



Aquatic Invasive Species Prevention in the Western Provinces



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Zebra and quagga mussels impacts

- Major concern for lake rearing fish like sockeye and kokanee and listed native mussels in BC
- Hydro facilities are heavily affected
 - 90% of BC's power is hydroelectric
- Property values and tourism BC, AB, SK
- Mussels clog agricultural irrigation intakes, channels and ditches, municipal water supplies BC AB SK

ZEBRA MUSSEL

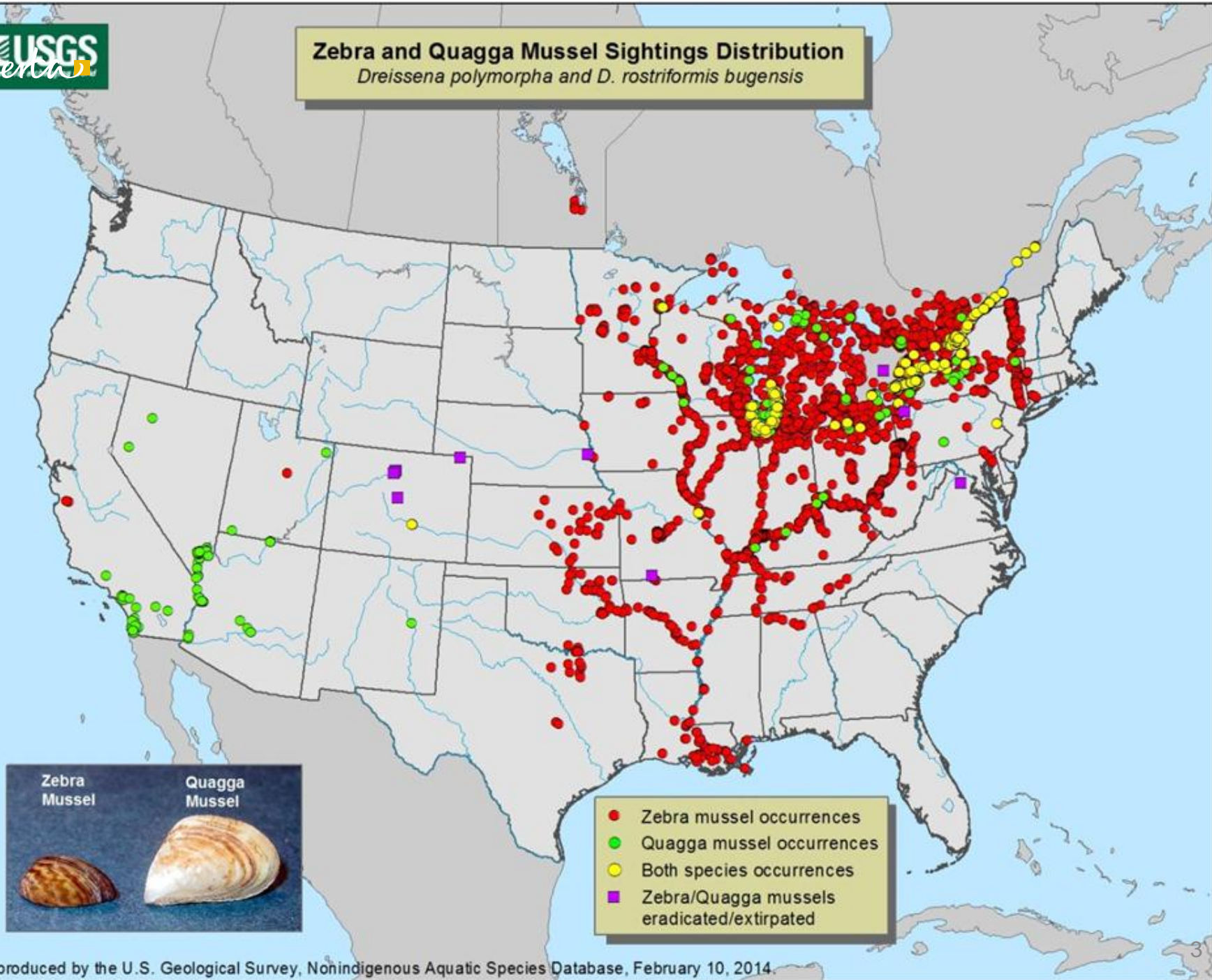


QUAGGA MUSSEL



Zebra and Quagga Mussel Sightings Distribution

Dreissena polymorpha and *D. rostriformis bugensis*

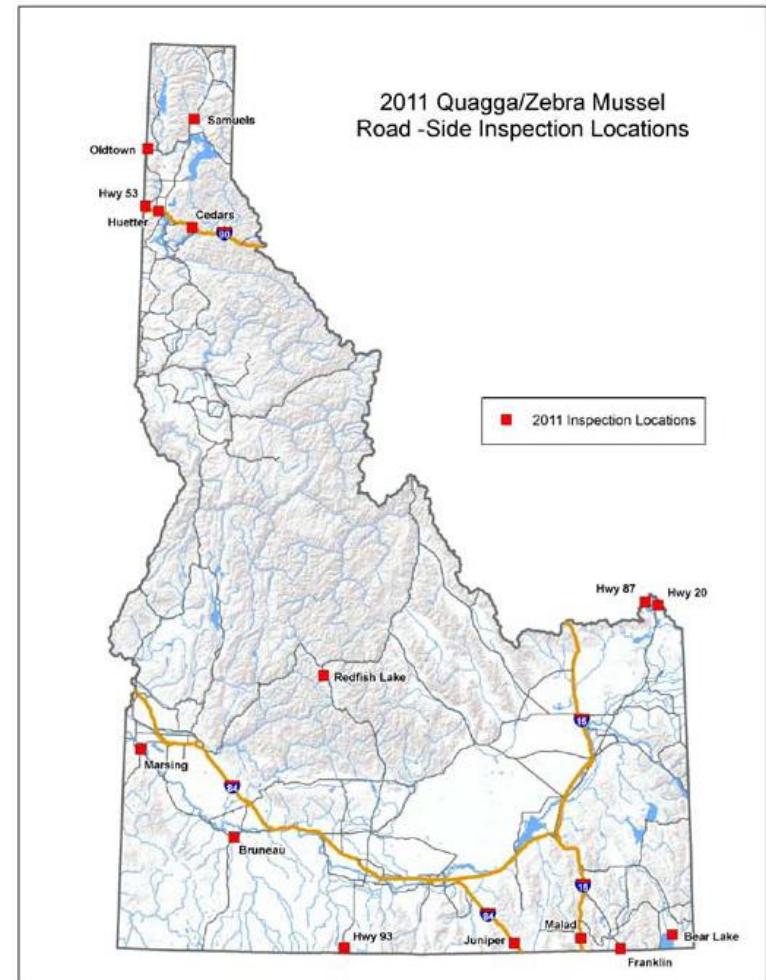
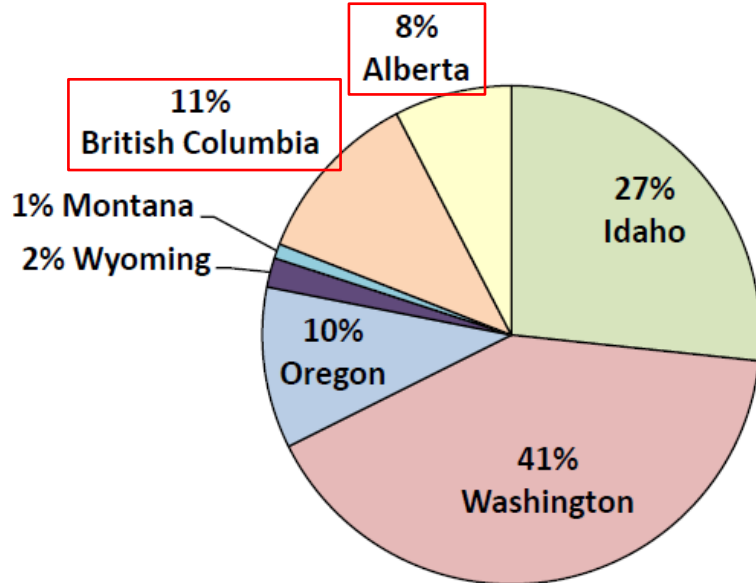


- Zebra mussel occurrences
- Quagga mussel occurrences
- Both species occurrences
- Zebra/Quagga mussels eradicated/extirpated

Boat inspection programs - Idaho

- Most intensive inspection programmes in Idaho and Montana
- Idaho inspected in the last 5 years almost 200'000 boats
- Intercepted 105 vessels with zebra and quagga mussels 2009-2013, 11% to BC, 8% to AB

Mussel Fouled Vessel Destinations 2009-2013



Prevention in western Canada

| | British Columbia | Alberta | Saskatchewan | Canada (federal) |
|----------|-------------------------|----------------|---------------------|-------------------------|
| Outreach | Yes | Yes | Yes | Yes |

Outreach efforts

Shared messaging across the western provinces, and the Pacific Northwest **Clean, Drain, Dry**



Aquatic invasive species (AIS) threaten aquatic habitats, fisheries and valuable recreational resources. They can spread through water and by attaching to watercraft, related equipment and gear, and aquatic plants.

HOW YOU CAN HELP: **CLEAN, DRAIN, DRY**



ATTENTION BOATERS
PROTECT OUR WATERS FROM INVASIVE SPECIES

On land, before entering the water, please:

- CLEAN** off plant parts, animals and mud from boat and equipment (e.g. boots, waders, fishing gear). Use a power wash station if available.
