Browntail Moth

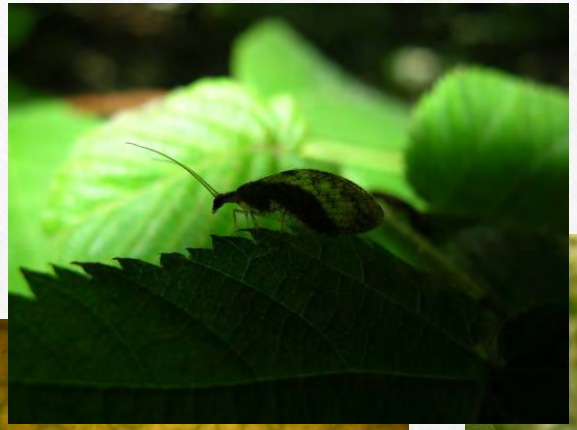
History, Background, Conditions in ME

Department of Agriculture, Conservation & Forestry

Maine Forest Service

February 2018

Lots of Insects Do No Harm or Are Beneficial



> 20,000 species of insects in Maine

Some Cause Problems

Browntail Moth Caterpillar

Browntail Moth

- Caterpillars have toxic hairs that cause:
  - Rash
  - Respiratory distress

By Cyware - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=6887721

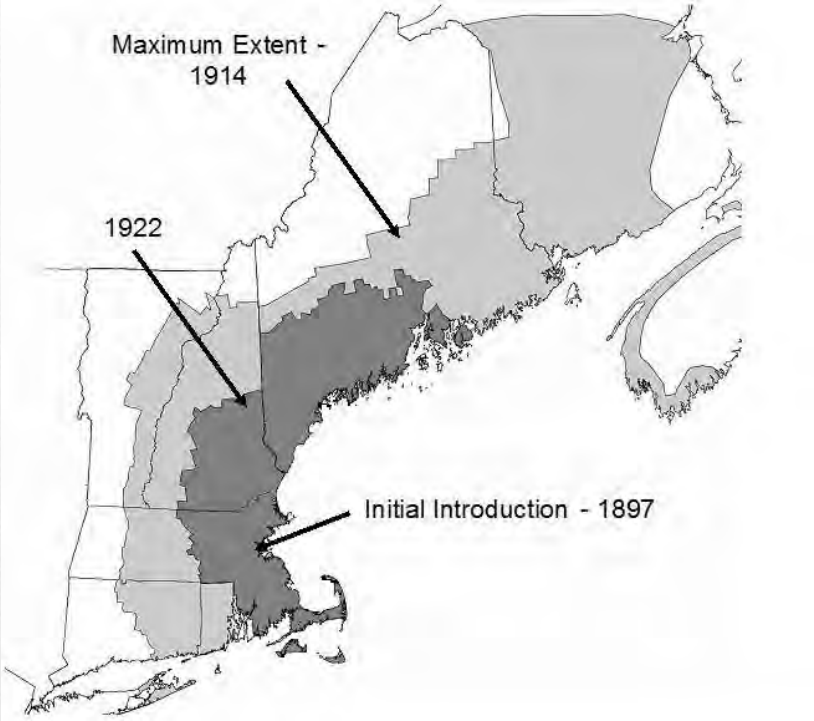
- Caterpillar feeding causes
  - branch dieback
  - tree mortality

Browntail Moth - History

Euproctis chrysorrhoea

- First established in Somerville, Massachusetts in 1897

- By 1914 found from Vermont and Connecticut to New Brunswick and Nova Scotia



Browntail Moth Expansion by Year
(From Elkinton *et al.* 2006)

Browntail Moth - History

- **Extensive efforts were made during the early 1900's to control BTM:**
- Winter webs clipped and burned by the 10,000's
- Spray projects initiated
- Apple trees cut down
- A federal quarantine imposed
- A huge biological control program instituted
  - Parasatoids & predators released

Pupils of Farm School, Thompson's Island, destroying winter webs of brown-tail moth, Dec., 1902.
From photo kindly loaned by Chas. Bradley, Supt.

