

Wild Rivers ISC

# FOREST INVASIVES & WATER QUALITY

*FOREST INVASIVES TO BE AWARE OF  
IN NORTHERN WISCONSIN*

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# WILD RIVERS ISC

Cooperative invasive species partnership operating in northeast Wisconsin & the Upper Peninsula of Michigan

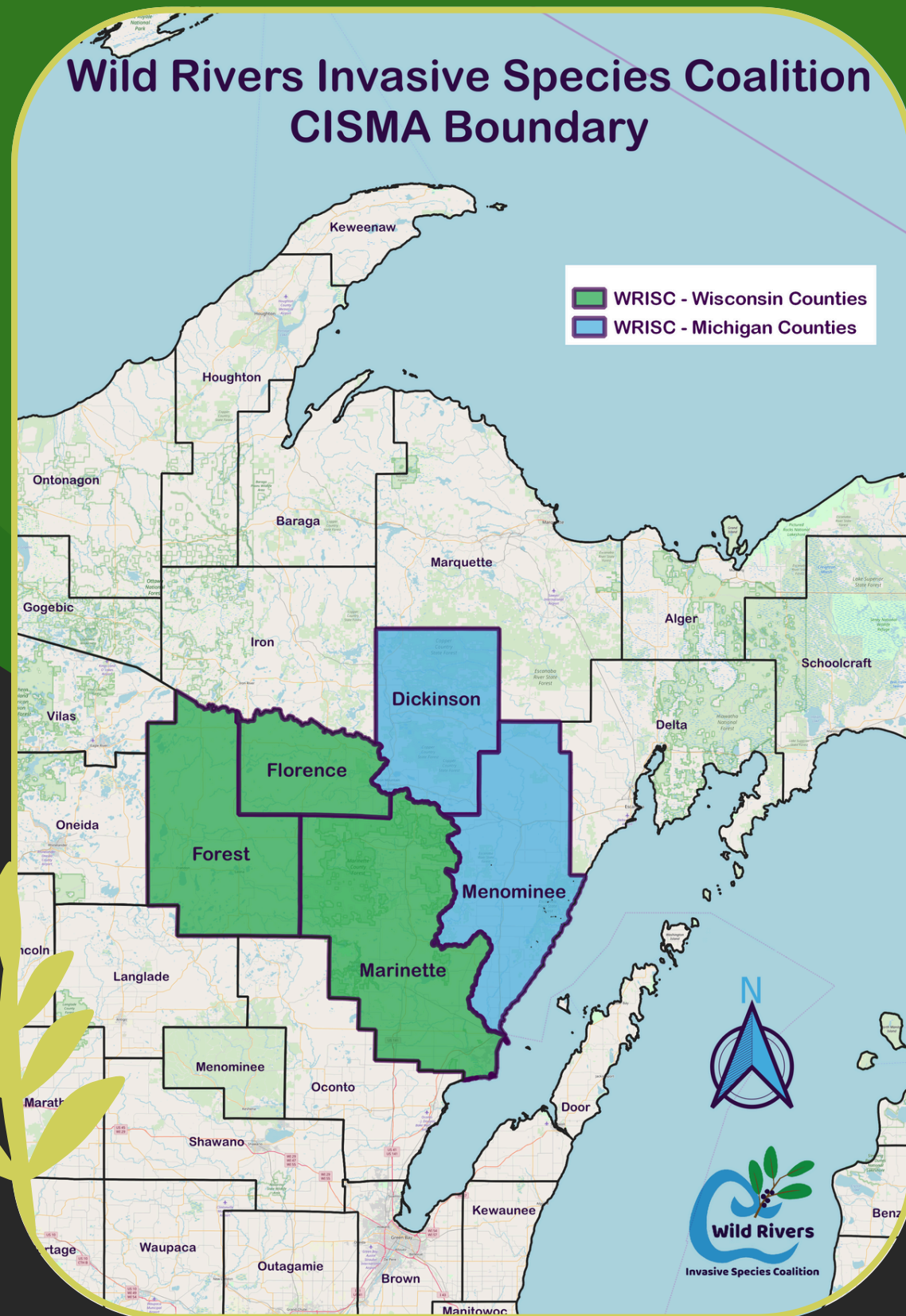
Strive to combine multi-agency resources & expertise to coordinate education & management of invasive species across borders, promoting best management practices that will help to slow the spread of invasive species

**5**  
COUNTIES  
**EST. 2009**

**2**  
STATES

**NEW NAME!**

ROOTS & RIVERS  
COLLABORATIVE





# FORESTS IMPACT WATER QUALITY

Forests significantly benefit water quality by acting as natural filters, their roots anchor soil and prevent erosion, reducing the amount of sediment and contaminants that reach waterways.



