

# Mudsnails in the Musconetcong: Engaging Stakeholders to Limit Environmental Risk

Year 1: NZM Invasion of the Musconetcong



# Musconetcong Watershed Association

- 501 (c) 3 Non-profit
- Mission on the Musconetcong
  - Protect & enhance River
    - Natural resources
    - Local cultural resources
  - Build community awareness
  - Foster protection & stewardship
- Underlying philosophy-
  - People protect natural resources when they understand their value



# Nancy Roberts-Lawler

- MWA Water Quality Program Coordinator-2009
  - Non-ambient monitoring
    - Dam removals and restorations
    - Non point source pollution
  - River Watcher-volunteer program
- Advocate for 20 years
  - Non-agency data for regulatory use
  - Member of NJ Water Quality Monitoring Council
- Education
  - University of Pennsylvania- Biology
  - UMBS 1978/79-Aquatic ecology



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Studied  
Snails





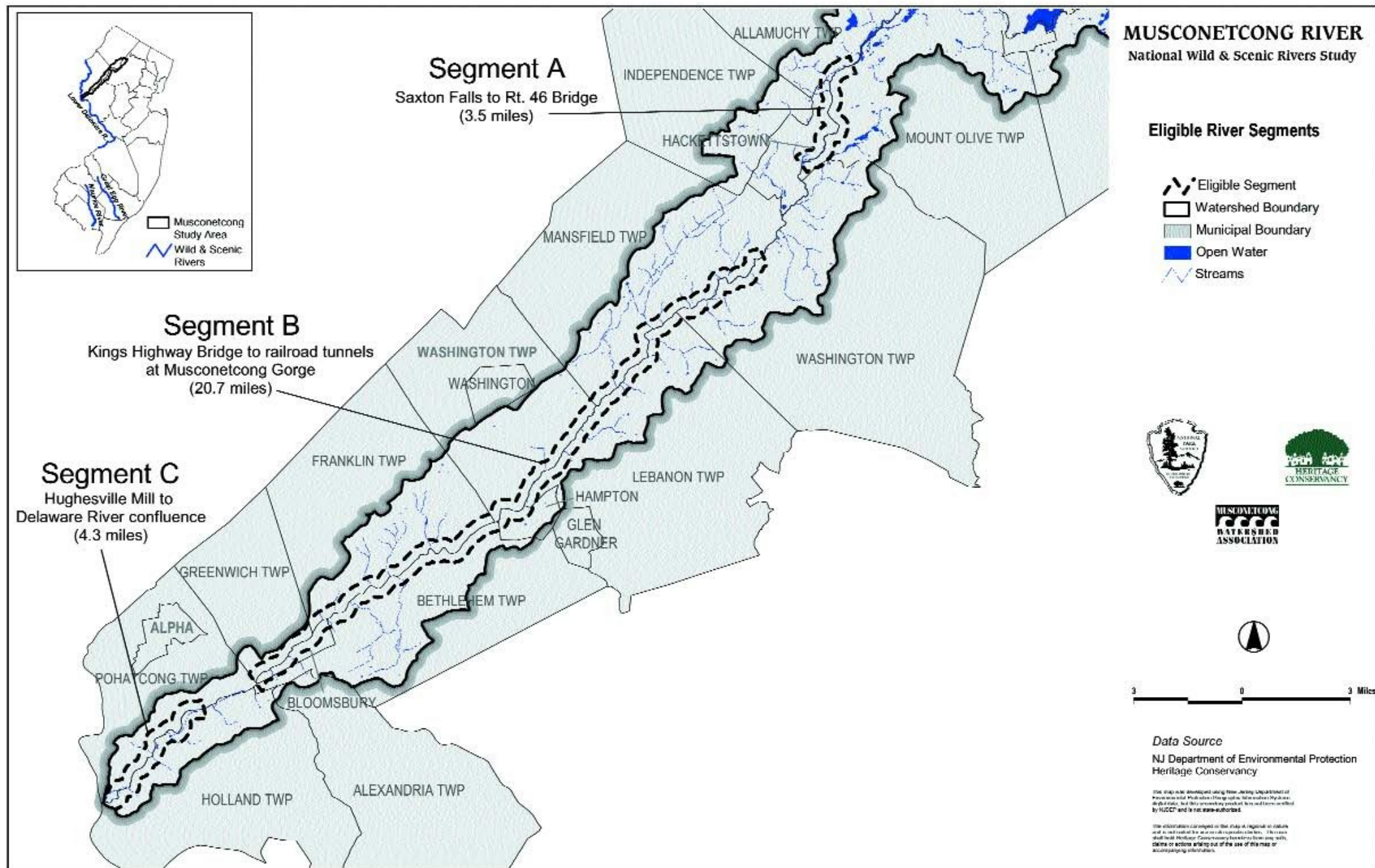
# Musconetcong River Watershed

- Outstanding Resource Values
  - Historical-*Lenape villages, archeological site*
  - Cultural-*historic sites*
  - Natural-*Brook Floater Mussels, Brook Trout*
  - Federal Wild & Scenic River
- C-1 protections
  - Fishing and Boating
- Impacts
  - Dams-21+
  - NPSP from Land use
- Targeted for restoration



Photo: John Parke

# Musconetcong River Wild & Scenic Sections





# Chapter 1: NZM in the Musconetcong

- At 5 study sites in 2018
  - Professional lab: confirmed
  - Sites: Bloomsbury to confluence
- First time
  - In NJ
  - In Delaware Watershed
- Concern:



# Chapter 1:

## NZM in the Musconetcong

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  - In NJ
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- Concern: **HIGHLY INVASIVE**





# MWA's Role?

- Protect and enhance the river