Browntail Moth - History

- The Browntail Moth population collapsed in the 1920's
- Possibly due to a combination of weather and a fungus, *Entomophaga aulicae*

Infected browntail moth caterpillar

Browntail Moth - History

Population retreated to:

- a few islands in Casco Bay, ME

  and

- Cape Cod, MA

- Occasional outbreaks over next 60 years

Browntail Moth - History

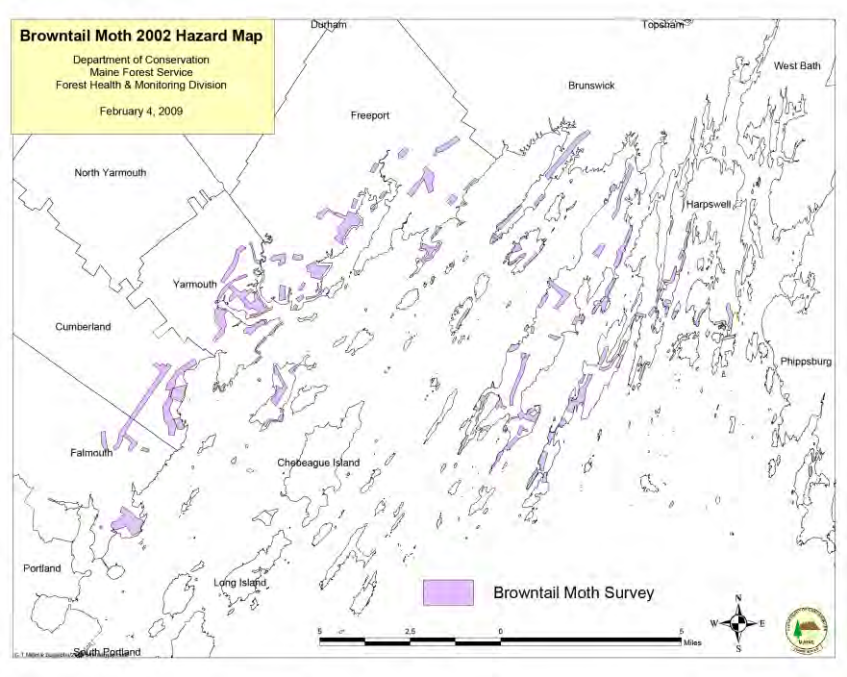
- Population began expanding on Little Diamond Island in 1988.
- Numbers continued to rise
- Spread from Kittery to Gouldsboro inland to Augusta by 1999

Browntail Moth - History

- Public Health
  - In 1997 legislation passed to allow BTM to be declared a public health nuisance on the municipal level by Bureau of Health Director
  - This facilitates municipalities' abilities to conduct and coordinate control projects
  - See Me CDC page on Browntail Moth:
    - **http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/browntail-moth/index.shtml**

Browntail Moth - History

- Municipal aerial control projects 1992-2002
  - Peak acreage of 5120 A. sprayed in 1999
  - Casco Bay Region from Portland to Harpswell
  - Insect Growth Regulators used
  - B.t. – a bacterial insecticide ineffective
  - Became highly controversial
- Private ground projects continue



Browntail Moth - History

Population crashed in 2004-2005 over most of infested area

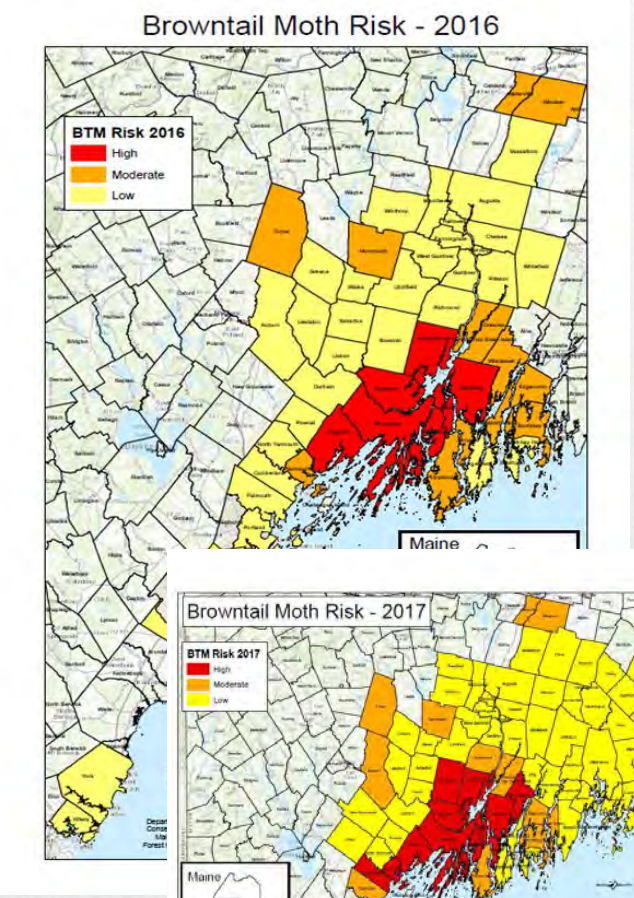
- Cool wet springs in 2004 & 2005
- Caterpillars huddle together, did not feed
- Caught a fungal disease and died
- Parasitoids and predators took advantage of sick caterpillars and further reduced population

