



BC Invasive Mussel Defence Program



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BC Invasive Mussel Defence Program

- BC-Program co-funded by Ministry of Forests, Lands and Natural Resources (FLRN), Ministry of Environment (MOE), Ministry of Agriculture (MOA), BC Hydro, Columbia Basin Trust (CBT), Columbia Power Corporation and Fortis BC.
- Highway signage (MOTI) for Clean, Drain and Dry at 24 locations near BC/US and BC/Alberta border crossings.
- **Six trained inspection crews** (2 seasonal staff/crew) with mobile decontamination units for boating season (May to October 2015) based out of **Nelson, Penticton, Cranbrook, Invermere and Valemount.**



Zebra and Quagga Mussels

- These freshwater mussels settle on any solid surface and grow in big clusters attached to each other
- They overgrow and clog water intake pipes of power stations, municipal water supplies and agricultural raw-water intakes
- Invasive mussels are a major threat contributing to the listing of Rocky Mountain ridged mussel in BC
- Can survive in slightly brackish water (6-8psu – practical salinity units)



Zebra and Quagga Mussel Sightings Distribution *Dreissena polymorpha* and *D. rostriformis bugensis*



- Zebra mussel occurrences
- Quagga mussel occurrences
- Both species occurrences
- Zebra/Quagga mussels eradicated
- Zebra/Quagga mussels failed

Map produced by the U.S. Geological Survey, Nonindigenous Aquatic Species Database, March 12, 2015.

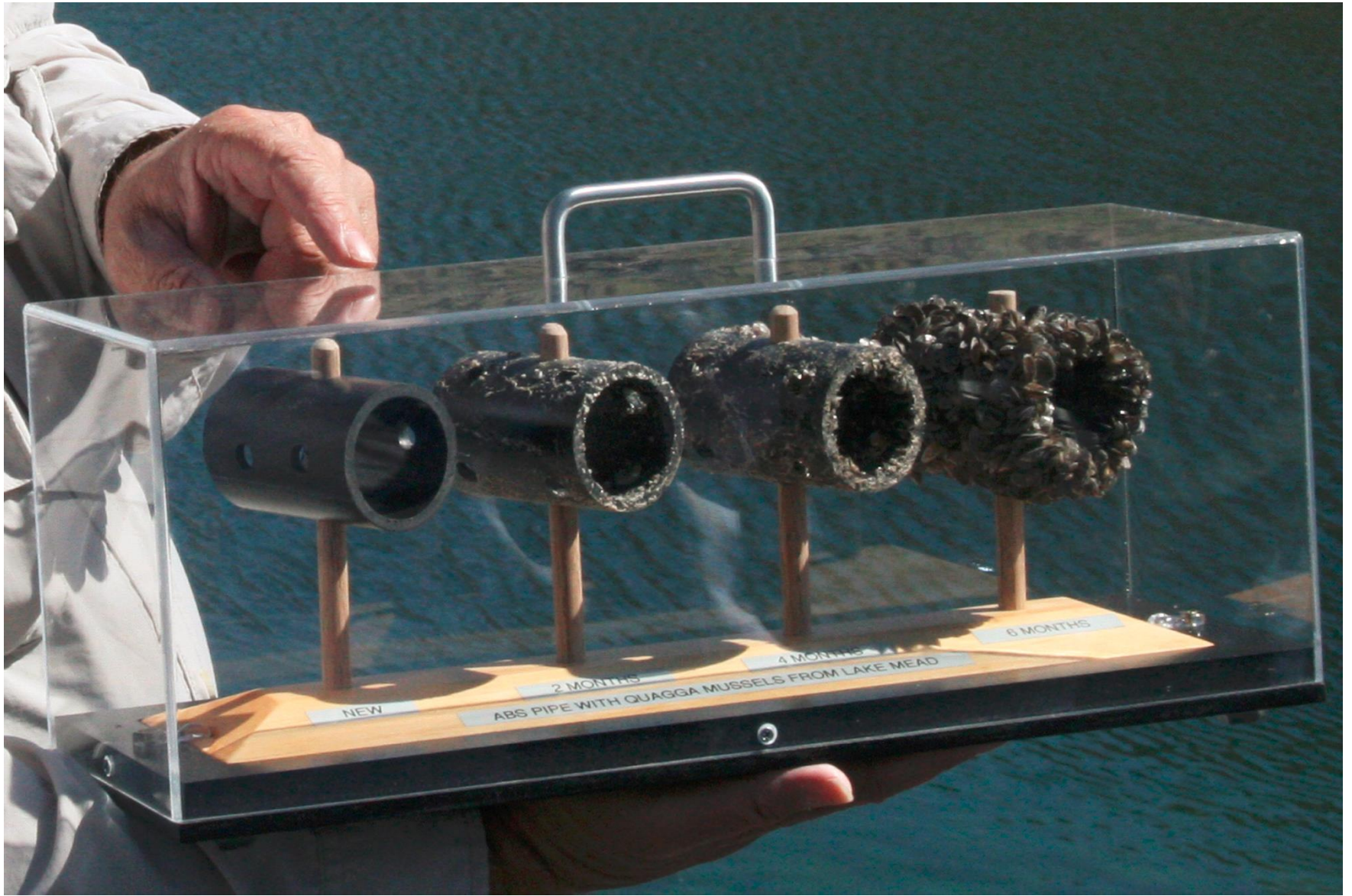
Distinguishing Features Zebra and Quagga Mussels