PREVENT  
EROSION



REDUCE RUNOFF  
& POLLUTION



REGULATE  
WATER FLOW



REDUCE FLOOD  
RISK



PROVIDE  
SHADE



KEEP WATER  
CLEANER





# BENEFITS OF FORESTS FOR WATER QUALITY

There are increasing concerns about the quantity and quality of both ground water and surface water supplies amid climate change, population growth, land use change, and increased water demand.

- Forests to Faucets Project



## ENVIRONMENTAL BENEFITS

Forests shade streams so they are at optimal temperatures for aquatic wildlife.

## DRINKING WATER

More than ***HALF*** of the drinking water in the U.S. originates in forests!



# HOW DO INVASIVES IMPACT FORESTS?

## TREE MORTALITY

Many forest pests weaken trees, making them susceptible to other pathogens or causing tree death. This reduces canopy cover, which increases stream temperatures & decreases transpiration.

## INCREASED EROSION

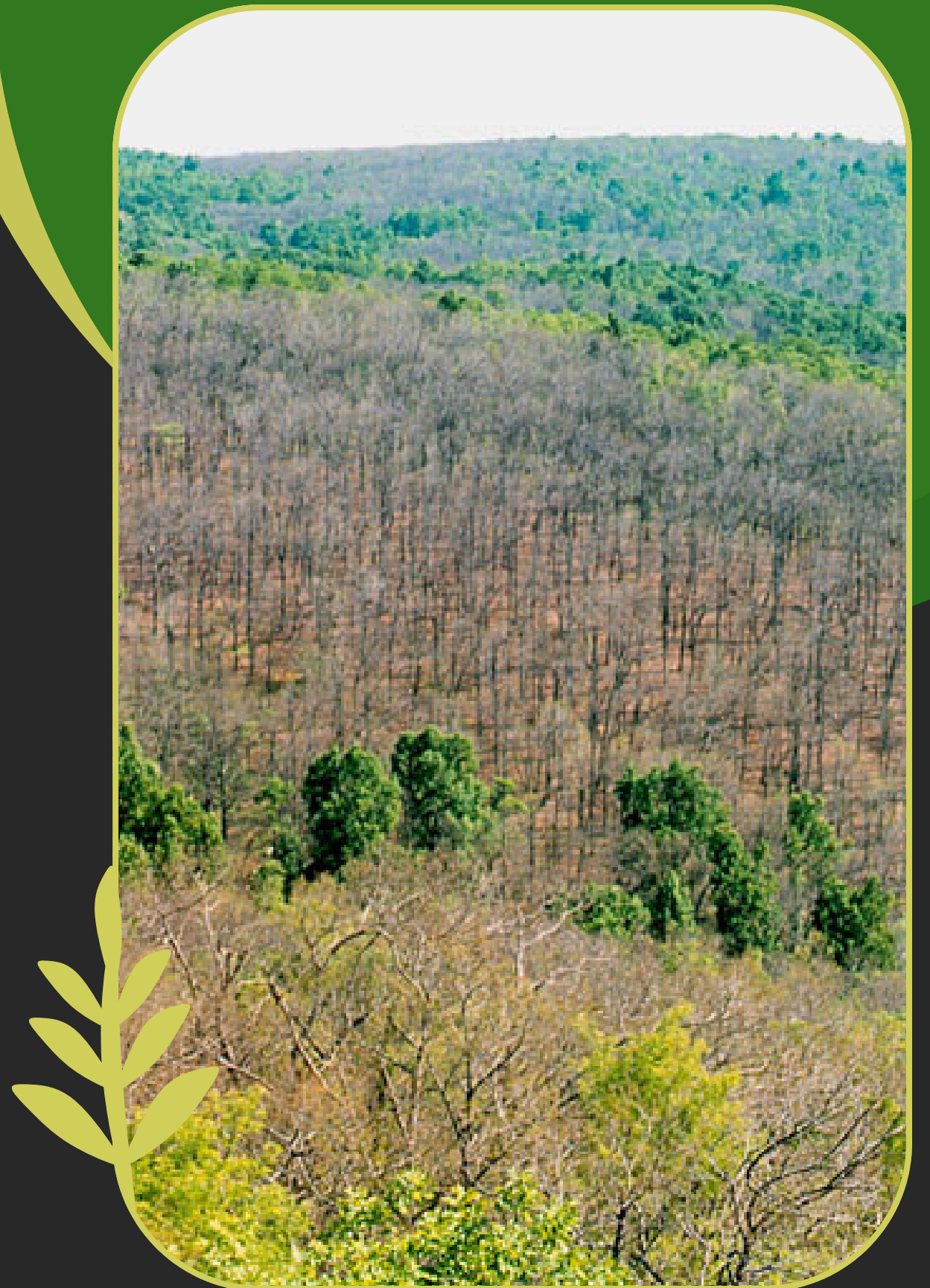
As trees die off or are unable to regrow, soils are no longer stabilized, & erosion can increase. This can lead to sedimentation in lakes & streams, impacting aquatic habitats. Run-off also increases, carrying nutrients & pollutants into waterways.