Browntail Moth - History

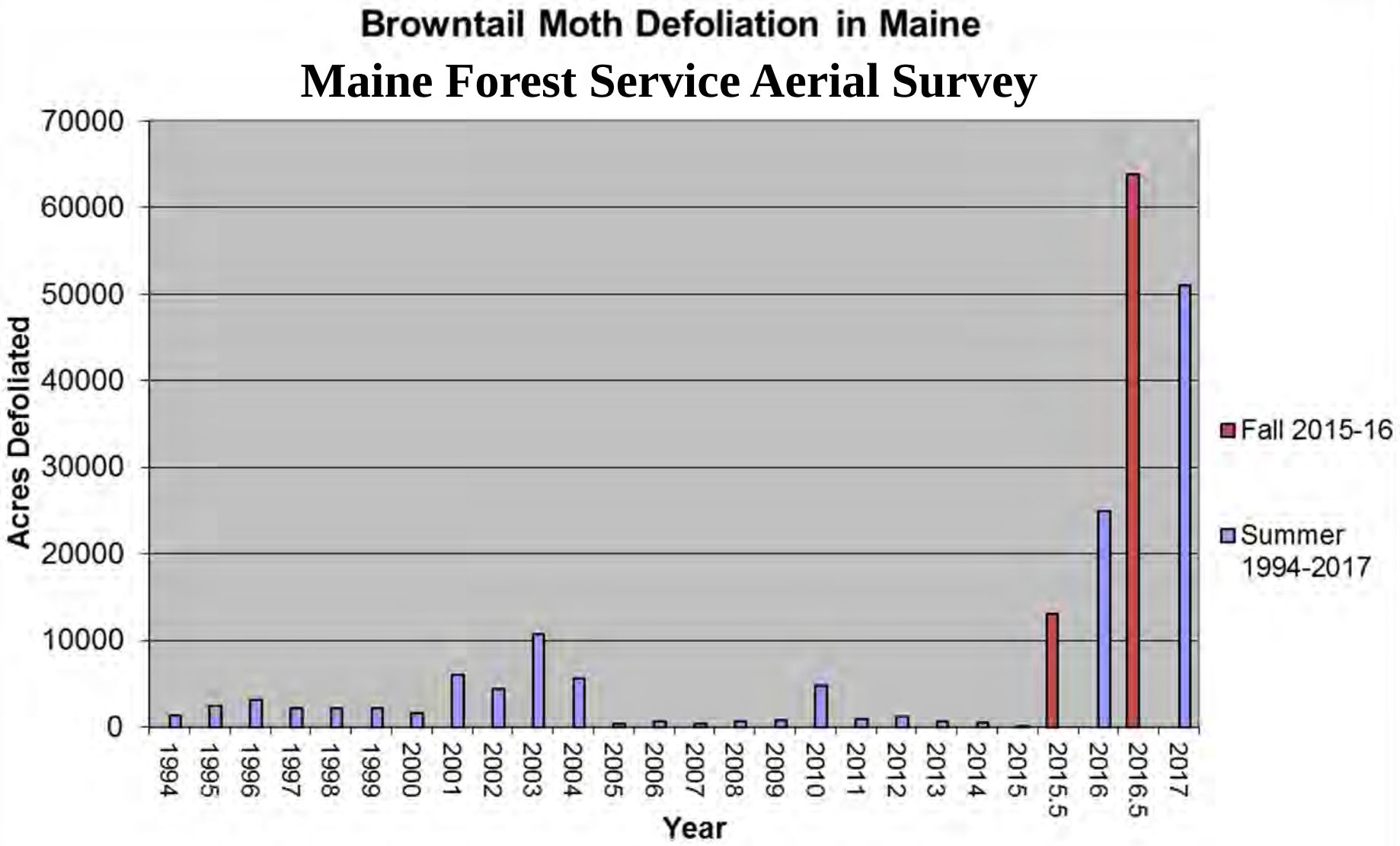
- Remnant remained in Brunswick area
- Population increasing again
- Falmouth, Turner, Kennebunkport in 2010

