



Minimizing the Spread of Invasive Species

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Why this is Important

Invasive Species -

- Harm Habitat
 - are the 2nd biggest threat to biodiversity
 - listed as a cause of 48% of endangered species
- Cost \$\$\$
 - cost the US approx \$120 billion per year, 1.4 trillion globally
 - invasive aquatic plants cost the U.S. approx \$100-275 million/year
 - Washington State spends at least \$30 million every biennium on invasive species

How invasive species spread

- Big jumps mainly through international trade
 - intentional (animals and plants imported for nursery or pet trade) or
 - by accident (shipping ballast, HITCHHIKERS)
- Smaller jumps
 - Nursery and pet suppliers
 - Education supply releases
 - **HITCHHIKERS** on boats and gear

← What we are trying to prevent

What are likely hitchhikers?

- Invasive non-native
 - Plants
 - Animals
 - algae
- Diseases



Invasive Plants

- 28 species of aquatic and wetland weeds on Washington State Noxious Weed lists
- Too many to learn to identify them all
- Illegal to transport plants on vehicles in Washington



Invasive Animals

- Many – some examples
 - Zebra/quagga mussels
 - New Zealand mudsnails
 - Marine organisms like tunicates
 - Asian clams
 - Bullfrogs
 - Amur goby and other fish
 - Mystery snails



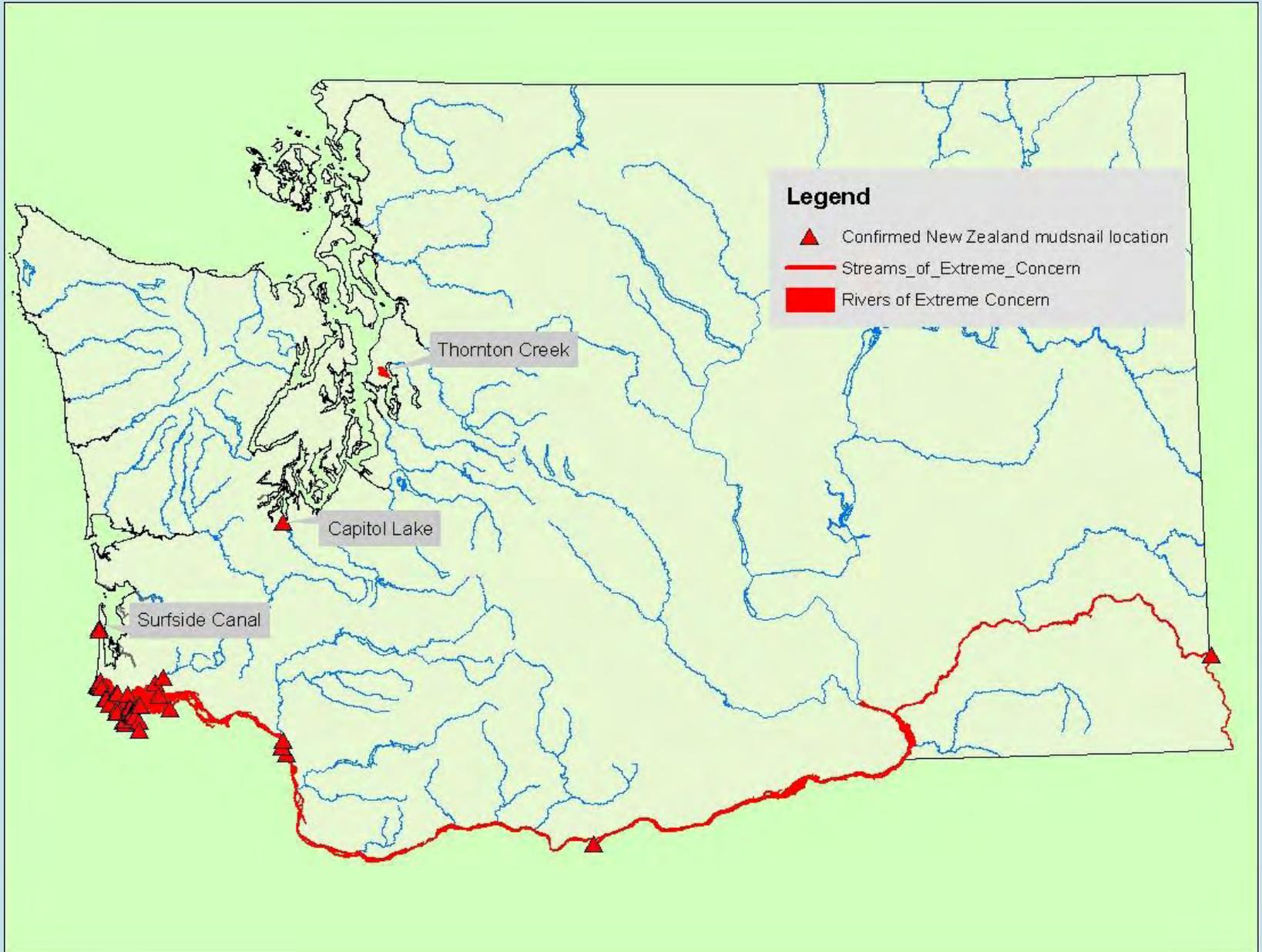
Why the extra concern - New Zealand mudsnail