  - Identify the threat to the river
    - Economic?
    - Human health
    - Natural Resource?
  - How bad is it?
    - How far has it spread?
    - Can we observe impact?
  - How can we help?
    - Do we have the authority/ability?
    - Who do we tell?
    - What/when do we tell public?





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**WE NEED MORE INFORMATION!**



# Chapter 2: Who can help us?



Michael Cole,  
invertebrate  
taxonomist

Found snail species  
in MWA samples



Dr. Robert Dillon  
Coordinator,  
Freshwater Gastropods  
of North America  
project

Snail expert:  
Confirmed species





# Chapter 2: Who can help us?



Amy Benson-USGS  
Aquatic Nonindigenous &  
Aquatic Invasive Species Database

Shared location &  
NJ record nationally



Dr. Ed Levri-Penn State  
New Zealand Mudsnail Expert

Our resource on NZM,  
Advice on collection



“...please, call *Invasive Species Specialist* in NJ”

## 43 states have Invasive Species Plan

- Signed Invasive Species Management Plan
- Designated agency coordinates management
- Designated person
  - Usually Fish & Wildlife

## But not New Jersey...

- Developed Invasive Management Plan
- Doesn't include aquatic species
- Not signed by Governor
- No assigned federal resources
- Now what?



# MWA Uses Network!

- Partners at agencies
  - NJ Fish & Wildlife, US Fish & Wildlife
  - NJDEP FWBM
  - EPA, USGS, NRCS,
  - National Park Service
- Academic Partners
  - State Universities-Montclair & Rutgers
  - DRWI-Academy of Natural Sciences, Stroud



**NJ Water Quality Monitoring  
Coordinating Council**

# MWA Uses Network!

- Municipal officials
- Non-profits partners
  - Trout Unlimited
  - Delaware Riverkeeper
- Restoration community
  - The Nature Conservancy
  - Consultants-Princeton Hydro
- And so on...





