

Highlights

Maine is combating a major forest pest using innovative science-based approaches. The Spruce Budworm, North America's most severe defoliating pest of spruce and fir trees, has surged dramatically from approximately 30,000 affected acres in 2024 to over 300,000 acres in 2025. This native insect goes through periods of outbreak across ranges of spruce and fir forests, with the last outbreak affecting over 7 million acres in Maine alone and causing hundreds of millions in economic losses.

However, Maine landowners are now utilizing an Early Intervention Strategy (EIS) that targets small hotspots before populations reach damaging levels. The University of Maine operates the only specialized processing lab in the United States, and collaborates with the UMaine Fort Kent in monitoring over 700 sites across the region. In early 2025, approximately 250,000 acres were treated with targeted pesticides designed to impact leaf-feeding caterpillars while protecting beneficial insects like pollinators. Preliminary results show stark success, with many dead larvae observed just days after treatment.

Key Takeaways

- Without L2 monitoring, the EIS cannot be effectively implemented
- The SBW outbreak is expected to last for 10+ years
- Maine's intervention and treatment are driven by cross-border SBW flights from Québec

Contacts

Dr. Angela Mech: UMaine
angela.mech@maine.edu

Dr. Neil Thomson: UMFK
neil.thompson@maine.edu

Spruce Budworm Early Intervention Strategy Shows Promise in Maine

UMaine and UMFK Collaborate to Develop a Monitoring and Early Intervention Strategy to Protect Maine's Forests

BACKGROUND

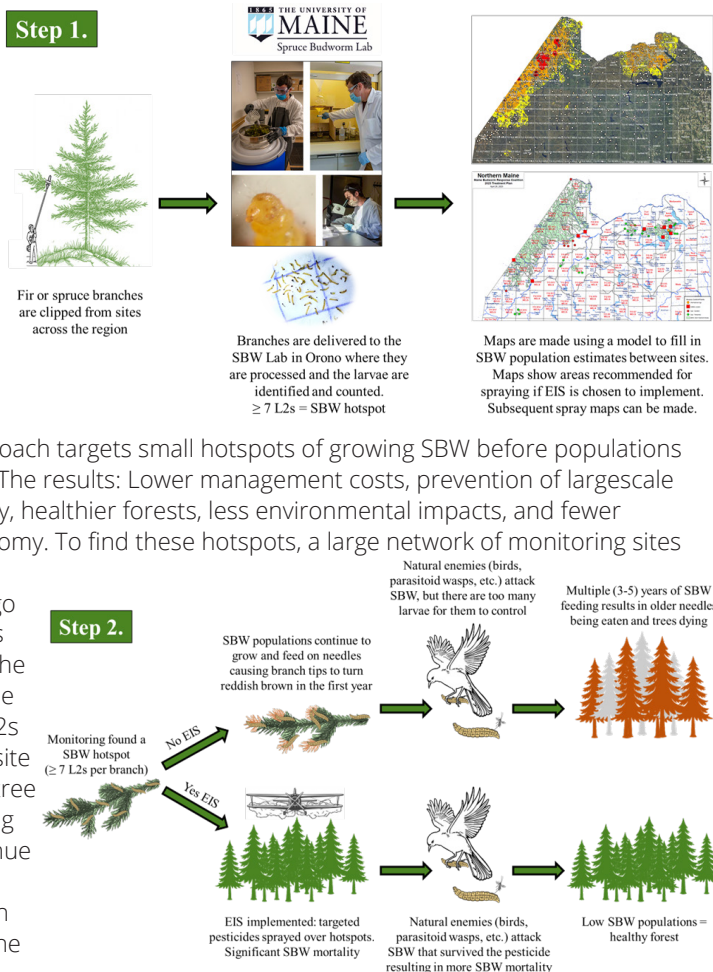
Spruce Budworm (SBW) is the most severe defoliating pest of spruce and fir in North America. It is a native insect that can be found across North America, and experiences cyclical outbreaks that are detrimental to spruce and balsam fir forests. These outbreaks have been happening for thousands of years, but the severity of them has been increasing since the turn of the 20th century. The last outbreak in the 1970s and 1980s was catastrophic: over 7 million acres were affected in Maine alone and the forest industry lost hundreds of millions of dollars. It took decades to recover from the ecological and economic ripple effects caused by this small caterpillar.



