

GLOWING BUG HUNTERS

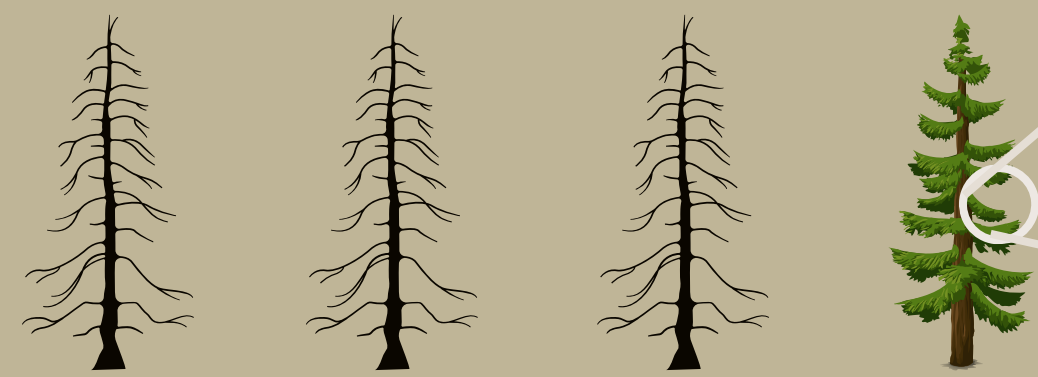
How might we reduce the population of the Hemlock Woolly Adelgid in Georgia's environment by tracking the beetles using UV light?

WHAT YOU NEED TO KNOW ABOUT HEMLOCK WOOLY ADELGID (HWA)...

INVASIVE BUG

 SMALL AS A RICE GRAIN
 BUT THEY'RE EVERYWHERE.

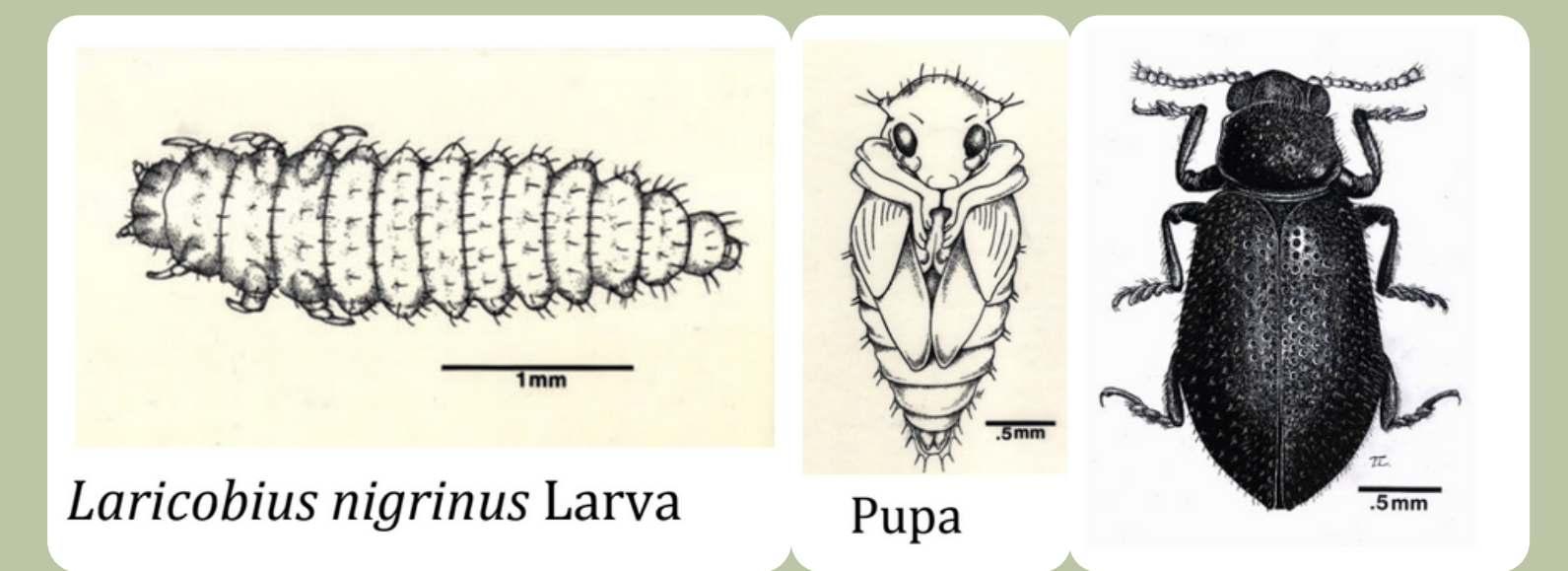
90% OF EASTERN HEMLOCKS HARMED



ATTACH TO TREE FOLIAGE, SUCKING NUTRIENTS TO TREE'S DEATH

... AND THEIR BIOLOGICAL PREDATORS

- main predator: *Laricobius nigrinus* (Ln) beetles native to the Pacific Northwest
- trained by researchers to eat the HWA