- Very hard to see, cling to gear, actively crawl onto gear
- Limited distribution - lower Columbia, tribs to mid-Columbia and Snake, Capitol Lake, Thornton Cr
- Only takes one
- Hard to kill
- High populations impact habitat



NZMS distribution



Thornton Cr

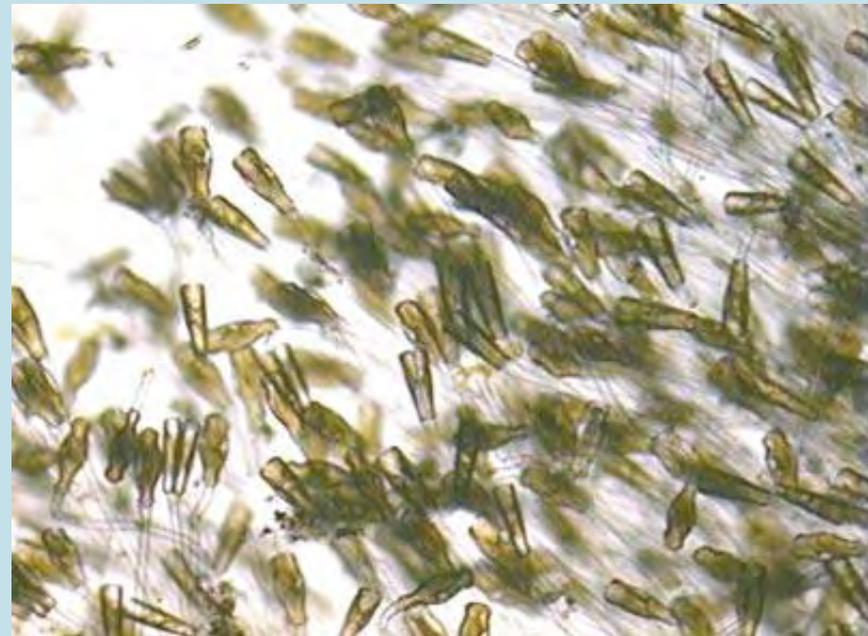


Paul Bakke

Algae

Didymo

- Confirmed nuisance populations
- Other similar diatoms (*Cymbella*)



Diseases

- Amphibians
 - Chytrid fungus
- Fish
 - VHS – Viral Hemorrhagic Septicemia
 - Whirling Disease
 - Infectious Hematopoietic Necrosis (IHN) virus



What is being done about hitchhikers?

- General public:
 - WDFW has enforcement officers and works with State Patrol to enforce laws against transporting aquatic plants and animals
 - All commercially hauled watercraft are inspected, other inspection stations are periodically established
 - Other states have mandatory inspection stations
 - National 'Stop Aquatic Hitchhikers' campaign

What is being done about hitchhikers?

- State Agencies:
 - Ecology requires following protocols developed by EAP (Environmental Assessment Program)
 - Other State Agencies - Invasive Species Council has developed protocols
- Counties and other jurisdictions have their own protocols

Prior to field work

- Plan field activities to minimize contact with sources of contamination (sediment, plants, fish)
- Select equipment that can be easily inspected and cleaned
- Plan for cleaning or decontamination needs – time and materials



After Field Work

Clean

Drain

Dry



**STOP AQUATIC
HITCHHIKERS!**

Please remember:

CLEAN • DRAIN • DRY

Boats and Equipment

— www.kdwp.state.ks.us —



Clean

- Inspect equipment, clean off any mud, plants or other debris.
- Scrub and rinse with clean water (from the site or brought in) if necessary.
- Flush areas that can't be seen until clean (bilges, inside boat motors, inside boots etc)



Where to clean

- Clean at the sampling site where practical
- Interim sites can also be used for inspection and cleaning (such as commercial car wash).
- Ensure no debris will contaminate another waterbody during transit or cleaning