Browntail Moth History

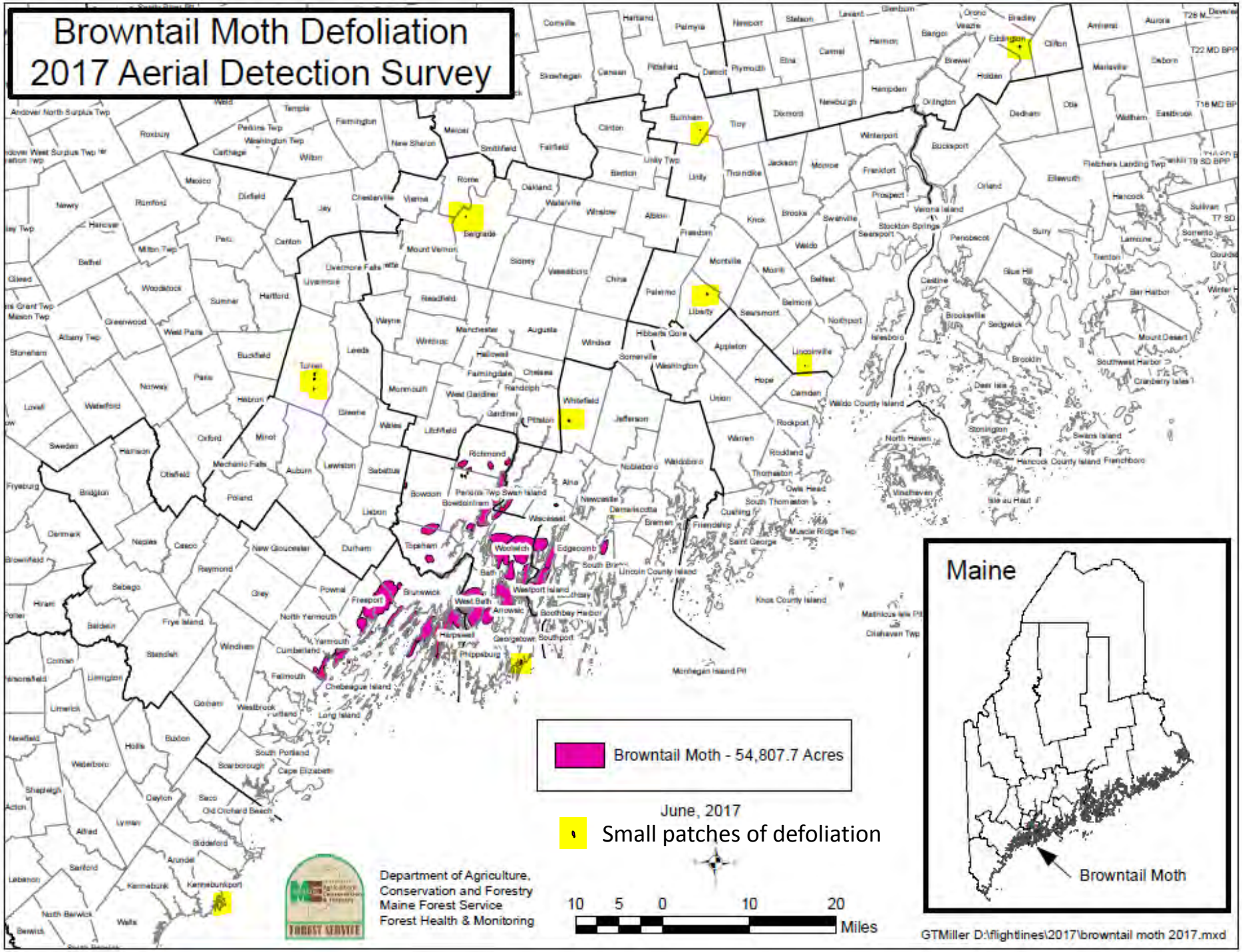
- 2015-2017 continued increase in population
- Aerial survey data ↑↑ acres
- Outlying patches of defoliation
- Winter web survey: continued expansion eastward and inland from center



