



Harvard LTER Schoolyard Program

Teacher Developed Lessons and Documents that integrate Harvard Forest Schoolyard Ecology Themes into curriculum.

Lesson Title: “Woolly Bully”

Project: Hemlock Trees and the Invasive Pest, the Woolly Adelgid

Teacher: Kate Bennett

School: J.R. Briggs Elementary School

Level: 5th Grade

Date: April 9, 2015

"Woolly Bally" - Hemlock Trees and the Invasive Pest, the Woolly Adelgid



Kate Bennett

John R Briggs Elementary School

Ashburnham





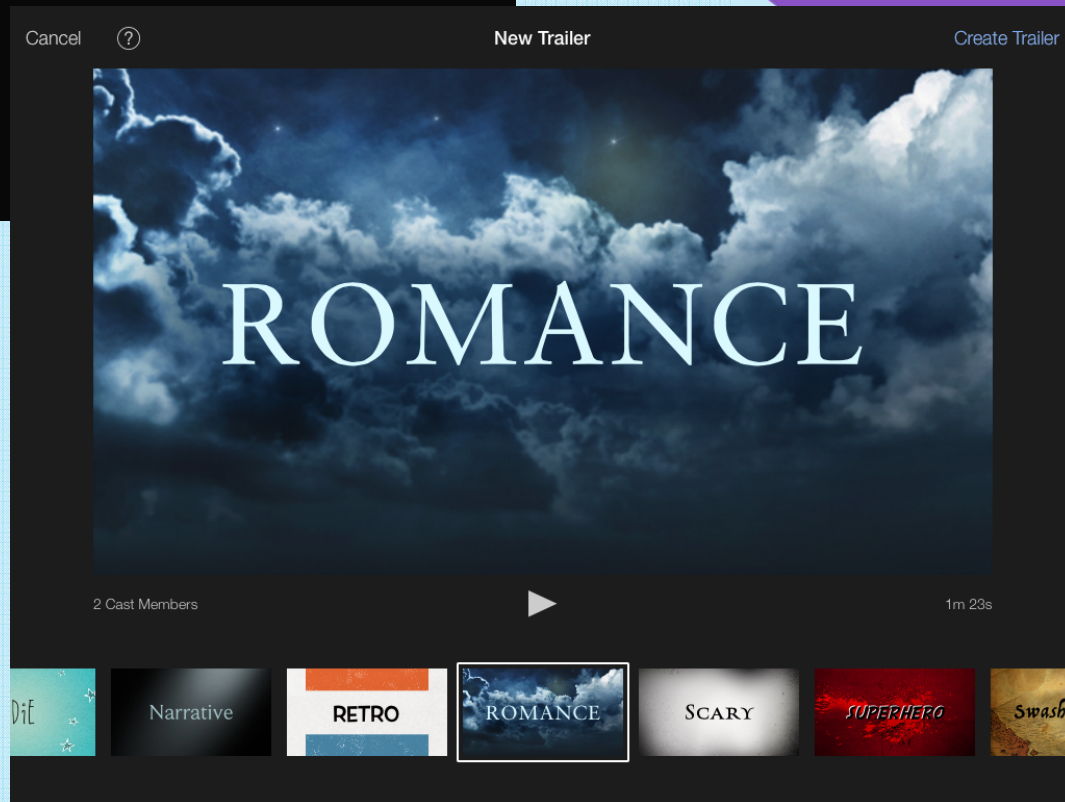
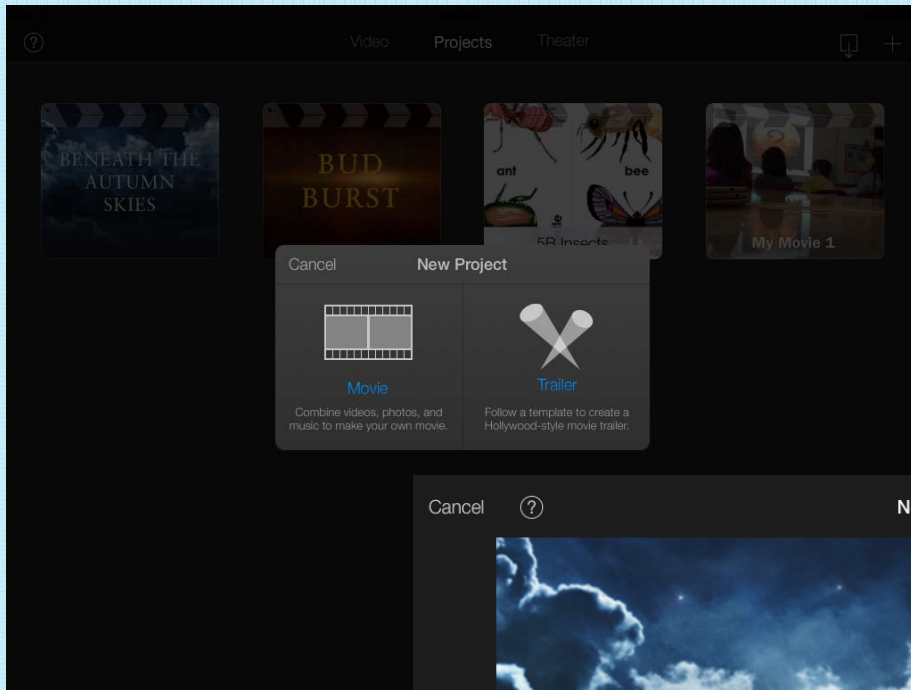
The Infestation