## DISRUPT NUTRIENT CYCLING

With fewer trees, less nitrogen is absorbed from the soil, causing excess to enter waterways. Large amounts of decaying wood and organic matter contribute to higher organic carbon levels in streams, which can affect dissolved oxygen levels

## LOSS OF BIODIVERSITY

Invasive plants may move in after tree mortality or pest disturbances. These invasions can decrease biodiversity, change forest compositions, & alter hydrology. Forests with low biodiversity are not as resilient against climate change & other major stressors





# FOREST INVASIVES



## EMERALD ASH BORER

Has caused extensive ash tree mortality in North America, leading to increased nitrate concentrations in affected watersheds.



## HEMLOCK WOOLLY ADELGID

Kills eastern hemlocks, which are key to maintaining cool, shaded stream environments. Their loss has led to warmer stream temperatures and altered stream chemistry



## GARLIC MUSTARD

Alters soil chemistry via allelopathy and prevents native plants & tree seedlings from germinating. Decreases biodiversity and increases erosion



## INVASIVE KNOTWEEDS

Aggressively invade riparian areas, displacing native vegetation. The rhizome root system increases bank erosion & allows the plant to spread, especially during floods



# EMERALD ASH BORER

## ADULTS

- Bright, metallic, emerald green color
- Size: 1/2-inch long and 1/8-inch wide
- Dorsal surface of the abdomen is bright coppery-red
- Chew distinctive D-shaped exit holes

## UNDER THE BARK

Galleries from feeding larvae accumulate & disrupt the flow of nutrients. trees begin to show signs and symptoms of the infestation. Trees generally die within one to three years of symptom onset.