SPRUCE BUDWORM EARLY INTERVENTION STRATEGY

Hotspot SBW populations in northern Maine have surged, jumping from ~30,000 acres in 2023 to more than 300,000 acres in 2024. Fortunately, landowners in Maine are utilizing a proven, science-based approach to keep this problem in check: Early Intervention

Strategy (EIS). This approach targets small hotspots of growing SBW before populations reach damaging levels. The results: Lower management costs, prevention of largescale defoliation and mortality, healthier forests, less environmental impacts, and fewer disruptions to the economy. To find these hotspots, a large network of monitoring sites are established and branch samples undergo a processing that allows staff to find and count the tiny, overwintering larvae (L2s). An average of 7 L2s per branch indicates a site is about to experience tree damage in the upcoming summer that can continue spreading to healthy forests. Dr. Angela Mech at the University of Maine operates the only SBW processing lab in the U.S., currently providing L2 counts from over 700 sites across the region. Dr. Neil Thompson at the University of Maine at Fort Kent uses these counts to provide the critical maps needed by forest managers for the development of EIS spray programs.



FUNDING AND SUPPORT

Programmatic funding for the L2 monitoring is currently funded by the Cooperative Forestry Research Unit (through June 2026), USDA Forest Service (through 2026) and the 2025 American Relief Act via the Maine Forest Service (through June 2027).

Proposals have been submitted which would support an additional 5 years of SBW monitoring.

Maine landowners formed the Maine Budworm Response Coalition in 2024 to coordinate efficient EIS spray programs.

ABOUT UMAINE

The University of Maine, founded in Orono in 1865, is the state's premier public university. It is among the most comprehensive higher education institutions in the Northeast and attracts students from across the U.S. and 65 countries. UMaine students directly participate in groundbreaking research working with world-class scholars. The University of Maine offers doctoral degrees in 35 fields, representing the humanities, sciences, engineering and education; master's degrees in nearly 70 disciplines; 90 undergraduate majors and academic programs; and one of the oldest and most prestigious honors programs in the U.S.

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ABOUT UMFK

Located on Maine's northernmost border, the University of Maine at Fort Kent is a career-focused campus offering relevant, experiential academic programs and personalized support. UMFK's diverse student body thrives in a caring, close-knit community surrounded by the natural beauty of the St. John Valley.

Students come not only from the great state of Maine, but also from 25 states and 25 countries. The adjacent North Maine Woods and the St. John Valley offer rich opportunities for learning, research, and outdoor recreation. The university also proudly preserves and celebrates the Acadian heritage through the Acadian Archives/archives acadiennes—one of only two dedicated collections of its kind in the nation.

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2025 EIS PROGRAM

In spring 2025, approximately 250,000 acres of hotspot SBW populations (> 7 L2s per branch per site) were sprayed with a targeted pesticide specifically designed to impact leaf-feeding caterpillars while not affecting beneficial insects, such as pollinators or SBW predators, or other caterpillars that are not feeding in sprayed stands within a couple of weeks of the spraying. Preliminary observations have found stark results: areas with abundant larvae prior to spraying were found to have many dead just a few days following the treatment. In addition, natural enemies (birds, parasitoid wasps, etc.) have attacked remaining SBW resulting in even lower survival. Using targeted pesticides, such as tebufenozide or Btk, is fundamental to EIS programs as it complements SBW's natural enemies rather than replacing them.

2025 Spruce Budworm Early Intervention Strategy Results



CONCLUSIONS AND FUTURE WORK

Overall, 2025 appears to have been a successful implementation of the Early Intervention Strategy. The upcoming fall 2025's L2 monitoring will quantify the efficacy of Maine's spray program and be used to plan for the spring 2026 EIS program. In addition, efforts will be made to include more small woodlot owners in the spray program to ensure better SBW population control across the landscape.



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