Extra Care Cleaning

- Nets
- Inner boat surfaces

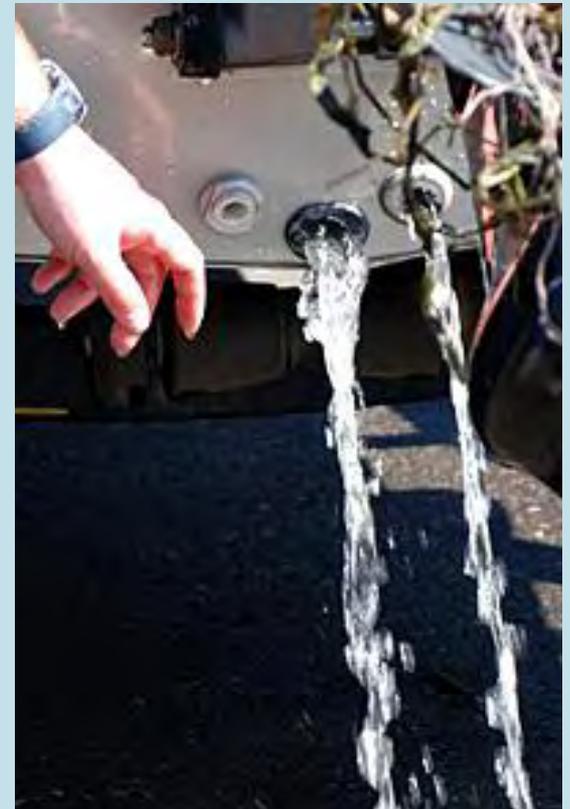


Don't Forget!
Clean vehicles when leaving areas
of high weed growth or mud



Drain

Drain all water in bilges, samplers or other equipment that could hold water from the site.



Felt sole boots

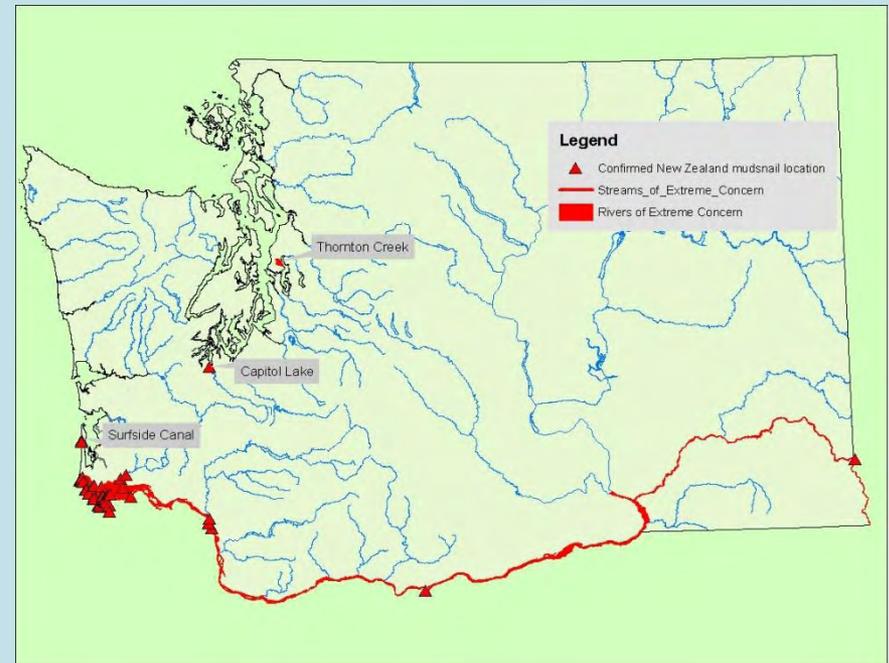
- **Clean and then Decontaminate** where ever they are used



- Consider Non-felt alternatives

Recommendation for NZMS

- All equipment that contacted sediment, aquatic plants or fish:
 - If equipment is smooth and small – wipe dry
 - Everything else needs to be decontaminated



Decontamination Options

Treatment	Concentration or temperature	Exposure Time	comments
hot water wash or soak *	60° C (140° F)	5 min for felt-soled boots and nets; 10 sec for all other equipment	Ensure all parts of the equipment reach temperature for the full exposure time
cold	-4° C	4 hours minimum	Time starts after the equipment reaches -4 °C
drying	low humidity, in sunlight is best	48 hours	Time starts after the equipment is thoroughly dry

* Caution – hot water may damage some equipment (Gortex)

Hot water, freezing or drying preferred over chemicals

- Chemicals have storage and disposal issues – and may contaminate water if gear isn't thoroughly rinsed