# Chapter 3:

## Scoping the problem

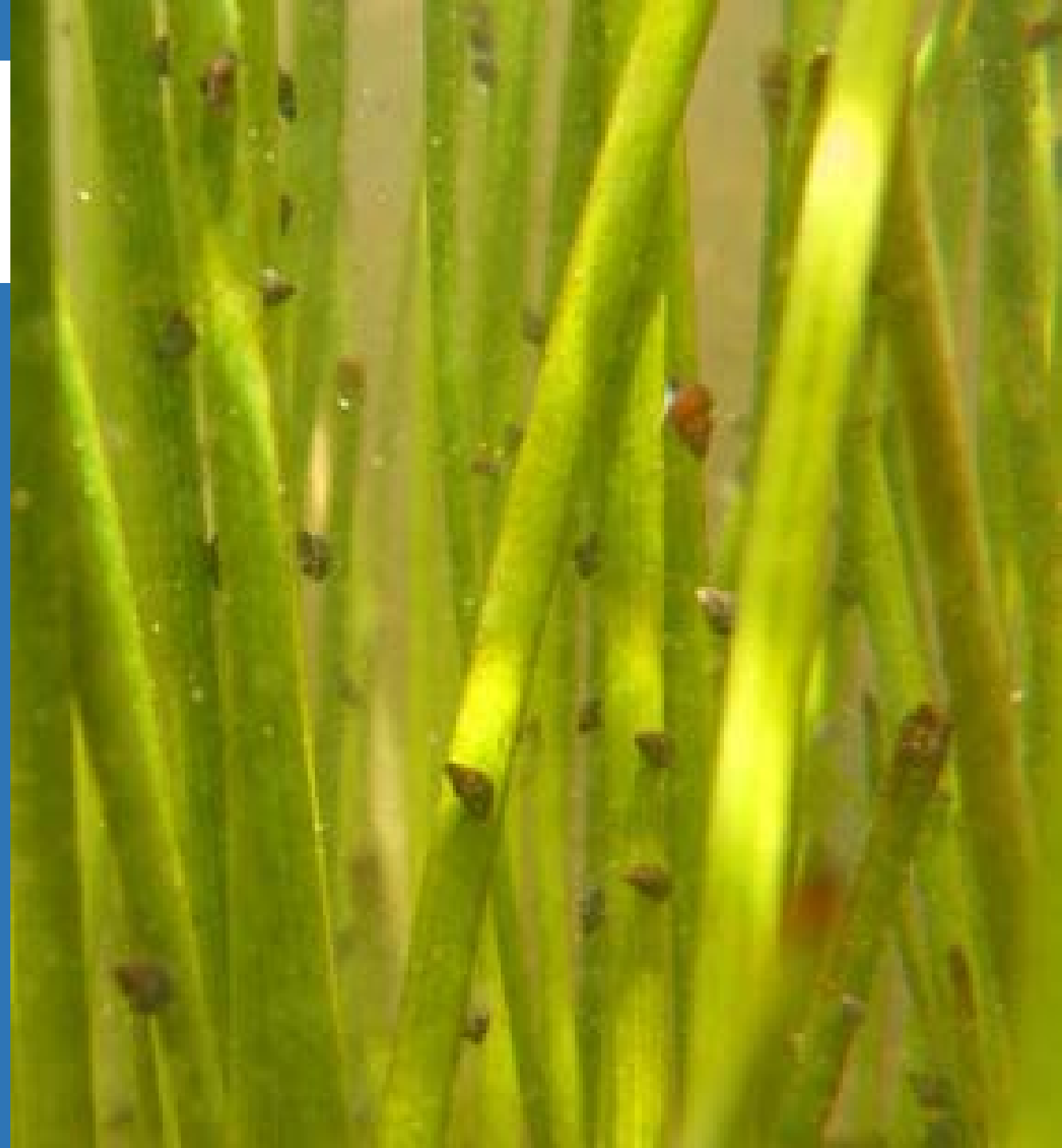
- Information needs
  - Has it spread?
  - Does it affect endangered mussels? Other aquatic life?
  - Can we control spread?
- What resources do I have?
  - River Watchers
  - Friendly colleagues
  - Equipment
  - Knowledge of standard methods
- What resources does MWA need?
  - **Time to work on problem**
    - Watershed Institute grant





