

Limiting the Spread of Zebra and Quagga Mussels in the Okanagan – 2012 study Funded by OBWB



Images: USGS, Google Earth, Biosecurity New Zealand

How could something so small...



Each female mussel can have a million offspring in one year. *For example, two years after an invasive mussel was first discovered at Lake Mead, the population is firmly established, with numbers soaring to the trillions.*

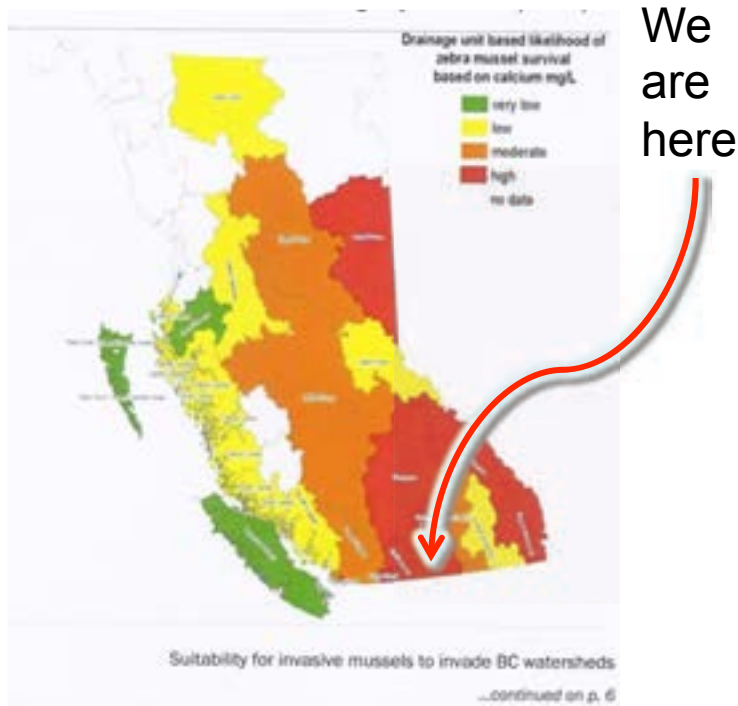
<http://phys.org/news167163370.html#jCp>

What AIS mussels do to a lake can be seen from space..



Vulnerability to Mussels

- Any lake or stream in red area is at high risk



Requirements for mussel growth

Dreissena Mussel Requirements:

Suitable environments for *Dreissena* growth are those with a pH between 7.4 and 9.4, 12°C to 24°C for optimal reproduction, within 2 – 70 m depth, with moderate to high plankton production and with a minimum calcium ion concentration of 12 -20 mg/L (Sprung 1993; Hincks and Mackie 1997; Whittier et al., 2008). The table below gives the range of values tolerated by these invasive animals:

General Dreissena Environmental Tolerance (many cited sources)

Parameter	High	Mod	Low	V Low
Diss oxygen mg/L	8 - 10	6 - 8	8 - 4	< 4
Temperature °C	18 - 25	16 - 18	9 - 16	< 8 or > 30
T Hardness mg/L	90 - 125	45 - 90	25 - 45	<25
T-Calcium mg/L	25 - 125	20 - 25	9 - 20	< 9
pH	7.5 – 8.7	7.2 – 7.5	6.5 – 7.2	<6.5 >9.0
Conductivity us/cm	83 - 110	37 – 82	22 - 36	>22
Secchi disk cm	40 - 200	20 – 40		<10 >250 (2.5m)
Velocity m/sec	0.1 – 1.0			<0.075 >1.5-2

The more ideal conditions are, the more intense the infestation will be.

Vulnerability to Mussels

- All Okanagan mainstem lakes
- Especially Kalamalka and Wood lakes
- Lower reaches of all creeks and streams

But NOT

- Upper elevation lakes that are iron-stained, low pH, low calcium



Recommendations (2013)

Government Action

- Federal government needs to pass legislation against AIS
 - Border Services cannot act without explicit consent in federal legislation and they need to be trained to inspect boats (hand out OBWB cards this summer?)
- Provincial resources are required to implement new policy
 - Highway weigh stations, provincial borders, National Parks gates, other? can be used to inspect boats ✓
 - Possibly implement a user fee system as has worked in other jurisdictions (with stickers for inspected boats) Launch staff only allow launch if boat is certified clean
- Municipal government to play key role in public education
 - Innovate ways to get voluntary gear cleaning (car wash passes?); commitment to clean sign-up website? ✓

Recommendations (2013)



Public Education Blitz

- Most people are currently unaware of AIS threat, use news media, brochures, presentations to inform on economic and environmental risks – its important to make clear how this could affect local way of life ✓
- Provide **Clean Drain Dry** formula to everyone and get commitments from municipalities, sports groups, everyone! ✓

Private Sector Involvement **Government cannot afford to do it all**

- Re-purpose existing infrastructure (train car wash staff to decontaminate boats and equipment and deal with waste water; use weigh stations for inspections)
- Engage boat handling businesses with possibility of new revenue streams ✓
- Provide resources to volunteer lake stewardship and fish/wildlife groups to inform public *and* monitor for infestations ✓

Solutions:



Commit to CLEAN DRAIN DRY!

OR else..... we could try
draining our lakes for
a winter...



Thank you!

Full report available on OBWB website