approach for maintaining healthy forests and healthy economies by reducing **SBW** population hotspots while allowing natural enemies to control residual budworm populations. The approach closely monitors the **SBW** populations for early detection and intervention.

EIS goals for landowners:
- » Protecting timber investments
- » Avoiding severe harvest losses
- » Maintaining long-term land value

EIS goals for the environment
- » Maintain wildlife habitats for terrestrial and aquatic species
- » Reduce wildfire risk from dead trees
- » Maintain water quality and temperatures

- The insecticides used in the **EIS** program contain one of two active ingredients to reduce **SBW** populations to endemic levels in targeted areas determined through annual population monitoring. Both are effective on feeding caterpillars during a short window after application.

Tebufenozide

Tebufenozide is an insect hormone mimic that triggers a fatal premature molt in caterpillars that consume it.

ENVIRONMENTAL IMPACTS			
	Tebufenozide works through larval ingestion and is practically nontoxic to most animals and insects except for those in the butterfly and moth family that are feeding at the time of application.	When applied following label directions, **tebufenozide** poses minimal risk to aquatic organisms.	**Tebufenozide** is immobile in soil, with low risk of leaching into water.

BtK

Bacillus thuringiensis kurstaki (**BtK**), is a spore-forming bacterium that produces crystal proteins in the gut when consumed by caterpillars. These proteins cause the insect to stop eating and die.

ENVIRONMENTAL IMPACTS		
BtK spores are only activated in the high pH insect gut. Because the required pH for efficacy is specific to caterpillars, ingestion by other organisms does not produce the same effect, nor are the crystals released in soil or water.	**BtK** also has minimal impacts on larvae feeding outside the time of application.	

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Has **EIS** been successful in Maine?

The Maine **SBW** Task Force leadership and the Maine Budworm Response Coalition (**MBRC**) first used **EIS** in 2025 to protect the health of Maine's forests in areas with growing **SBW** populations.

Treated sites experienced more than 90% decline in **SBW** populations, followed by a reduction in hotspot growth. The EIS approach for managing **SBW** is a long-term process, and continued annual monitoring and treatments of hotspots will be needed to prevent a widespread **SBW** outbreak. Treatment areas with SBW hotspots may shift across the landscape from year to year.

The implementation cost of **EIS** in 2025 in Maine was approximately $11 million, in stark contrast to the estimated $794 million of annual economic losses in an outbreak like that of the 1970s and 1980s.

What evidence informs Maine's Plan?

1 Quebec's management strategy, beginning in 2006, followed the best practices of the last outbreak to treat high value stands to provide foliage protection. The outbreak there expanded to **33 million acres in 20 years**. The province treats two million acres annually and still loses millions of acres of trees. The resulting high tree mortality has contributed to widespread wildfires, (causing poor air quality days in Maine), massive emissions of carbon into the atmosphere, and substantial lost economic and wildlife values.

2 Learning from Quebec, New Brunswick developed and tested the Early Intervention Strategy (**EIS**) as a proactive management response to reduce the SBW hotspots in the province before they reached outbreak levels. A 10-year case study of **EIS** in New Brunswick has documented success with the program where **EIS** management resulted in significant suppression of **SBW** hotspots and population growth rates in treated areas for every year of the program, roughly **80% less insecticide usage** than other strategies, and a reduction in tree damage and mortality. This data provides support for **EIS** as an effective proactive outbreak management approach.

Who will apply and oversee the continued **EIS** operations?

- MBRC and other private partners engage with Maine's federal delegation and state government for treatment funding to match private investments.
- The UMaine SBW Lab provides critical monitoring and testing services on the spruce budworm populations in Maine.
- Maine Forest Service provides technical assistance and communications with landowners and the public regarding **SBW** and management options.

What is needed now?

- To continue the success of the **EIS** approach, treatments will need to focus on areas of building **SBW** populations to reduce populations and encourage natural enemies to keep budworm populations low and our forests healthy.
- Landowners collaborate with the UMaine **SBW** Lab to track where the budworm population is expanding. This allows for targeted and cost-effective intervention.

Where can I learn more?

Find more details about the response and contacts for more information at www.**sprucebudwormmaine**.org.

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