from **kbennett** 1 month ago / via **iOS 7** NOT YET RATED



	A	B	C	D	E	F	G
1	hemlock	1	2	3	4	5	average
2	plants	0	0	0	1	0	0.2
3	fungus	2	1	0	1	2	1.2
4	insects	3	1	3	2	1	2
5	soil temperat	11	12	10	10	12	11
6							
7							
8	hardwoods	1	2	3	4	5	
9	plants	20	25	35	37	20	27.4
10	fungus	1	3	2	1	2	1.8
11	insects	3	2	1	3	1	2
12	soil temperat	11	11	12	13	16	12.6
13							
14							





About 94,900 results

- Any time
- Past hour
- Past 24 hours
- Past week
- Past month
- Past year

All results
Verbatim

[Scholarly articles for hemlock woolly adelgid](#)

- [Hemlock woolly adelgid](#) - McClure - Cited by 146
- [... response to the introduced hemlock woolly adelgid in ...](#) - Orwig - Cited by 357
- [Biology and control of hemlock woolly adelgid](#) - McClure - Cited by 147

[Hemlock Woolly Adelgid - USDA Forest Service](#)

www.na.fs.fed.us/fhp/hwa/ ▾
The hemlock woolly adelgid (HWA) *Adelges tsugae* was first described in western North America in 1924 and first reported in the eastern United States in 1951 ...

[Pest Alert - Hemlock Woolly Adelgid - USDA Forest Service](#)

na.fs.fed.us/spfo/pubs/pest_al/hemlock/hwa05.htm ▾
Hemlock Woolly Adelgid. Native to Asia, the hemlock woolly adelgid (*Adelges tsugae*) is a small, aphidlike insect that threatens the health and sustainability of ...

[Images for hemlock woolly adelgid](#)



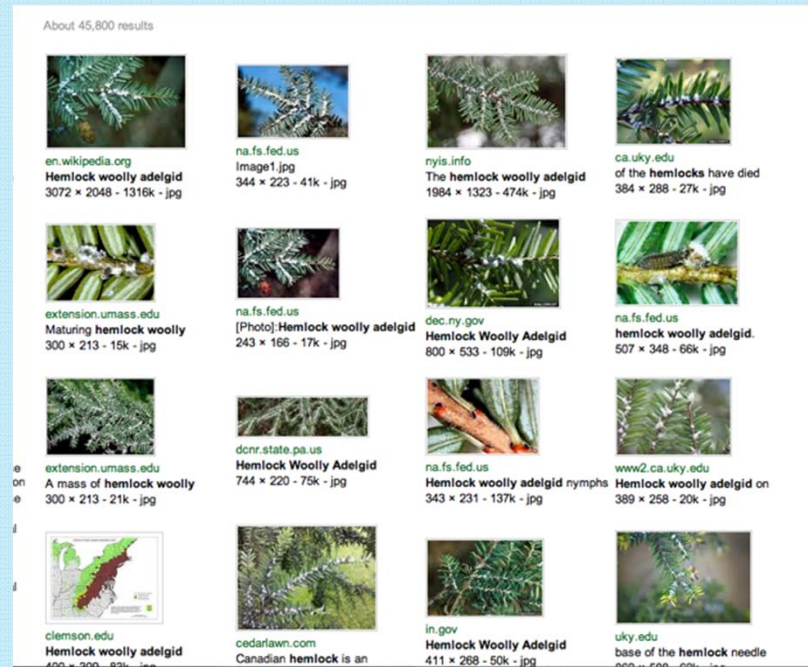
[Hemlock woolly adelgid - Wikipedia, the free encyclopedia](#)