1. **Small** only up to 3cm / 1 inch
2. Form **dense clumps attached to hard surfaces**
3. **Propeller blade shaped**
4. Zebra stripes often but not always present
5. Tolerate **high water flows** $< 2\text{m/s}$



Native Mussels vs. Zebra and Quagga Mussels

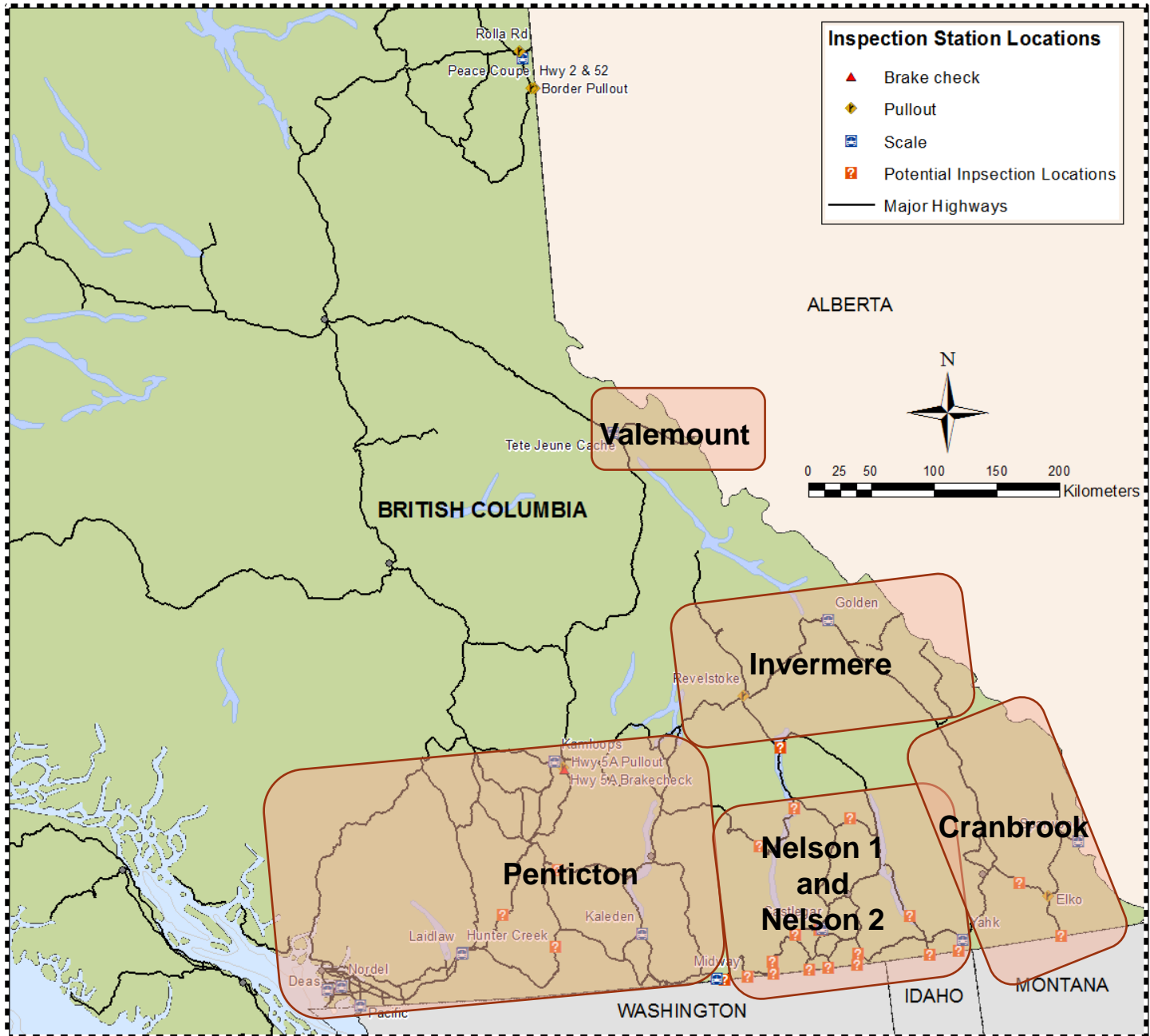




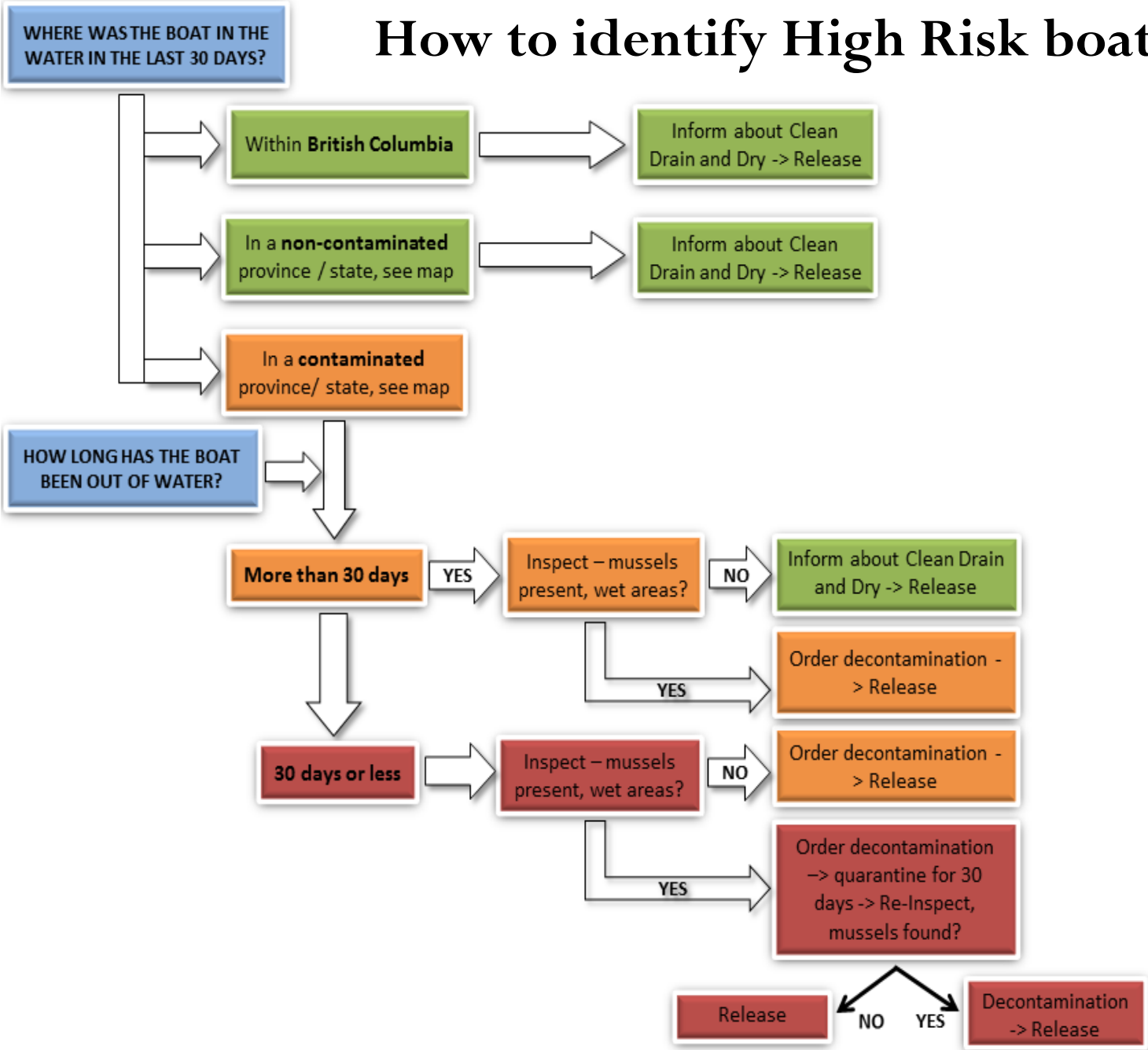
BC's Inspection Crews Priorities 2015

- **Roadside Inspections** – target location and times with highest number of boaters, preferably out of Province, identify suitable inspection locations for permanent stations.
- **Education/Outreach** of the boating community to follow Clean Drain and Dry their boats to prevent AIS spread
- **Collaboration**– other government agencies, Conservation Officers, Commercial Vehicle Safety and Enforcement (CVSE), Canada Border Services Agency (CBSA), Fisheries Officers, Park Rangers, Natural Resource Officers.