Laricobius nigrinus Larva

Pupa

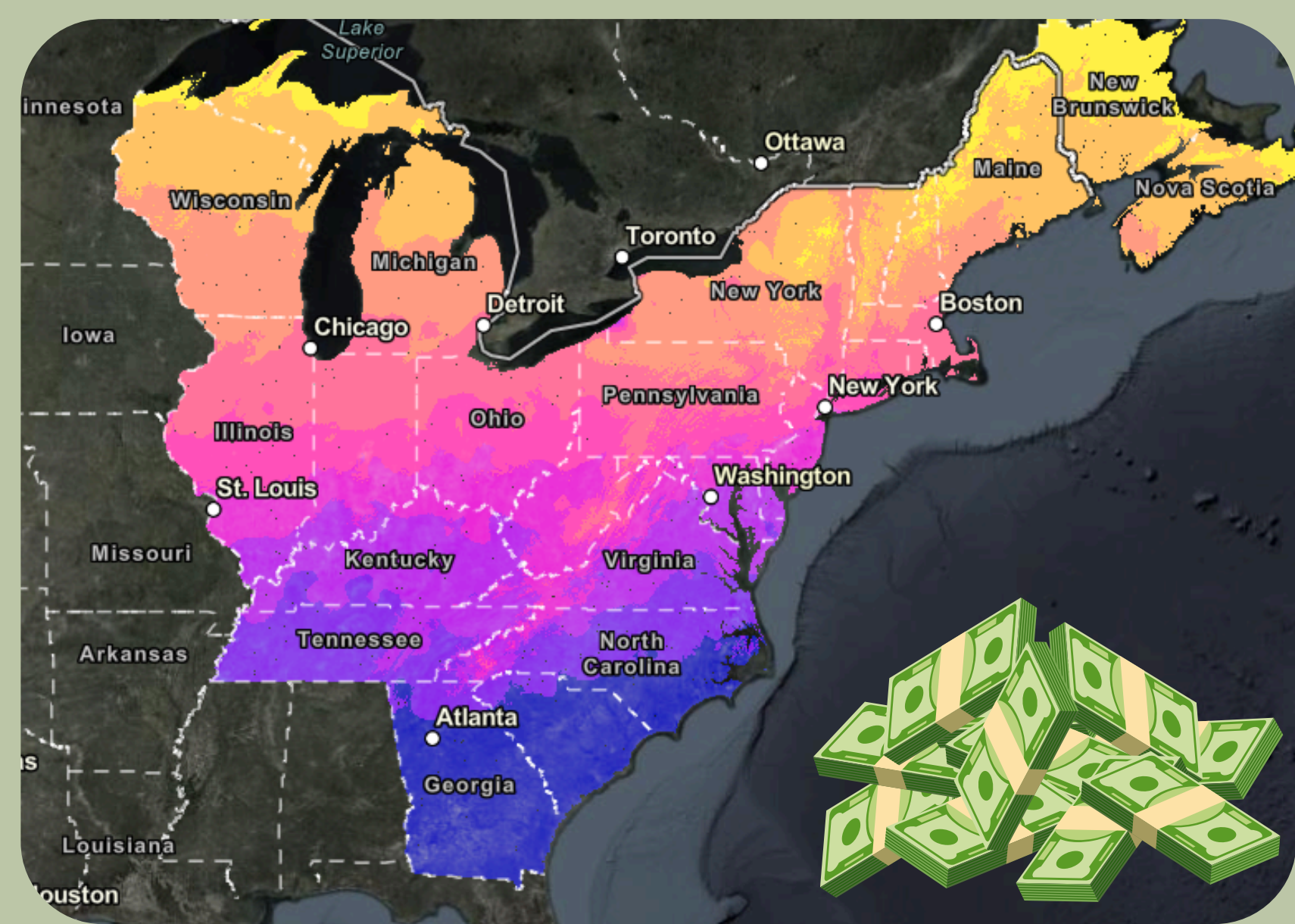
Adult

SO WHY DOES THIS MATTER?