en.wikipedia.org/wiki/Hemlock_woolly_adelgid ▾
Hemlock woolly adelgid (*Adelges tsugae*), or HWA, is member of the Sternorrhyncha suborder of the Order Hemiptera and native to East Asia. It feeds by ...
Characteristics - Control methods - Significance - References

[Invasive Species: Animals - Hemlock Woolly Adelgid \(Adelges tsugae\)](#)

www.invasivespeciesinfo.gov/animals/hwa.shtml ▾
A species profile for Hemlock Woolly Adelgid from USDA's National Invasive Species Information Center.

[Hemlock Woolly Adelgid | UMass Amherst Landscape, Nursery ...](#)
extension.umass.edu/landscape/fact-sheets/hemlock-woolly-adelgid ▾



US FOREST SERVICE ABOUT US CONTACT US [Forest Service National Links](#)

Northeastern Area

Home | Conservation Education | Fire & Aviation Management | Forest Health Protection | Forest Health Monitoring | Forest Health Management | Technology Development | Technical Assistance | Pesticide Use Management | Forest Legacy | Forest Stewardship Publications | Sustainability and Planning | Urban & Community Forestry | Watershed Programs | Wood Education & Resource Center

Forest Health Protection—Hemlock Woolly Adelgid

The hemlock woolly adelgid (HWA) *Adelges tsugae* was first described in western North America in 1924 and first reported in the eastern United States in 1951 near Richmond, VA.

Research scientists using molecular genetics have recently determined that several distinct populations of HWA occur in Asia and western North America and we now know that HWA populations found in the East originated from southern Japan. In their native range, these populations of HWA cause little damage to the hemlock trees they feed on as natural enemies and possible tree resistance has evolved with this insect pest.

In the absence of these natural control elements in eastern North America, this introduced insect pest attacks both eastern (Canadian) and Carolina hemlock which are often damaged and killed within a few years of becoming infested. HWA is now established from northeastern Georgia to southeastern Maine and as far west as eastern Kentucky and Tennessee.