How to identify High Risk boats ?



Watercraft Inspection

See the 100th Meridian Initiative website inspection and decontamination video

<http://www.youtube.com/watch?v=JX8TmwTx-tU>



HIGH RISK (ANS) INSPECTION FORM

For use on High Risk Trailered Watercraft

Inspection Location: _____ Date/Time: _____ Water Code: _____

Vessel Registration# (CLF): _____ Vehicle Tag #: _____ Trailer Tag #: _____

REASON FOR HIGH RISK INSPECTION (check all that apply)

- Out of state registered or used out of state within last 30 days.
- Been in infested waters within last 30 days: _____ (Name/State of water). Days since in infested: _____
- Leaving infested waters after more than 24 hours at an infested reservoir
- Big/Complex boat Standing water present Vol Request Dirty/Crusty/Slimy below waterline
- Entering/Leaving marina Other: _____

VESSEL INSPECTION (Inspect very methodically and carefully)

Overall look and feel of the hull (check box):

- Clean/Smooth Bumpy/Sandpaper feel Other: _____
- (if bumpy/sandpaper feel, then look at bumps with magnifying glass to see if mussels)

Vessel Exterior Checked

- Entire hull Trim tabs (top and bot.) Through hull fittings **Soilboats:**
- Transom Transducers Pitot tubes Centerboard box
- Anchors and ropes Depth sounders Water intakes/Outlets Rudder and transom
- Water holding pockets Recessed bolts PWC—foot recesses Keel
- Motor well Cavitations plate(s) Lights Fittings

Motor Checked

- Exterior housings Propeller and assembly Propeller shaft Prop., shaft supports Propeller guards
- Rudders Propulsion system Lower unit Gimbel area Water intake/Outlets

Trailer Checked

- Rollers, bunks, pads License plate Trailer lights Trailer wiring Trailer axels
- Trailer springs Fenders Pockets and hollows Wheels and tires Hangers

Interior/Equipment Checked

- Bait and live wells Internal ballast tanks PFD's Float cushions/belts Rope and equipment lockers
- Anchors Waterfowl decoys Nets Water skis and ropes Other equipment

Vessel Thoroughly Drained

- Bilge plug or pump Bait and live wells Ballast tanks Drain lower unit on outboard
- Drain inboard motors fully by pulling plugs. Drain water cooled generators, swamp coolers with plugs

Large boats, ask driver to activate bilge pump.

If entering a reservoir with any standing water and from infested or out-of-state waters in last 30 days, send to decontamination!

If entering a reservoir with standing water, require draining. If vessel cannot be drained and has more than 5 gallons, send to decontamination. For lesser volumes of water, assess risk to determine whether to decontaminate.

If leaving, drain and educate about Clean/Drain/Dry.

Closeout (if nothing is found)

- Ask owner to replace bilge or other plugs Yell "stand clear" Thank them for cleaning/draining/drying

VESSEL INSPECTION FINDINGS (check all that apply)

- Did not find any identified or suspected ANS species
- Found: Large volume of water Suspected ANS in water Mussels Vegetation
- Other: _____ Location(s): _____

INSPECTION COMPLETED IN ACCORDANCE WITH STATE PROCEDURES:

Inspected by (print # and name): _____

Inspected by (signature): _____

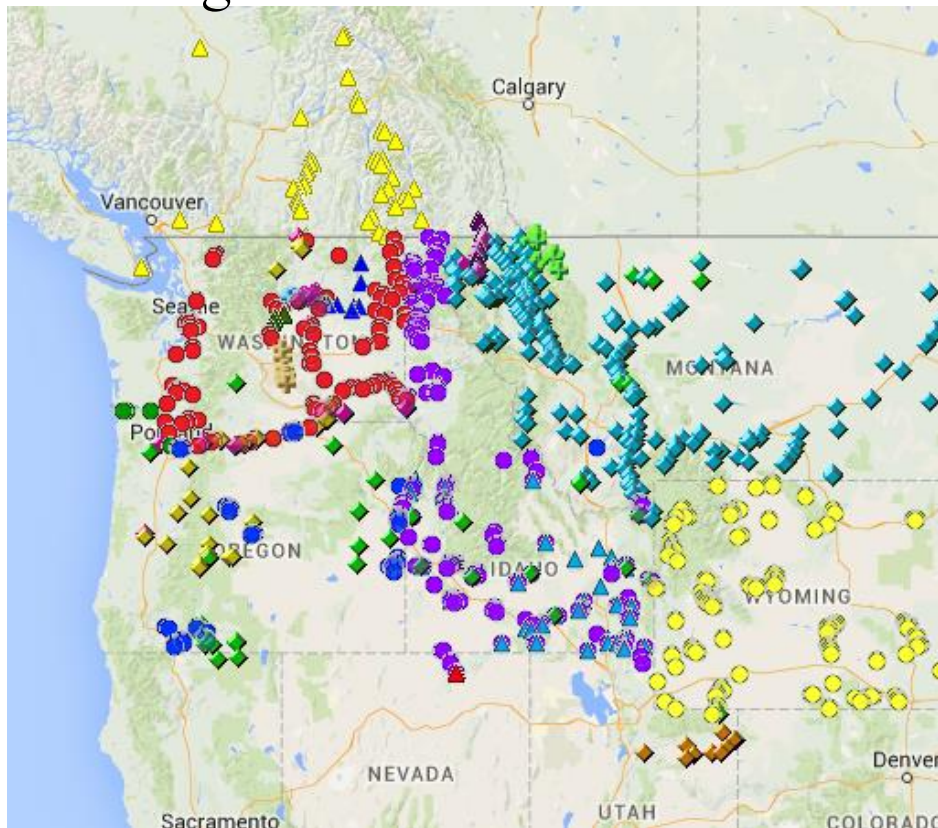
Inspection Crew Data

- As of September 20th over 3,800 watercraft inspected across all 6 inspection crews.
- 64 were high risk watercraft (coming from an infested province or state).
- Inspection crews will be operational until October 31st 2015.