# What do we know?

- Highly adaptable in native NZ
  - Inhabits lakes, streams, estuaries, reservoirs
- Tolerates range of conditions
  - Salinity, temperature, turbidity, discharge, and stream productivity
- Eats algae
- Can switch reproductive strategy



# What makes it invasive?

- Ecological damage
  - Competes with native macroinvertebrates
    - Food
    - Habitat
  - Provides no ecological benefit
    - Passes through wildlife gut
    - Trout lose weight when ingest NZM
- Resistant to natural controls
  - Can survive for weeks out of water
  - Walks upstream & downstream @ 10 feet/hour





# What makes it invasive?

- Reproduction
  - Parthenogenic in US
  - ♀-230/year
- Natural population control absent
  - Native-parasitic trematode
  - Limited predation
- Easily transported-globally
  - In fish stock
  - Ballast or drinking water
- Easily transported-stream to stream
  - Fishing gear
  - Boats





# Can we stop the spread?

- Difficult to control in flowing water
  - Control methods are not NZM specific
  - Diverse potential vectors
    - Anglers & boaters
    - Fish stocking
    - Monitoring professionals
    - Restoration Equipment
- Best option is to slow the spread...
  - Education
    - Engagement
    - Encourage decontamination



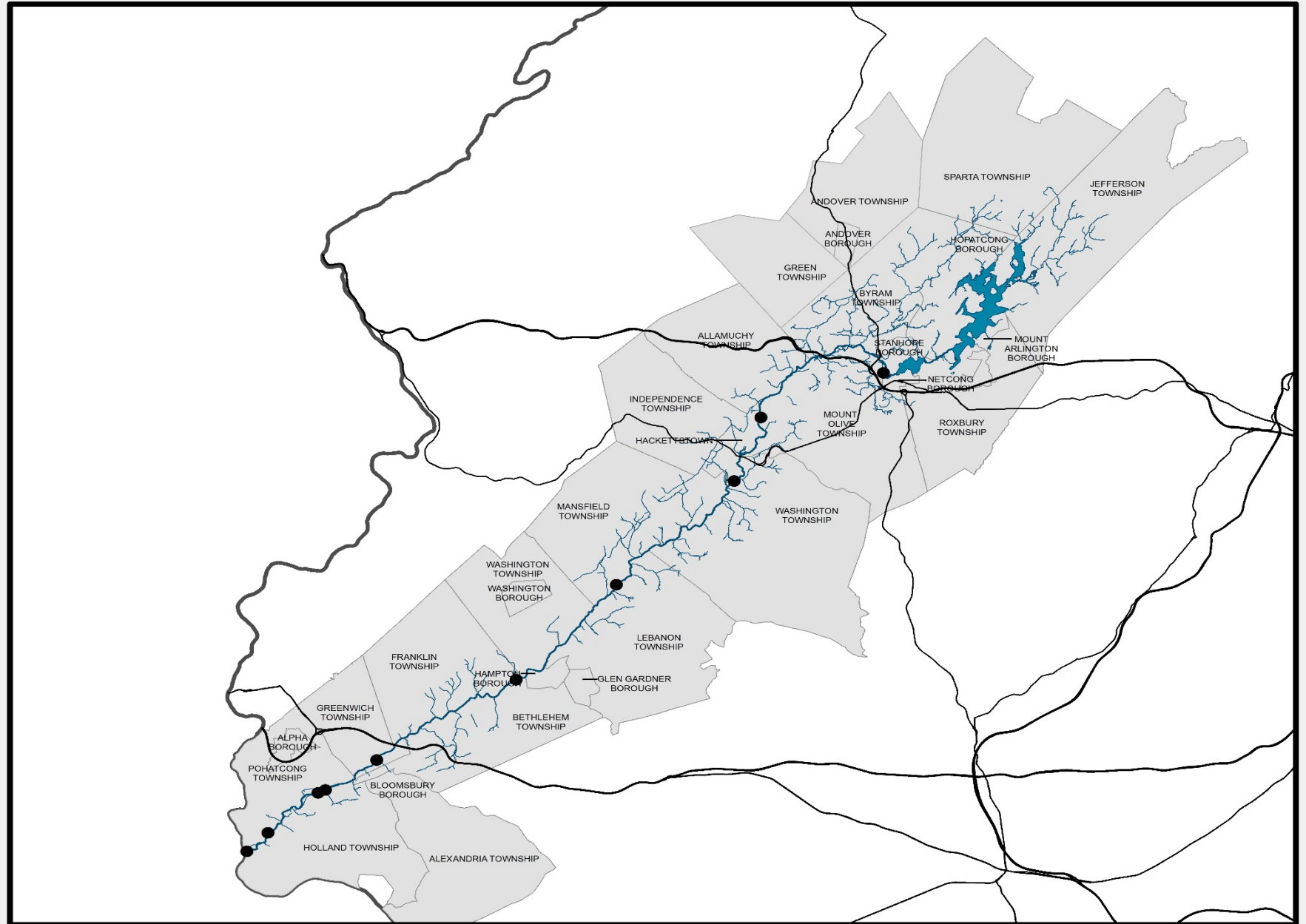


# Chapter 5: Engage the community

- MWA River Watchers
  - Could they identify snails?
  - No metamorphosis
    - Could determine presence/absence all year long
    - Look at water < 2ft
    - Turn over rocks
    - Collect confusing snails
- Confirm ID using expert-Ed Levri
- Interns- develop id “tips”



# Snail Watch Begins at 12 sites





# To Identify New Zealand Mudsnail

- Conical
- 4-6mm
- Opens to right
- 5-6 whorls
- Has operculum (need microscope)



Which one is NZM?

NZM



A



B

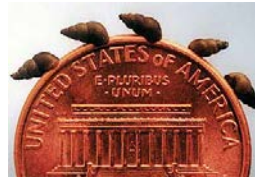




# Distributed Flyers with Help

- To Municipalities
  - MRMC
- To Agencies
  - NJWQMC
- To Outfitters
  - Trout Unlimited
- To Partners
  - DRWI
- To Anglers & Boaters
  - Posted at affected fishing accesses

## **STOP** The New Zealand Mudsnail In the Musconetcong River!



This snail spreads by hitchhiking on waders, boats and fishing gear.  
*Stop it getting into nearby streams.*