Hot Topics

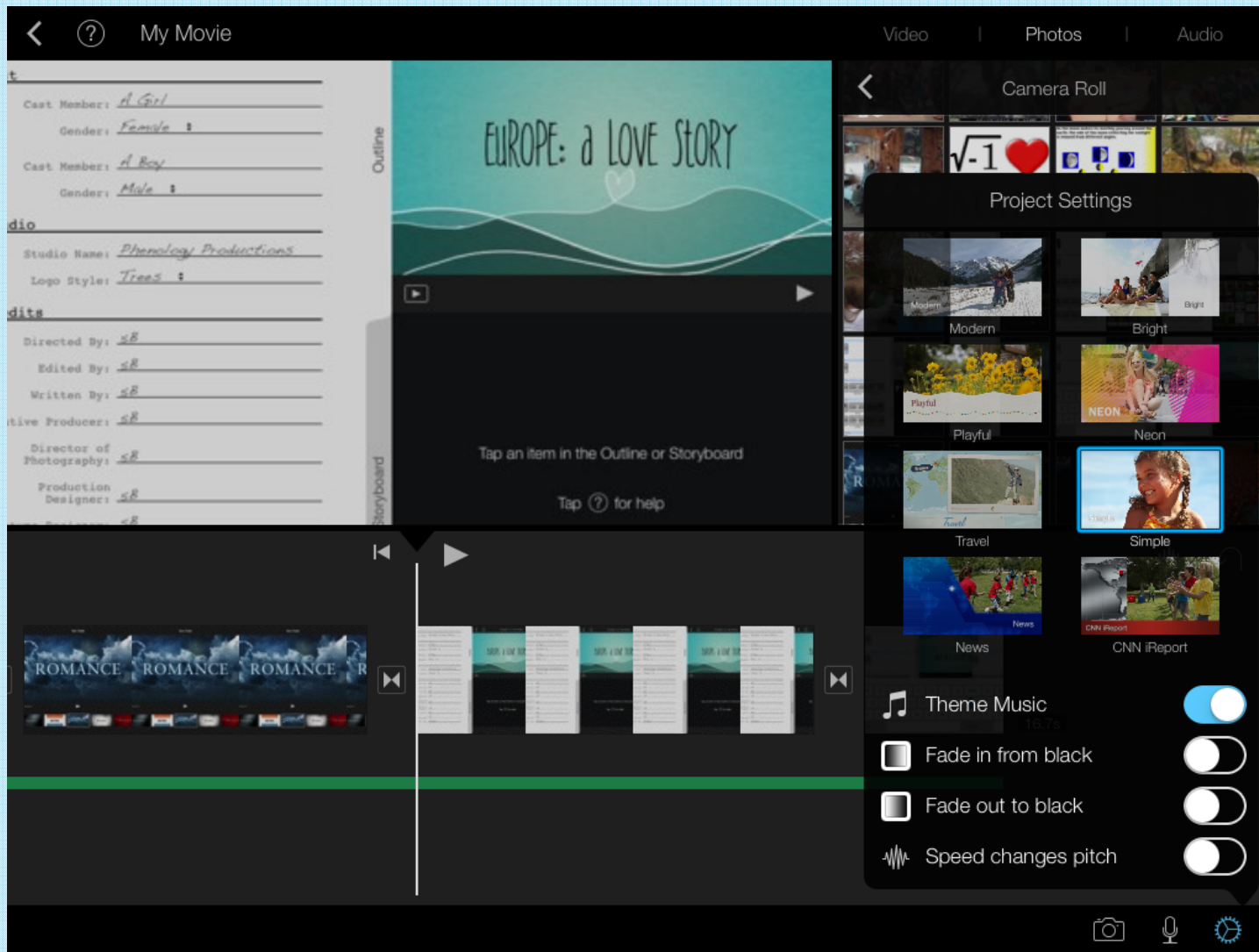
- [HWA Predator Release and Monitoring Database](#)
- [Implementation and Status of Biological Control of the Hemlock Woolly Adelgid-2011](#)
- [Fifth Symposium on Hemlock Woolly Adelgid in the Eastern United States—Asheville, NC, August 17-19, 2010](#)
- [HWA Stairway Database](#)
- [Pest Alert: Tip Blight on Eastern Hemlocks](#)
- [Standardizing Sampling for Detection and Monitoring of Hemlock Woolly Adelgid in Eastern Hemlock Forests—Scott Costa and Bradley Oakes, PVET-2006-16, October 2006](#)
- [HWA Initiative Strategic Plan 2014-2018](#)
- [HWA Communication Plan](#)

- Biological Control
- Biology
- Chemical Control
- Contacts
- Distribution Maps
- Impacts
- Infestations
- Newsletters
- Other Hemlock Pests
- Other Links
- Photo Gallery
- Publications
- Quarantines
- Silvicultural Management
- State and Federal Reports
- Hemlock Woolly Adelgid Home