Maine Forest Service Aerial Survey



Browntail Moth Defoliation
2017 Aerial Detection Survey



Browntail Moth Forecast 2018

- Preliminary & Imperfect
  - Winter web surveys: on-going
    - Weather, traffic and other factors impact detection/evaluation
    - Cannot survey everywhere
    - Guided by past detections, aerial survey; additional isolated spots likely
- <u>This is a guide</u> for planning & decision making at town/individual level
  - Towns, especially in heavily infested areas, may want to conduct or contract for more detailed surveys; especially if considering town-coordinated treatments

Browntail Moth Forecast 2018

- May be decreasing in areas previously hit hard. But not enough for significant town-wide relief.
- <u>Seem to be increasing in outlying areas</u>:

  Webs detected (so far, Feb. 2018):

  - Along the coast from Kittery to Trenton
  - Inland locations: Raymond, Turner, Rome, Smithfield, Burnham, Eddington

  Outlying Defoliation Detected 2017 Aerial Survey:

  - Belgrade, Burnham, Eddington, Liberty, Lincolnville, Turner, Whitefield

Browntail Moth - Life Cycle

- Caterpillars emerge from webs in late April and May
- Feed on foliage until late June
- Molt five times
- Cast skins have toxic hairs on them

Tent Makers		No Tents	
Browntail Moth	Eastern Tent	Forest Tent	Gypsy Moth
Look for Overall brown color; White tufts along sides; Red-orange dots on tail-end **DANGER!!**	**Look for** White stripe down center of back Blue spots like the "eye" in peacock feather along each side of stripe	**Look for** White or off-white footprint-shaped marks down the center of the back Blue body coloration in later instars	**Look for** Prominent knobs with hairs on each side of head capsule. Five pairs of blue- and six pairs of red- spots along back (larger caterpillars).
Invasive **Human & Forest Health Impacts**	Native Mostly aesthetic impacts	Native Occasional outbreaks	**Invasive** Forest Health Impacts **Quarantined** pest

Browntail Moth - Life Cycle
Pupation: Late June-Early July

- Move around looking for a good place to build a cocoon
- Make cocoons in leaves, on branches, buildings, under eaves, and in boats and other protected areas
- Cocoons are full of toxic hairs!
- Often pupate in masses

Browntail Moth - Life Cycle

- Moths emerge from cocoons in July
- Lay eggs on <u>leaves</u> of host trees
  - Oak, birch, apple other hardwoods & shrubs
  - 200-400 eggs
  - Covered with toxic hairs
- Eggs hatch in August

Browntail Moth - Life Cycle

- Caterpillars skeletonize leaves
- Tie leaves together with silk
- Spend winter in webs
- 25-400 caterpillars/web

Browntail Moth - Problem

- Hairs are on caterpillars, cast skins and cocoons
  - Microscopic
  - Blow around in the air
  - Stay toxic for 1-3 years
  - On leaves and brush in fall and spring
  - Stirred up during mowing, raking, sweeping and other activities

Browntail Moth - Precautions

- June through August:
  - **Avoid places heavily infested by caterpillars**. Campers should plan their stays on un-infested islands.
  - **Take a cool shower and change clothes** after any activity that might involve contact with browntail moth hairs. (Tip: Prior to shower, use duct tape to remove hairs from exposed skin)
  - **Dry laundry inside** during June and July to avoid having the hairs become impregnated in clothing.

