

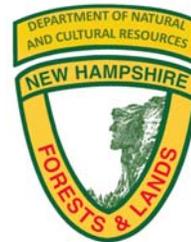
## Protect New Hampshire forests and consumers. Use BMPs for hemlock nursery stock.

Hemlocks are valued landscape and forest trees at risk from pests like hemlock woolly adelgid (HWA) and elongate hemlock scale (EHS). If not properly controlled, these pests kill hemlocks. HWA is a prohibited invasive species in New Hampshire (Agr 3802.01): “No person shall collect, transport, import, export, move, buy, sell, distribute, propagate, or release any living” HWA, excepting transportation for the purpose of destruction. Additionally, sellers of hemlock nursery stock are required to offer plants that are not infested with plant pests, infected with plant diseases, and of a quality to ensure survival with a reasonable amount of care (Agr 2501.04). Infested nursery stock can be placed on stop sale and ordered for treatment or disposal (Agr 2501.04). Best management practices can be utilized to reduce the risk of importing and selling infested hemlock nursery stock - protecting forests and consumers. Use of multiple BMPs is encouraged in order to maximize efforts to provide clean material.



Photo: Inspection is an important BMP. Look at the underside of hemlock branches to **start clean, stay clean, and keep it clean!** NH Div. Plant Industry

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## HEMLOCK WOOLLY ADELGID & ELONGATE HEMLOCK SCALE BEST MANAGEMENT PRACTICES FOR NURSERIES



Photos: Hemlock woolly adelgid (top), hemlock dying from hemlock woolly adelgid (center), elongate hemlock scale (bottom). NH Div. Plant Industry



Photos: Hemlock woolly adelgid and close-up. NH Div. of Plant Industry



**NURSERY STOCK:** use BMPs to **start clean, stay clean,** and **keep it clean.**

**START CLEAN:** Starting clean is the first and best step to ensure that your hemlocks are free of HWA, EHS, and other pests.

- Buy nursery stock from a reputable supplier. Suppliers that have provided clean stock in the past should be preferred to those that have previously sent infested material.
- Maintain supplier records, including information on the condition in which stock is received.
- Provide annual training to all staff about threats to hemlocks from HWA, EHS, and other scales. Provide information on identification of HWA and EHS. [NHbugs.org](http://NHbugs.org) is an excellent resource.
- Inspect a subset (10%) of each shipment of hemlocks that arrive at your facility. Inspection includes:
  - ◊ Isolation of the entire shipment of hemlocks from other naturally occurring hemlocks or nursery stock on the property until the subset has been inspected. This will reduce the potential for spread of HWA from newly delivered stock.
  - ◊ Untie hemlocks to be inspected in order to allow for adequate inspection.
  - ◊ Working from the edge to the interior, examine the undersides of hemlock branches from high, middle, and low in the tree, as well as on all aspects of the tree. HWA will appear as small cottony balls on the twigs (see above). EHS will be small cigar-shaped white or brown bicolor scales adhering to the underside of the needles (see adjacent).

- ◊ If a suspect is found during an inspection, contact DAMF for confirmation and do not offer the trees for sale. Isolate them and do the following:
  1. Request confirmation and verification of specimen viability from the Division of Plant Industry. When submitting a sample, provide sufficient plant material to enable an inspection for crawlers - near microscopic life stages of scales and adelgids.
  2. If sample is confirmed, consider return of trees to supplier. It is a requirement that nursery stock imported into NH is free of pests with all non-quarantine pests under effective control (Agr 2501.04).
  3. Follow recommendations from the Division of Plant Industry regarding disposal or treatment of the trees. Disposal of trees will be recommended for trees with significant populations of HWA as this compromises tree health and poses an immediate risk of further spread of HWA.

*Also consider:*

- If you have performed training and inspection BMPs and don't feel confident with your inspection, request that the Division of Plant Industry perform inspections of hemlocks.
- Request treatment records for hemlocks as a condition of purchase from your supplier. As of 2018, treatments with **imidacloprid** or **dinotefuran** are preferred for control of HWA. Be aware that treatment with imidacloprid is not recommended for armored scales like EHS.



Photos: Elongate hemlock scale and close-up. NH Div. of Plant Industry

**STAY CLEAN:** If stock has arrived clean at your site, you will want to guard against infestation from HWA in the surrounding area.

- Maintain a separation of hemlock material offered for sale as far as possible from native hemlocks. A distance of at least 300 feet is recommended.
- Periodically re-inspect hemlocks to ensure continued freedom from HWA and EHS. Monthly inspection April through October is recommended.

*Also consider:*

- Treat trees for HWA and EHS with a systemic insecticide at a time of the season to ensure maximum control. As of 2018, products containing **imidacloprid** or **dinotefuran** are effective for HWA. Imidacloprid is not recommended for armored scales like EHS. **When treating trees, or having trees treated, follow all state pesticide license and use laws and follow the label requirements.**

**KEEP IT CLEAN:** Hemlocks are at risk of being infested upon planting, impacting the long term-survival of the tree. Communication with your customers about the threats hemlocks face will help them make informed decisions about maintaining the health of their tree.

- Communicate with your customers about the BMPs that you have used to ensure that they are receiving clean, healthy hemlock stock.
- Communicate recommendations to your customers about on-going care of hemlocks to maintain healthy material.
- Maintain customer records.

*Also consider:*

- Documenting your use of BMPs with a compliance agreement with the Division of Plant Industry.