USDA

TOP

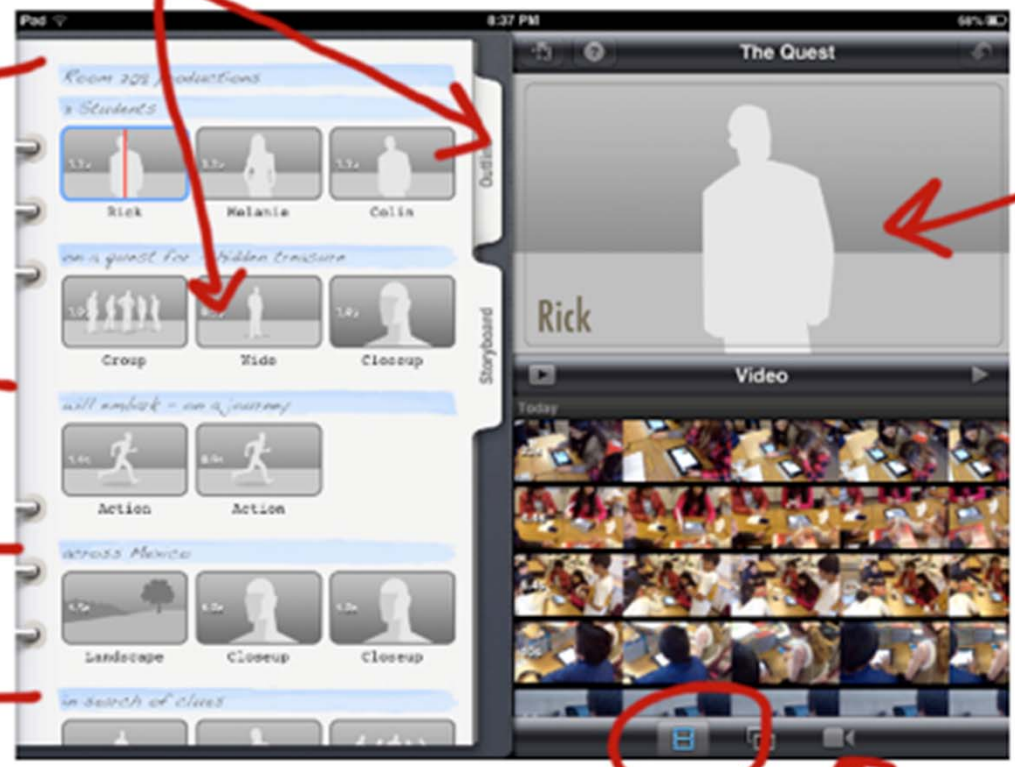
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credits

Helpful preloaded storyboard...