\$4,000,000,000

U.S. HEMLOCK TREE WHOLESALE INDUSTRY

HEMLOCK HEALTH IS VITAL TO OTHER ECOSYSTEMS.



AN ENTIRE **PARK** IN MICHIGAN HAD TO **CLOSE DOWN** DUE TO INVASIVE HWA.



UV LIGHT DETECTS ADELGIDS & BEETLES...

POTENTIAL TRACKING SOLUTION DETECTED!



INSIGHTS ON WHAT'S BEING DONE SO FAR

BEAT-SHEETING (TREE BEATING)

1. HOLD SHEETS UNDER SOME BRANCHES
2. HIT THE TREE TO COLLECT BEETLES THAT FALL
3. COUNT THEM ONE BY ONE



UNCERTAINTY IN BEETLE PLACEMENT

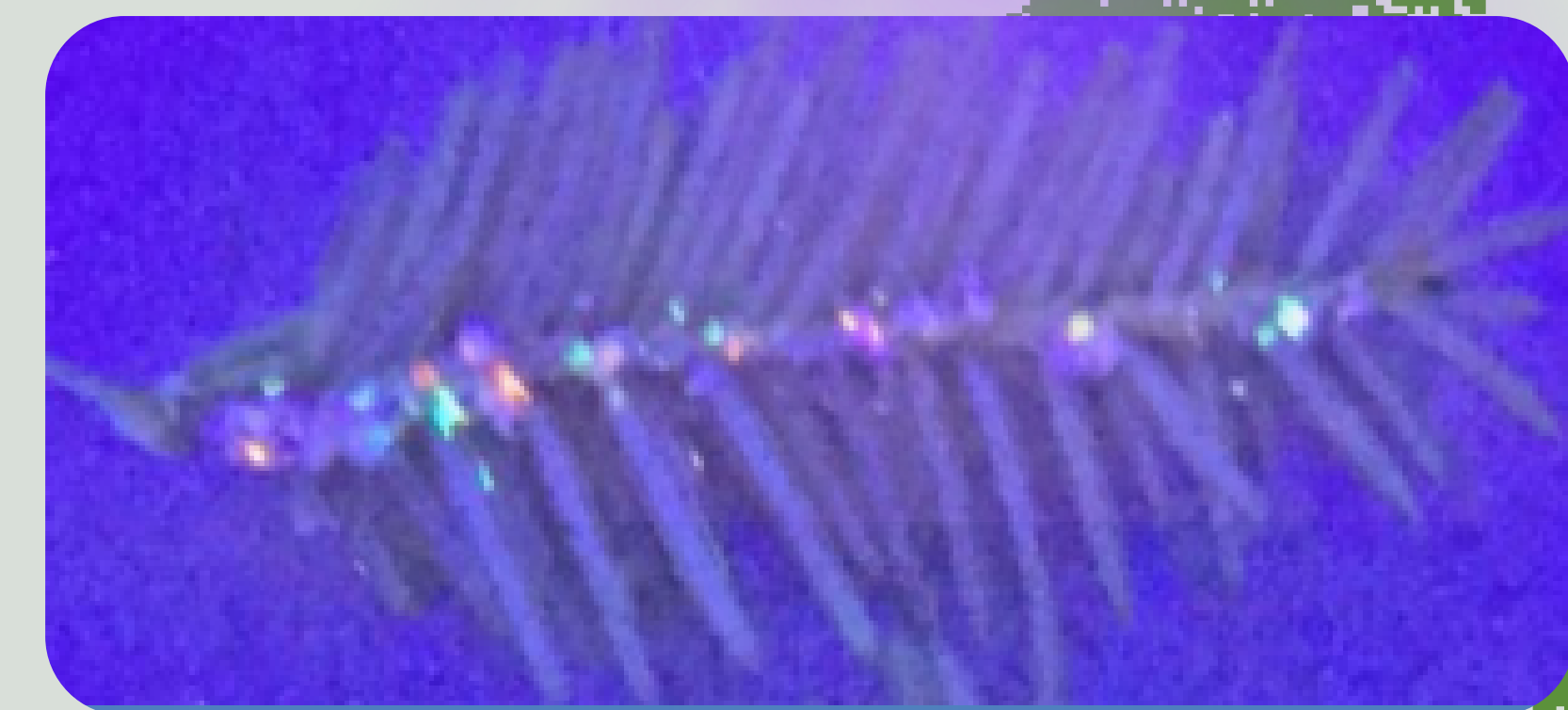
COST ██████████
 ACCURACY ██████████
 REPETITIVE ██████████