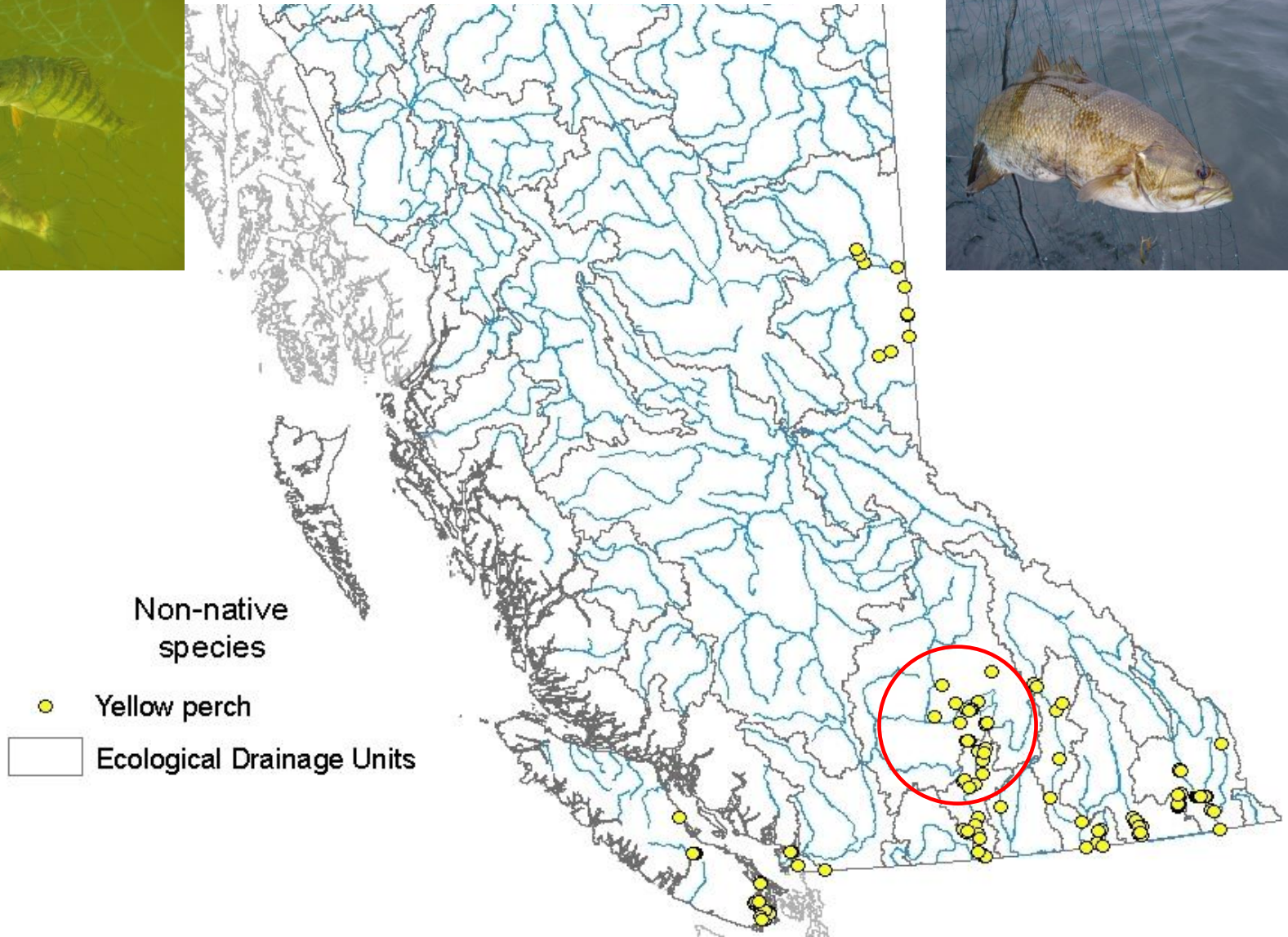


2015 Mussel Veliger Monitoring

- Expanded monitoring this year with plankton tow samples being collected by regional committees and ministry staff in lakes across the Lower Mainland, Vancouver Island, Okanagan, East and West Kootenays, Columbia-Shushwap and Cariboo regions.



Intentional illegal introductions – Yellow perch and Smallmouth bass



Eradication of Yellow Perch in Central BC

- Introductions into small lakes in the Thompson drainage
- Spread into major salmon rearing systems like the Shuswap and Adams Lake are a major concern
- Eradication conducted using plant based fish poison (Rotenone)
- Project cost over one million \$ over 4 years
- All nine lakes completed, ongoing monitoring in collaboration with DFO