## SIGNS & SYMPTOMS

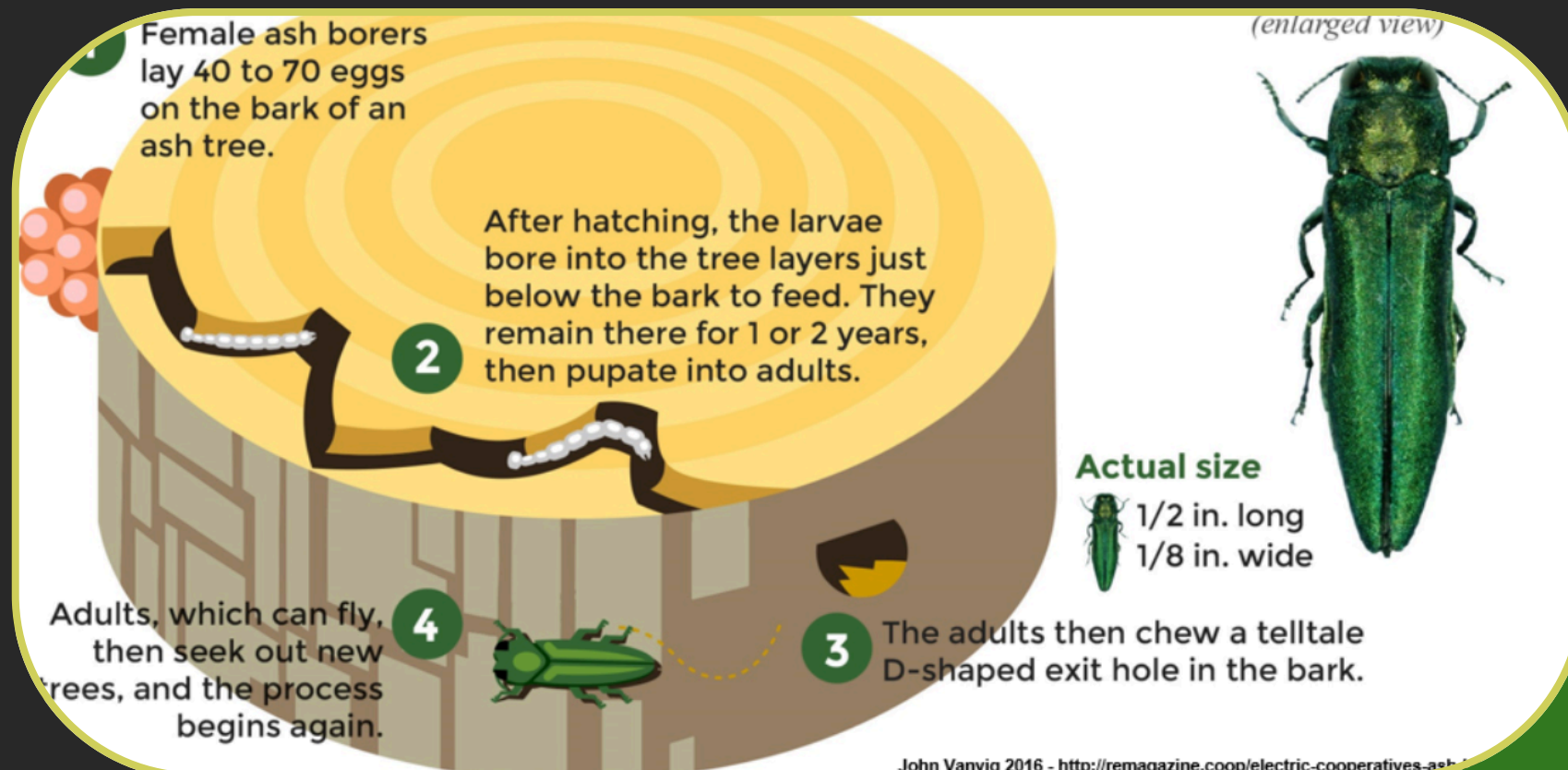
Woodpeckers readily probe for larvae feeding beneath the bark and trees become covered in light-colored "flecking" as woodpeckers remove the outer bark.





# EMERALD ASH BORER

Emerald ash borer has killed millions of ash trees throughout the eastern half of the U.S. and southeastern Canada



## Signs & Symptoms:

- Canopy die-back and thinning
- Epicormic sprouts
- Woodpecker flecking
- Galleries under bark and D-shaped exit holes



# HEMLOCK WOOLLY ADELGID

## MOVING THROUGH MI

Western side of the lower peninsula of MI. On average, the insect spreads about 15-20 miles per year, the result of dispersal by wind, people, birds and other animals.

## WOOLLY TUFTS

The white, cottony egg sacs of the hemlock woolly adelgid can be seen on the undersides of hemlock branches at the base of needles year-round and are the most distinct way to identify HWA

## WILDLIFE AND WATER

Wildlife of all kinds depend on hemlocks. These trees provide winter habitat for deer and keep streams and rivers cool in the summer for cold water fish.





