Spruce Budworm
Reliving the past
2013 and looking forward –

Dave Struble
State Entomologist
Maine Forest Service
So where are we?

- No spring/summer larval budworm yet detected
- We are recovering budworm moths in light traps (for the first time in years)
- Pheromone trap catch counts are up – significantly in the first traps we’ve checked
Québec méridional
Relevé aérien des dommages causés par la tordeuse des bourgeons de l’épinette
Territoire survolé

Source : Détection de la protection des forêts
Projection cartographique : Conique conforme de Lambert avec des parallèles d’Ellipses corrigées (40° et 50°)

Ressources naturelles et Faune
Québec
egg mass survey

numbers found

1948 | 1953 | 1958

X-Axis
1950 aerial survey
AERIAL SURVEYS SHOWING TREND OF SPRUCE BUDWORM OUTBREAK IN MAINE FROM 1950-1953

DEGREE OF DEFOLIATION

HEAVY MODERATE LIGHT

1950 1951 1952 1953

Flight lines
AERIAL SURVEYS SHOWING TREND OF SPRUCE BUDWORM OUTBREAK IN MAINE FROM 1950-1956

DEGREE OF DEFOLIAISON

- HEAVY
- MODERATE
- LIGHT

- 20,000 acres sprayed in 1954
- Traces of defoliation
- Continuous
- Scattered

1954  1955  1956
SPRUCE BUDWORM SITUATION
MAINE 1954

- AERIAL SURVEY LINES
- LIGHT DEFOLIATION — SPOTS WITH HEAVIER FEEDING
- SPRAY AREA

0 10 20 MILES
Put in regional perspective
1950 Quebec situation

SPRUCE BUDWORM SITUATION 1950

- 40% MORTALITY
- 60 - 100% DEFOLIATION
- 20 - 60% DEFOLIATION
Maine Forest Service projects only

Number of Acres treated for Spruce Budworm

- 200,000 acres treated annually

Bar graph showing the number of acres treated from 1954 to 1985. The graph indicates a significant increase in treated acres in the mid-1970s.
So what are we going to do about it this time?

- 1950’s data/decisions-
- state and federal entomologists
- field staff sneaking and peeking across the north half of the state
• Monitoring in the 1970’s
  – Aerial and ground survey to map location and severity of stand damage
  – Egg mass surveys to predict populations
  – Early spring surveys to confirm survival and continued threat
  – Pre spray surveys to assess development of foliage and caterpillars to time the spray treatments
  – Post spray sampling to assess success of treatment (foliar damage and population levels)
  – Checks on parasitism
  – From June through Aug, there were insect collect samples and reports coming in from forest rangers re the condition of the trees across the state
  – Concurrently there was a network of light traps reporting on moth activity
  – All this got analyzed and summarized into various reports that were used to make management and policy decisions
  – And then we’d start over again
By the 1980’s it was a full time job for some of us:

- Full blown assessment organization to do the field work
- Another 150-200 people (mostly short term project or contractors) tied to the actual spray project
Spruce-Fir Inventory Trends (Million Cords) as published
(Compilation of Historic (Pre-1959) and Periodic FIA Type Resurveys), 2010
SBW across Canada 1939-2012

“The spruce budworm, Choristoneura fumiferana Clem., is a native insect that reaches defoliating levels in every province and territory in Canada where its primary hosts, spruce and fir trees, are found. Outbreaks recur every few decades, with an average return interval in eastern Canada of 32 ± 5 years over the 20th century. Patterns of defoliation at the largest spatial scales are attributable to contemporary forest landscape structure but also climate. Fine-scaled patterning is attributable to forest stand structure and to moth dispersal. Although outbreaks are generally periodic, their intensity, which is the single major determinant of resulting impacts including tree mortality, are not completely predictable. Annual weather is a weak, but variable input whose contribution to annual recruitment of budworms is not well quantified because it influences so many aspects of the insect’s biology. Given the intrinsic variation in such natural processes, the uncertainties in our knowledge of cause-and-effect, and the changes in forest structure and climate over the past 40 years, the forestry sector must prepare for a wide range of possible scenarios during the emerging outbreak cycle. In particular, the insect’s response to climate change is not known with certainty. Initial indicators are that more northern areas may be impacted in the future but, at the same time, southern areas badly damaged in the last outbreak may experience more moderate outbreaks in the future.

B. Cooke & V. Nealis, CFS, Sept. 5, 2013
Prudence suggests we’d be well advised to prepare