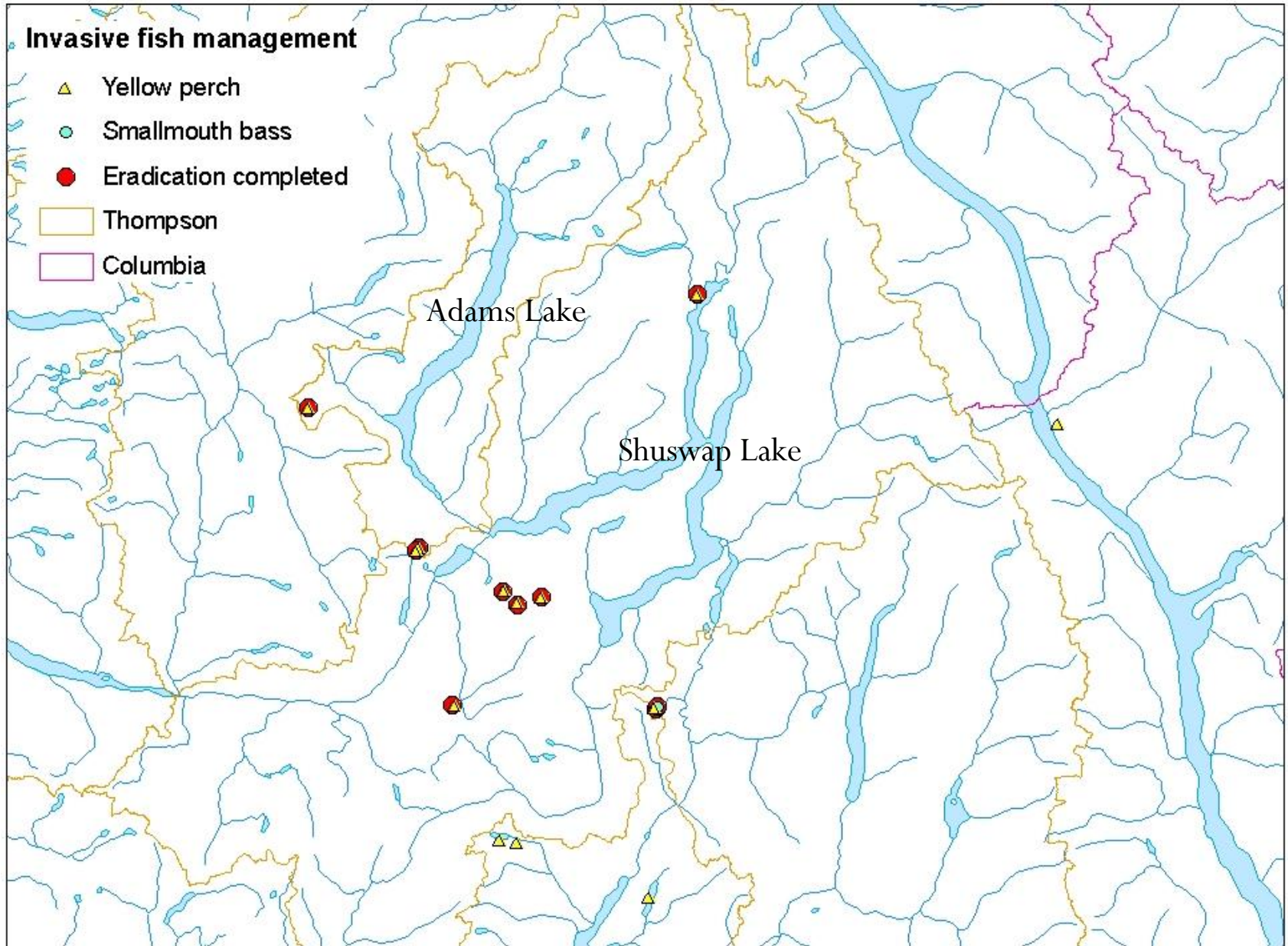


Illegal Stocking Time Line

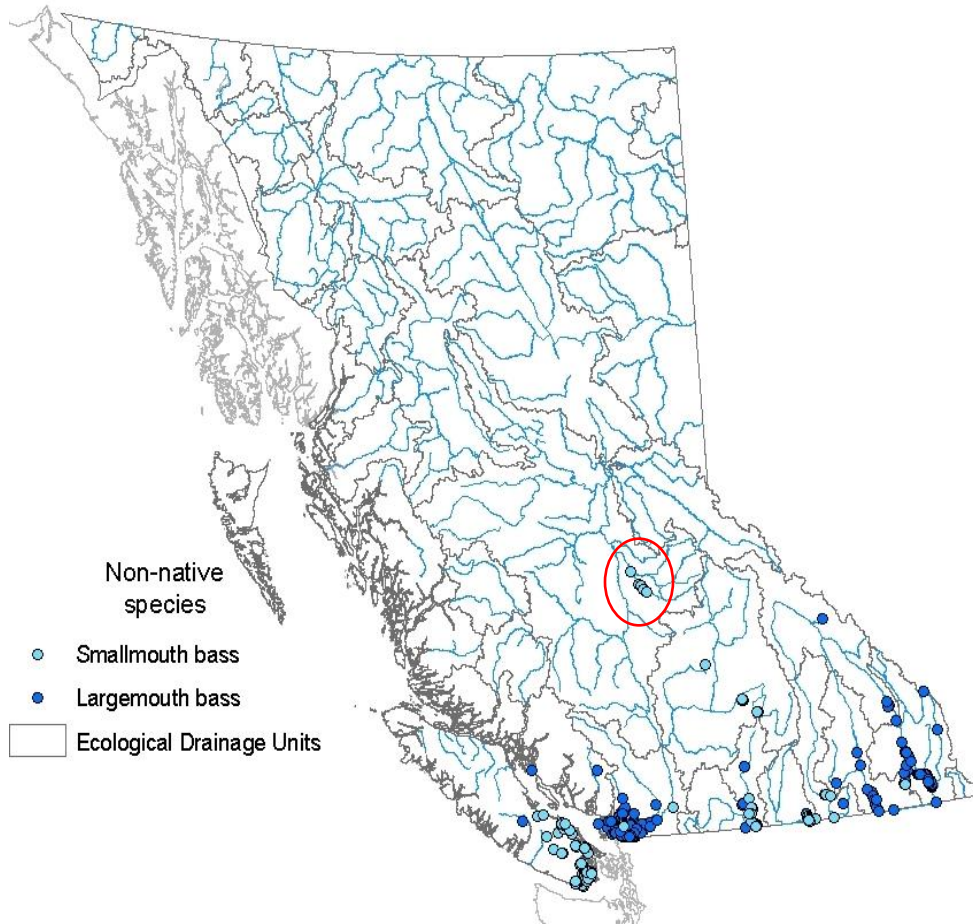
- 1996 - Gardom Lake (Yellow Perch, Smallmouth)
Little Skmana Lake (Yellow Perch)
Skmana Lake (Yellow Perch)
- 1998 - Phillips Lake (Yellow Perch, Sunfish, Largemouth, Smallmouth)
- 1999 - Nellies Lake (Yellow Perch)
- 2005 - Forest Lake (Yellow Perch)
Miller Lake (Yellow Perch)
Skimikin Lake (Yellow Perch, Sunfish)
Fleming Lake (Yellow Perch, Sunfish)