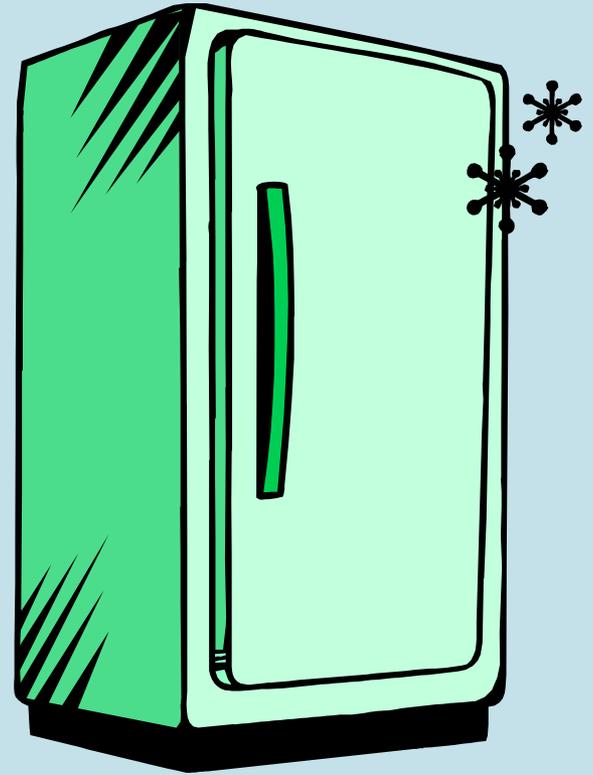
Hot Water



- portable hot water heater developed by the Ecology Flow Monitoring Group
- Ecology has an in-line hot water heater for cleaning gear at the equipment storage area
- Hot water pressure washers are available, used by WDFW

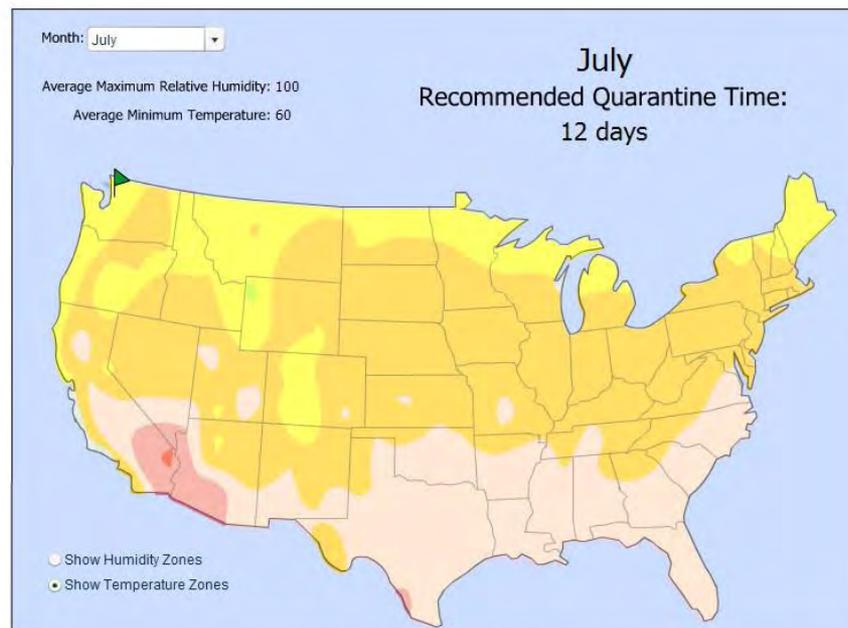
Freezing

- Some groups take multiple sets of gear to sample different waterbodies, then freeze all at night in walk-in freezers
- Very cold weather events may help satisfy this criteria if equipment is exposed



Dry to decontaminate

- Drying time depends on weather conditions
- <http://www.100thmeridian.org/emersion.asp>



Note: both layers (temperature and humidity) are used in the estimation regardless of which one is currently showing.

Recommendations are based on U.S. Army Corps of Engineers Contract Report EL-93-1, June 1993, "Use of Emersion as a Zebra Mussel Control Method" by Robert F. McMahon, Thomas A. Ussery, and Michael Clarke, The University of Texas at Arlington.

Dry

- After all cleaning and decontamination are complete, store equipment to facilitate drying



When don't you need to clean?

- Moving short distances by foot
- Sampling by boat
- Using a float plane in marine waters

Helpful links

- <http://www.ecy.wa.gov/programs/eap/InvasiveSpecies/AIS-PublicVersion.html> Ecology's field gear cleaning methods page
- <http://nas.er.usgs.gov/queries/washington/default3.asp> USGS Non-indigenous Aquatic Species database for Washington
- <http://wdfw.wa.gov/fish/ans/> Washington Aquatic Nuisance Species page

What if I find something?

- take a photo and/or collect and preserve some
- GPS and take notes on the location
- contact Ecology if it is an aquatic plant or algae, WDFW for animals (contacts are listed on the internet)