**40,000,000**

PRODUCED BY  
**1 FEMALE SNAIL**  
IN 3 YEARS

## **CLEAN YOUR WADERS** TO PROTECT NJ TROUT STREAMS

### **INSPECT**

gear carefully.  
Snails hide in  
treads & socks

### **TREAT**

Remove debris.  
Rinse with  
potable water

### **DRY**

waders  
completely

Avoid using felt  
soled waders

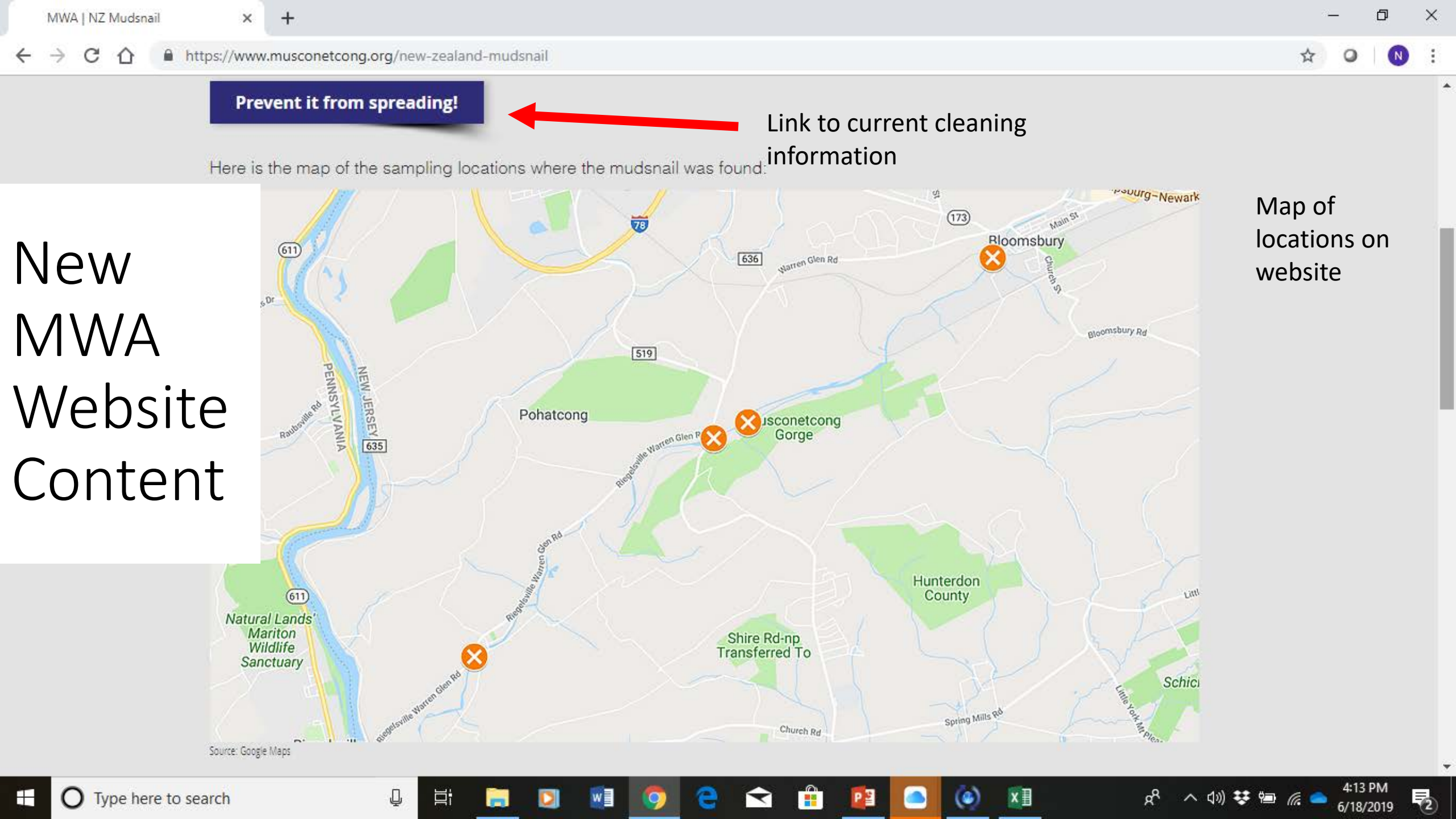


Freeze waders for 24  
hours OR see  
website for other  
options

Dry for 72 hours before  
using in other streams

Visit [www.musconetcong.org](http://www.musconetcong.org) to learn  
more about this snail in our watershed





Prevent it from spreading!

Link to current cleaning information

Here is the map of the sampling locations where the mudsnail was found:



Map of locations on website

New  
MWA  
Website  
Content



# Practical advice for cleaning gear

## Stop the Spread of New Zealand Mudsnails in Our Rivers

June 11, 2019

If you visit a site where New Zealand Mudsnails (NZM) have been found, taking some precautions will help prevent the snail from spreading to nearby streams.

### SELECT THE RIGHT WADING GEAR

Avoid wearing felt-soled waders with detachable neoprene booties. Tiny snails and other invasive species can hide in small spaces that stay damp and survive for many weeks.