Yellow Perch Eradication

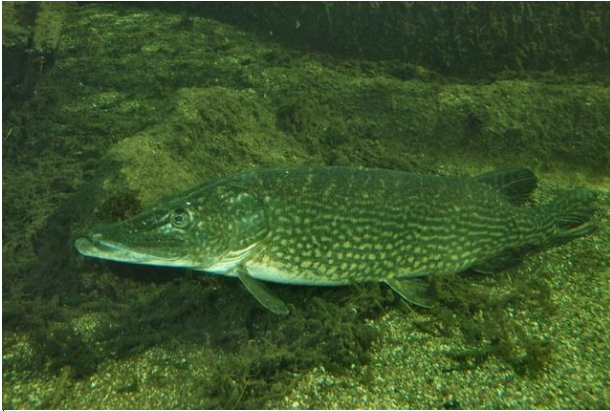


Intentional illegal introduction - Smallmouth bass Beaver Creek

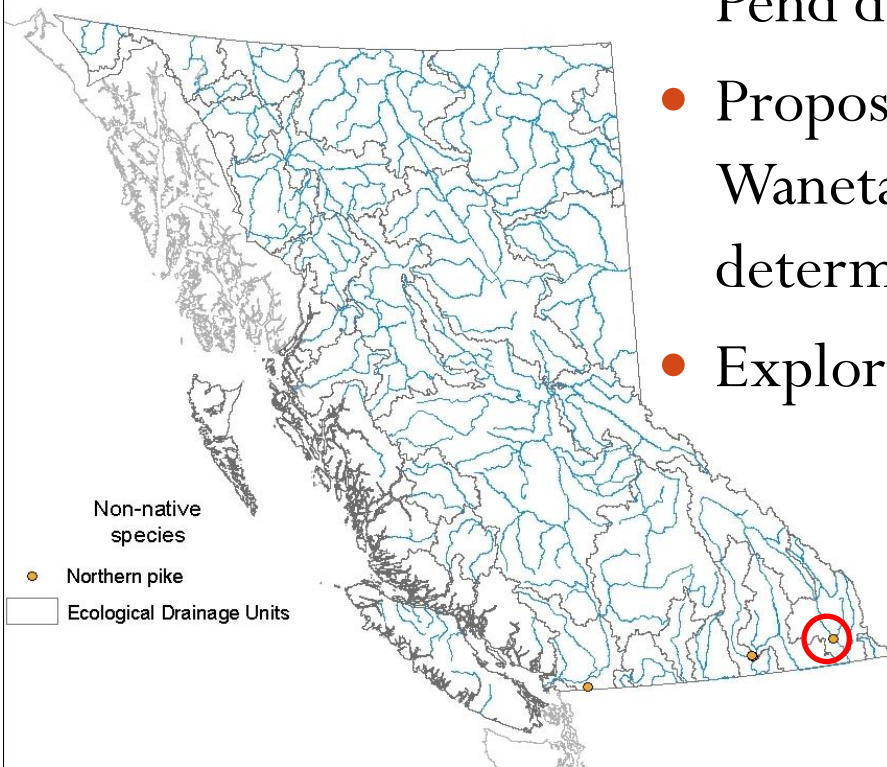


- Upstream barrier work is completed, closing 60% of watershed to upstream dispersal
- Bass population still at a high level
- Downstream barrier is currently being assessed
- Treatment is estimated to cost \$5 Million

Northern pike



- Northern pike was removed from Haha Lake in 2006 through intensive gill netting, follow up in 2011
- Northern pike is getting closer through the Pend d'Oreille system
- Proposal to test spring gill netting in the Waneta and Seven Mile Reservoir to determine the spread
- Exploring eDNA as a detection method



Summary

- Provincial Invasive Mussel Defence Program has had a busy year.
- Inspection crews will remain operational until the end of October
- Veliger sample analysis is underway and will continue into the fall/winter as samples continue to be collected.
- Northern pike research being conducted in the Columbia River system.





Questions?

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