Browntail Moth - Precautions

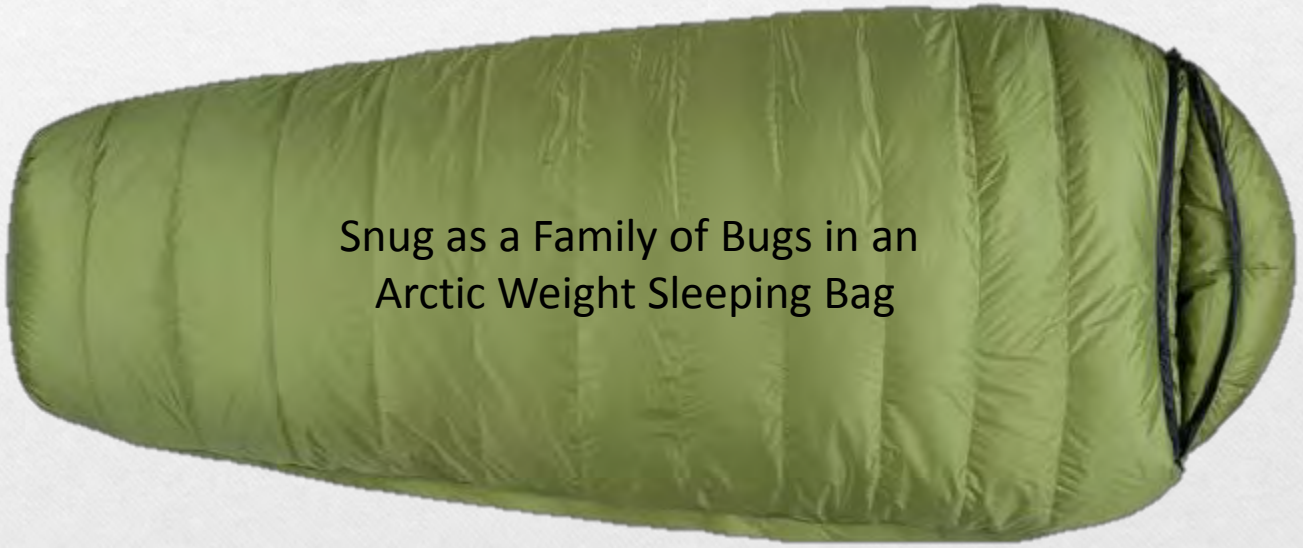
- Use caution cleaning debris left by caterpillars.
  - The **toxin is extremely stable and remains a hazard for a number of years**.
  - Summer residents should bear this in mind when opening cottages that have been closed all winter. Wet mopping prior to vacuuming or dusting is advised.
- **Consult your physician** if you develop a severe reaction to the browntail moth.

Browntail Moth - Precautions

- **Wear respirator, goggles and coveralls** tightly closed at neck, wrists and ankles when performing activities that stir up caterpillar hairs such as:
  - mowing
  - raking
  - weed whacking
  - sweeping
  - removing pupal webbing from eaves and boats
- **Perform the above tasks above on damp days or wet down material** with a hose as moisture helps keep the hairs from becoming airborne there by minimizing contact.

Browntail Moth - Control

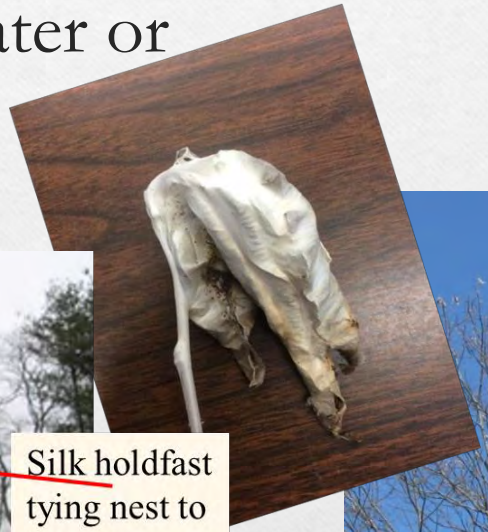
- NOTE: Cold winter temperatures along the coast <u>do not</u> reduce browntail numbers enough to provide relief.
  - Wet, cool springs, with higher populations allow diseases to develop and spread.

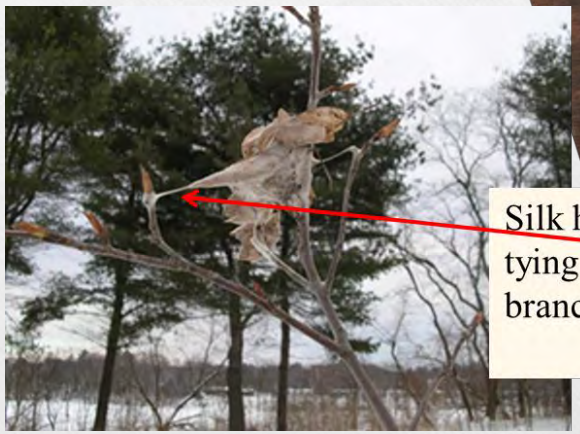


Browntail Moth - Control

Winter web clipping:

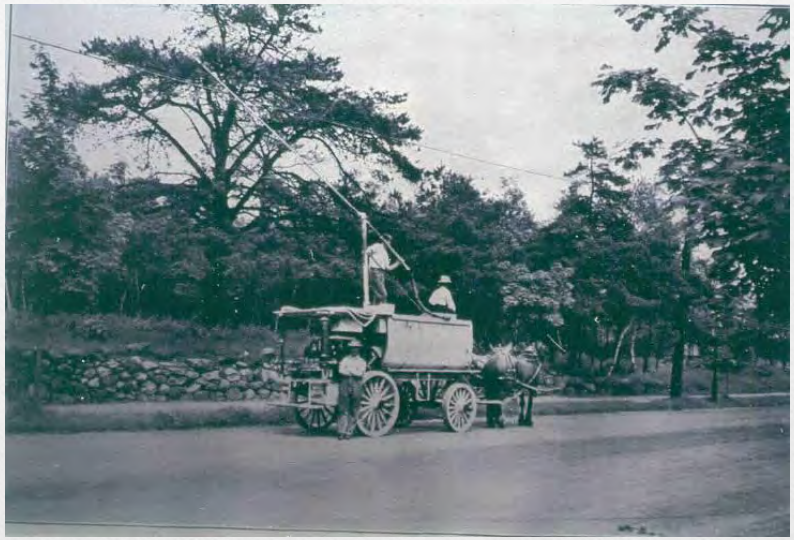
- Before mid-April:
- Clip low winter webs and put in soapy water or burn





Chemical control of larvae

- Chemical control in the spring – BEFORE the end of May
  - **Later spraying <u>DOES NOT</u> reduce exposure to hairs**
  - Hire a licensed pesticide applicator
- More effective if control is widespread



List of arborists willing to do this work available from Maine Forest Service

Control options

- Spray
  - Spinosad and permethrin most common choices
  - Bt in sensitive areas IF APPLIED EARLY
    - Reduces but does eliminate problem
    - Double applications probably more effective
- Injection
- August-September if BTM persists
  - Problem determining if trees are infested

Browntail Moth - Control

- Protection for lobsters
  - Lobstermen became concerned about BTM spraying
  - Board of Pesticide Control regulation passed in 2008 restricts BTM spray near coastal waters

Browntail Moth – Control

Coastal Waters

Pesticide applications for control of browntail moths **within 250 feet** of the mean high tide mark adjacent to **coastal waters** and extending upriver or upstream to the first bridge are subject to the requirements of this section

The prohibitions and restrictions do **not** apply to:

- biological pesticides
- injection of pesticides directly into the soil or trees
- application of pesticides by licensed commercial pesticide applicators using **non-powered** equipment.

Browntail Moth – Control
fmi: www.thinkfirstspraylast.org

Prohibitions and Restrictions

- A person may not apply a pesticide to control browntail moths on shade or ornamental trees within 50 feet of the mean high water mark.
- A person may not apply a pesticide to control browntail moths on shade or ornamental trees in coastal areas located between 50 and 250 feet from the mean high water mark except in accordance with this subsection.
  - Only products with active ingredients specifically approved by the Board for this purpose may be applied. Applications may be performed only with a hydraulic hand-held spray gun or air-assisted sprayers.
  - Applications may be performed only in a manner in which the applicator directs the spray away from marine waters.
  - Applications may not be made when the wind is blowing toward marine waters.
  - Applications may be performed only when the wind is equal to or greater than 2 miles per hour and blowing away from marine waters.

Browntail Moth - Control

- Research by Maine Forest Service and Partners
  - Chemical control
  - Biological pesticide control
  - Biological control
  - Mating disruptant control
  - Mechanical control
  - Numbers of webs that cause rash
  - Numbers of webs that affect tree health
  - Precautionary measures to reduce exposure to hairs

Contact Information

- Maine Forest Service: (207) 287-2431, allison.m.kanoti@maine.gov www.maineforestservice.gov
- Maine Board of Pesticides Control (207) 287-2731 www.thinkfirstspraylast.org pesticides@maine.gov
- Maine Center For Disease Control 1-800-821-5821 http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/browntail-moth/index.shtml