# HEMLOCK WOOLLY ADELGID



## Signs & Symptoms:

- White “woolly” sacs at the base of hemlock needles on most recent twigs
- Premature needle loss
- Thinner, greyish-green crown
- Dieback of twigs and branches
- Discoloration of foliage
- Death within 4-15 years



# GARLIC MUSTARD

## MASSIVE SEED PRODUCTION

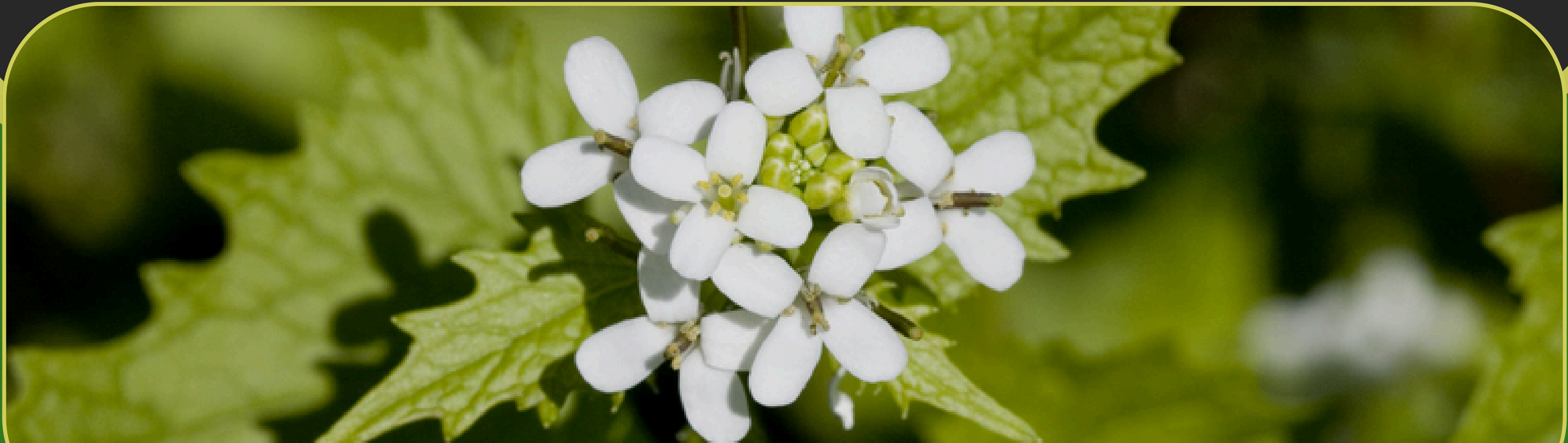
Slender seed capsules form after flowering & produce a single row of oblong black seeds.  
One plant can produce up to 8,000 seeds which are viable in the soil for 5+ years

## EARLY SEASON INVADER

Flower clusters appear at the tops of stems. Individual flowers are small, white, and 4-petaled. Flowering occurs from May through June.

## ALLELOPATHY

Garlic mustard exudes antifungal chemicals into the soil that disrupt associations between mycorrhizal fungi and native plants, suppressing native plant growth.





# GARLIC MUSTARD



Garlic mustard is highly invasive and detrimental to forest understory health and biological diversity. Native understory plants have a hard time competing with invading garlic mustard populations. It can spread into high-quality woodland habitats, not just into disturbed areas.



# INVASIVE KNOTWEED



## RHIZOME ROOT SYSTEM

Rhizomes allow knotweed to spread quickly, & new colonies can form from small stems or rhizome fragments. Plant parts can be moved by natural means, such as waterways, & often through human activities

## NEGATIVE IMPACT

Knotweed forms tall, dense thickets that shade out and displace native vegetation, degrade habitat for fish and wildlife, can alter waterways, and facilitate erosion and flooding