### RECOMMENDED PROCEDURES FOR CLEANING WATERS AND HIP-BOOTS

After visiting a site, first clean your waders and then treat them using either the physical or chemical methods listed below. We recommend the following precautions:

- **Change your wading gear** for use in different bodies of water, if possible.
- **Clean all gear** before leaving a site, scrubbing with a stiff-bristled scrub brush and rinsing with clean, potable water. Clean your gear with a high-pressure hose as soon as possible. This is often the simplest and most effective for prevention.
- **Inspect gear** before it is reused. Traces of sand, mud, gravel, and plant fragments on the gear are signs that gear has not been properly cleaned.
- **Select ONE** recommended treatment method in addition to scrubbing and rinsing if NZM is suspected to be present.
  - **PHYSICAL treatments are inexpensive, environmentally sound, and possibly, not as destructive to gear. Time/space requirements or lack of feasibility may make physical treatments impractical for specific types of gear.**
    - **Freeze gear** for 6 hours. This is the best known treatment to kill all snails. Freezer temperatures should be 26 degrees Fahrenheit (-3 degrees Celsius); **OR**
    - **Soak in hot water** for 10 minutes. Hot water should be 120-140 degrees Fahrenheit (46 degrees Celsius). This method is not recommended for Gortex; **OR**
    - **Dry gear before reuse.** A drying time of at least 48 hours is recommended to remove all dampness. Gear should be completely dry for an additional 24 hours to limit snails. Check boots to ensure that they are completely dry before reuse.

### Featured Posts



Press Release: Wild & Scenic River Signs to be placed along the Musconetcong River  
January 4, 2019

Created recommendations with help from Maureen Ferry....

# No further spread...so far

- Byram Twp- *Stroud* **absent**
- Stephens SP-Centenary *U* **absent**
- Hackettstown-RW **absent**
- Point Mountain Preserve-RW-**absent**
- MWA neighborhood-RW-**absent**
- Bloomsbury Dam-RW/lab-**increase**
- Downstream of Dam removals-RS-**increase**
- Confluence with Delaware-DRK-**present**

Centenary University faculty & students  
learning about macroinvertebrate





# Chapter 5: Invasive species obey no boundaries

- Without a state-wide management plan
    - Organizations act individually
    - Different Messaging
      - Clean, Drain, Dry?
      - Play, Clean, Go?
      - Inspect, Treat, Dry?
    - People need to know what to do
  - NZM impact may be ecological
  - Zebra Mussel will be economic
- Was HABs event a wake up call?



# Wash your gear!

- NJ Aquatic Invasive Decontamination Workgroup
- Decontamination Protocol Manual
  - NJ Water Supply-Heather Desko
  - MWA
  - NJDEP-BEARS
  - The Watershed Institute
  - Pinelands Commission
  - Raritan Headwaters
  - Sea Grant
  - USGS
  - Brick MUA
  - Montclair State University
- Almost complete





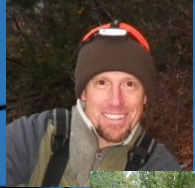
# What next?

- Coalition for the Delaware River Watershed
  - 2018, 2019 Roundtables at conference
  - 20+ organizations interested
  - Recommendation
    - Prioritize Delaware Basin-wide plan as priority
- Private lake communities ban outside boats
- MWA
  - gives out NZM samples for ID
  - asked by TU to join Great Lakes NZMZ Collaborative



# It'll Takes More than a Village to Slow the Snail's Pace

Special Thanks to these Villagers





# References

Invasive Species Compendium

<https://www.cabi.org/isc/datasheet/43672>

Freshwater Gastropod project

<http://www.fwgna.org/FWGMA/>

USGS NonIndigenous Aquatic Species Program

<https://nas.er.usgs.gov/>

New Jersey Water Monitoring Council

<https://www.nj.gov/dep/wms/wmcccharter.html>