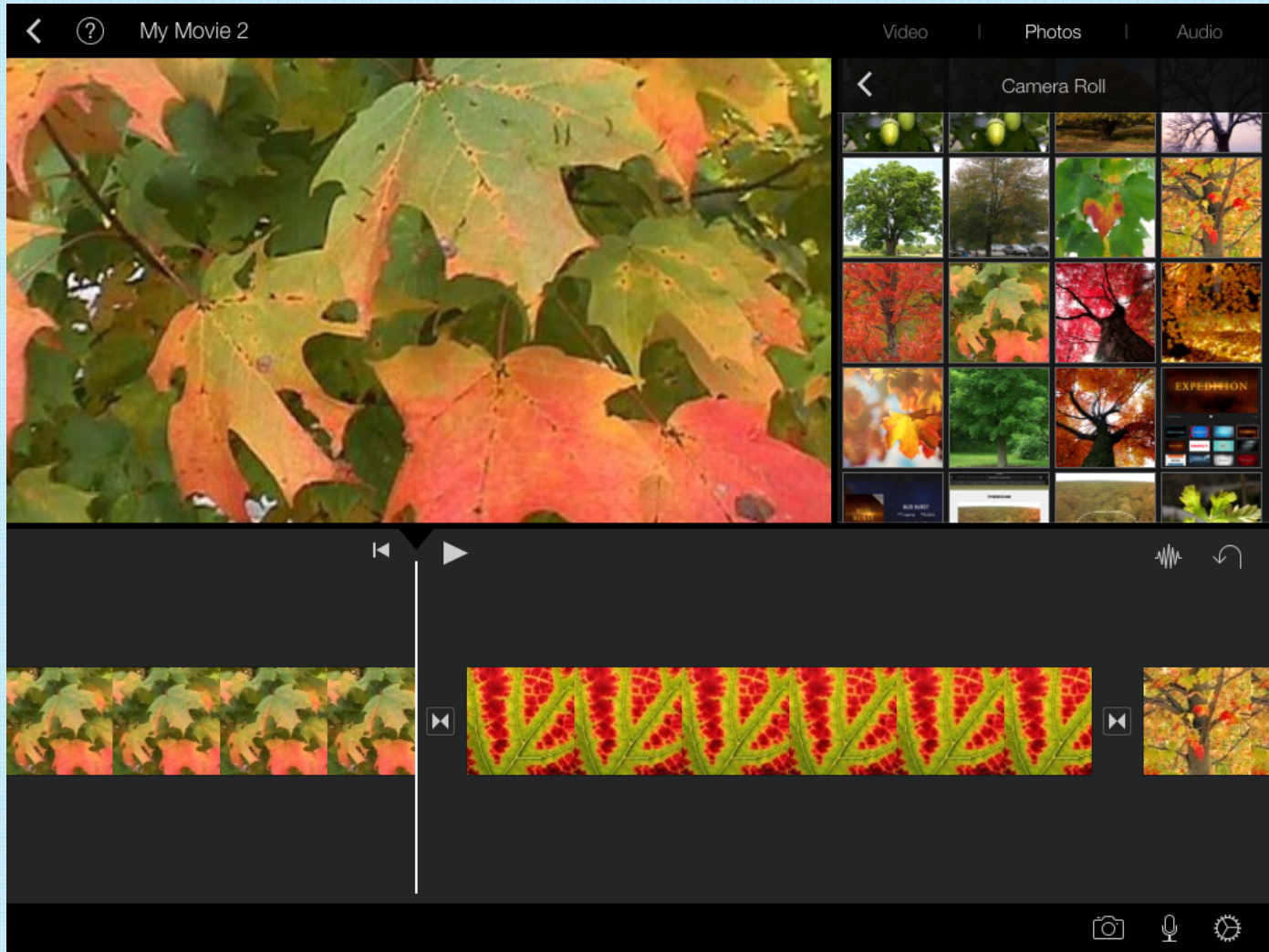
Replace
with
your
own
awesome
choices.



Preview
your
greatness
😊

Record
video
in the
app!

Access
the camera roll...



kbennett

Joined 2 years ago



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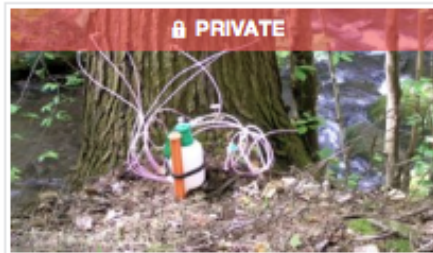
+ See all 19 videos



The Crayfish Olympics
1 week ago



The Infestation
1 month ago



HWA trailer
5 months ago



Beneath the Autumn Skies
7 months ago

Recent Activity

Plot Studies With Students

Under the Hemlocks

Under the Hardwoods



Group names _____ Date _____

Hemlock Plot ~ plants (small plants, grasses, moss, ferns)

Hemlock Plot ~ shrubs (with woody stems)

How Many?	Name of plant	Description
	moss cover	0 none 3 50-75% 1 1-25% 4 75-100% 2 25-50%

How Many?	Name of shrub	Description

Total # _____ **# of Species** _____

Total # _____ **# of Species** _____

Hemlock Plot~ Fungi (mushrooms and other fungi)