INCONSISTENCY → INEFFICIENCY AND HIGH COSTS



TRACKING BEETLES LEADS TO:

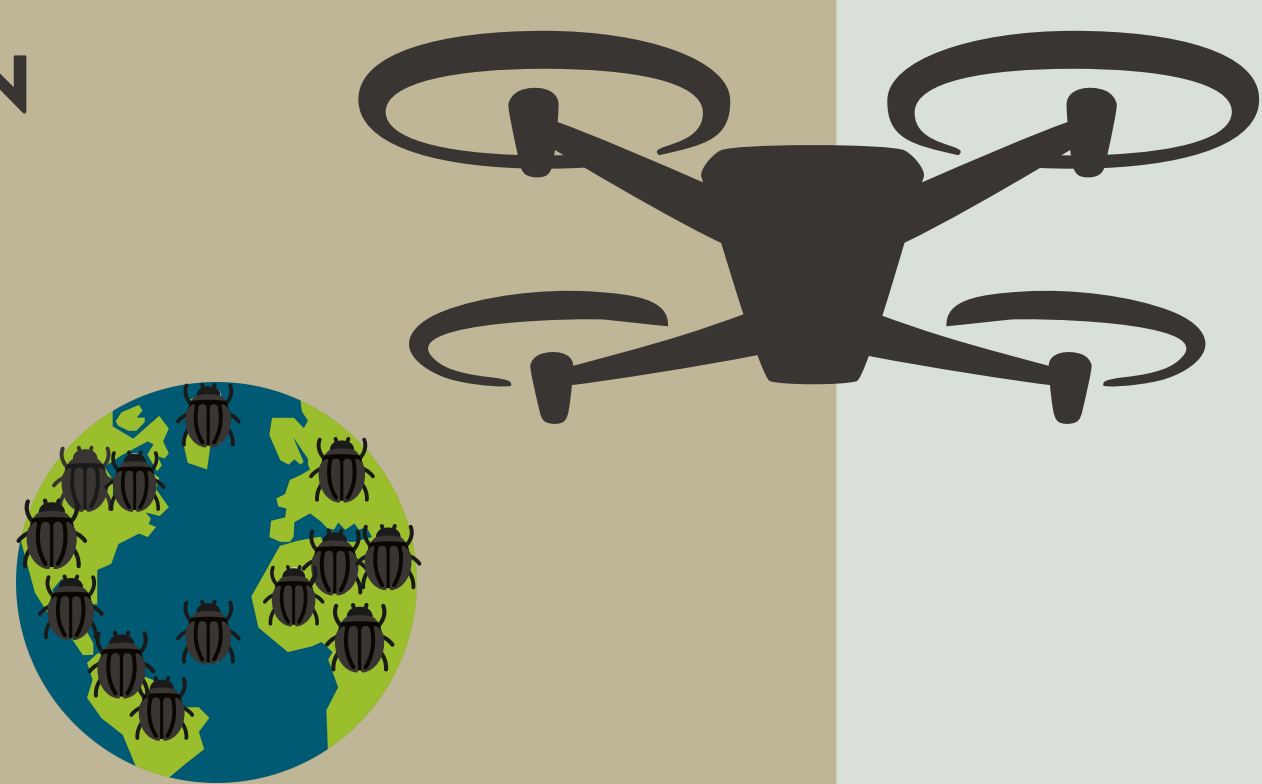
-  MORE FUNDING
-  PUBLIC USE
-  HWA REMOVAL



EARLY ADAPTERS/FUTURE

RESEARCHERS IN GEORGIA SEEK FASTER TRACKING METHODS

IMPLEMENT TECHNOLOGY FOR ADELGID & BEETLE POPULATIONS



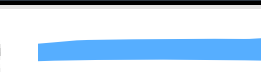



OUR IDEA!

COMPUTER IMAGING RECOGNITION SOFTWARE

OF BEETLES + STATUS OF ADELGIDS



CONVOLUTION NEURAL NETWORK PROCESSES UV IMAGES AND PRODUCES INSIGHTS

OBSERVATION	COLOR
Undisturbed HWA adult honeydew	Bluish-white 
Damaged HWA adult	Yellow-green (chartreuse) 
Damaged HWA eggs	Bright yellow 
<i>Laricobius nigrinus</i> and <i>Sasajiscymnus tsugae</i> frass	Bright orange fades to reddish pink over several weeks 

Objective:
 integrate technology into monitors or drones for rapid area surveys and vital data collection

HELP US BRING THIS IDEA TO LIFE!