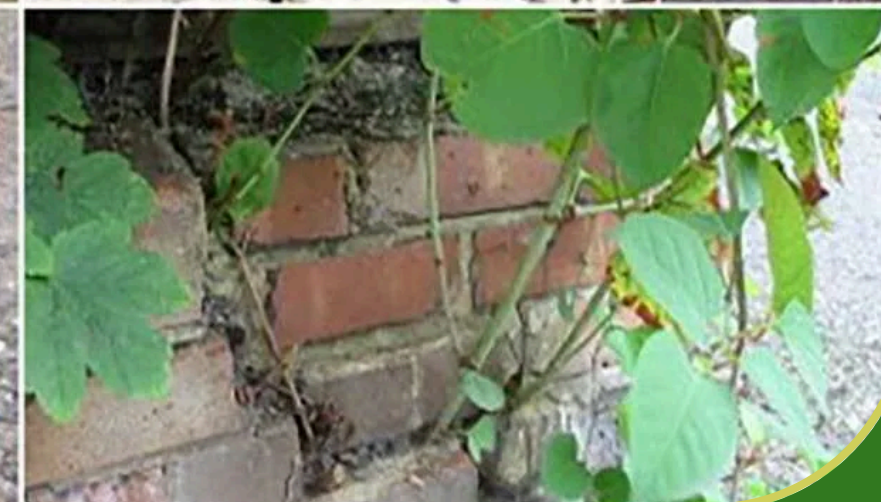
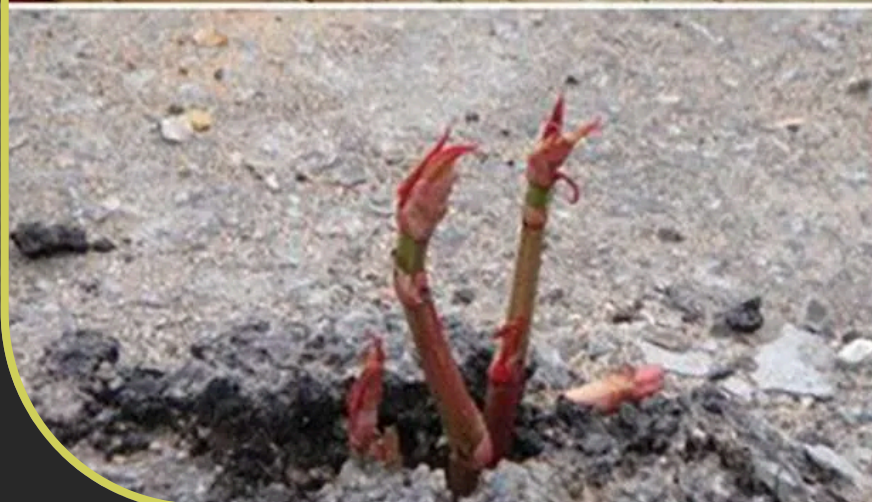
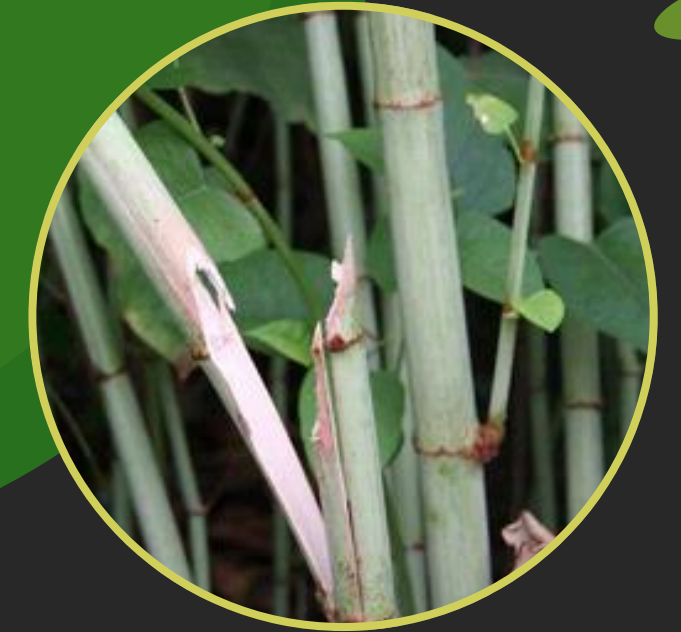
## INFRASTRUCTURE DAMAGE

Knotweed grows through pavement cracks and along paved surface edges, even home foundations, and can result in damage to infrastructure.





# INVASIVE KNOTWEEDS



- Grows 8 to 12 feet tall
- Hollow, bamboo-like stems
- Leaves are simple, alternate, and have a wide base with pointed tips
- Flowers bloom in August and September



# INVASIVE SPECIES PREVENTION

Prevention is the most effective and low-cost solution for managing invasive species. Waiting until an invasive species is established to start management is costly and can harm valuable infrastructure and the natural biodiversity needed for healthy ecosystems.



**PLAY**



**CLEAN**



**GO!**

## WHAT YOU CAN DO:

- Remove plants, seeds and mud from boots, pets, vehicles and gear before leaving a recreation or hunting site.
- Stay on designated trails or access areas.
- Clean your gear thoroughly before heading to a new site.
- Don't bring firewood with you, and don't take firewood home.





# THANK YOU

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