Hemlock Plot ~ Seedlings and Saplings

How Many?	Name of fungus	Description

How Many?	Name	Description

Total # _____ **# of Species** _____

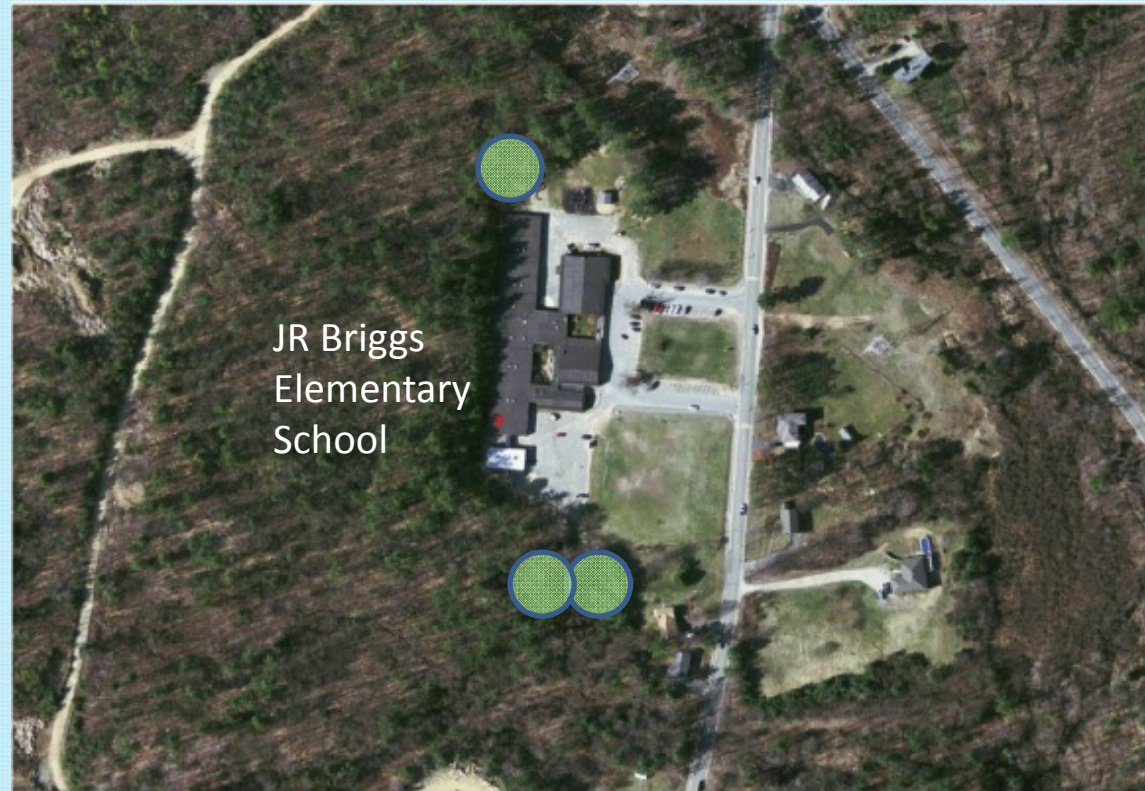
Total # _____ **# of Species** _____

Using Google Earth to Survey the Hemlocks in your Town



Step 1 Students print out maps (black and white are fine) of their house and yard from the computer. *Make sure they have the latitude and longitude in decimals (under tools).

Using Google Earth to Survey the Hemlocks in your Town



Step 2 Students take this map home. With a parent they color in any areas that have hemlock trees with a green crayon.

Using Google Earth to Survey the Hemlocks in your Town



Step 3 Students check each hemlock carefully for adelgid. If they see adelgid on a tree, mark that tree with an x on their map. Then take a sample, a small piece of the infested branch and seal it in a ziplock bag. Have the students bring it in to school to do a positive identification under the microscope.

Step 4 Students enter the latitude and longitude of their house from their map on to a spreadsheet. I like to use Google Docs so we can all do it together in the computer lab. Now you have a record of the hemlock trees and adelgid in town. You can add to the spreadsheet every year.

Invasive Species Research





Search NISIC

- Search all USDA
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Browse by Geography

- ▶ United States
- ▶ International

Browse by Subject



- ▶ Aquatic Species
- ▶ Plants
- ▶ Animals
- ▶ Microbes
- ▶ Economic Impacts
- ▶ Laws and Regulations
- ▶ Manager's Tool Kit
- ▶ Resource Library

You are here: Home

National Invasive Species Information Center (NISIC): Gateway to invasive species information; covering Federal, State, local, and international sources.

Invasive species are plants, animals, or pathogens that are non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause harm.
(See **What is an Invasive Species** for more information)

What's New on NISIC's Site:

- See **What's New** (recent five items rotating below)
- Subscribe to **NISIC - What's New**  

National Invasive Species Awareness Week (NISAW) – Feb 22-28, 2015

Current Invasive Species News (from various sources):

- Read **Invasive Species News**
- Subscribe to **Invasive Species News**  



I Want To...

- See What's in My State
- Find Out What I Can Do
- What is an Invasive Species?
- Find Images
- Help to Control Invasive Species
- More ...



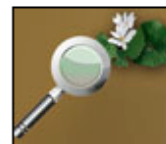
Agricultural Research Service's Research on Invasive Species



Pink Hibiscus Mealybug



Spotlights



Identify unknown species that may be invasive.



Calendar Invasive Species related Conferences

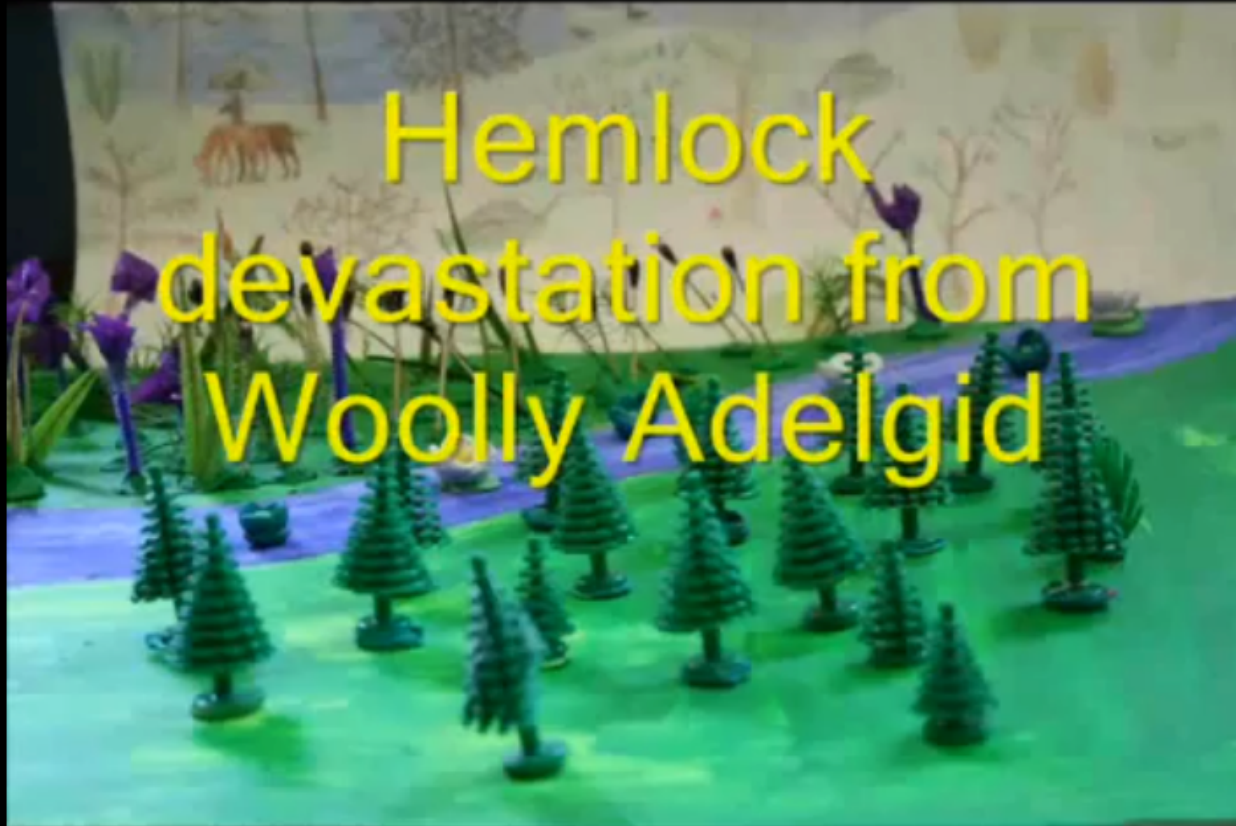


What You Can Do Learn how to prevent or



Education Invasive Species Resources for

Hemlock devastation from Woolly Adelgid



1:18 / 2:28



Analytics

Video Manager

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