- DRAIN** onto land all spaces or items that can hold water (e.g. buckets, wells, bilge and ballast).
- DRY** all items completely before launching into another body of water.

ONLY YOU CAN STOP THE SPREAD OF INVADERS

Hydrilla forms mats
Zebra mussels attach to boat hull
Callitriche covers river beds

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| Legislation | Yes | Yes | Yes | Pending |

Aquatic Invasive Species Regulation - Federal *Fisheries Act*

- Proposing to:
 - Prohibit importation, live transport and possession of Asian carps (in Canada) and Zebra/Quagga mussels (in western Canada)
- Would create a federal law that CBSA could enforce – reduce inspection stations along southern border
- Current timeline aims for Fall 2014
- Legislation developed through the National Aquatic Invasive Species Council (DFO – Prov)

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| Legislation | Yes | Yes | Yes | Pending |
| Rapid Response | In process | In process | No | No |

BC Provincial EDRR Plan

EARLY DETECTION

STEP 1

Early detection
Notification
Preliminary ID

Make initial notification
Activate organizational
elements

IDENTIFICATION

STEP 2

Confirmation of ID

Verify reported
introduction

ALERT SCREENING

STEP 3

Species legislated in BC

Risk assessment,
economic impact
reports complete

Define extent of
colonization
Establish external
communications
Obtain and organize
resources
Prevent further spread
Initiate control actions

RISK ASSESSMENT

STEP 4

Defining extent of
colonization
Prevent further spread
Eradication/control
efforts

RAPID RESPONSE

STEP 5

MONITOR & REASSESS

STEP 6

Long term monitoring
Adaptive management

Institute long-term
monitoring
Evaluate response and
plan

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| Impact Assessments | Economic& Environ | Economic | No | Environ |

Alberta – Estimated annual costs

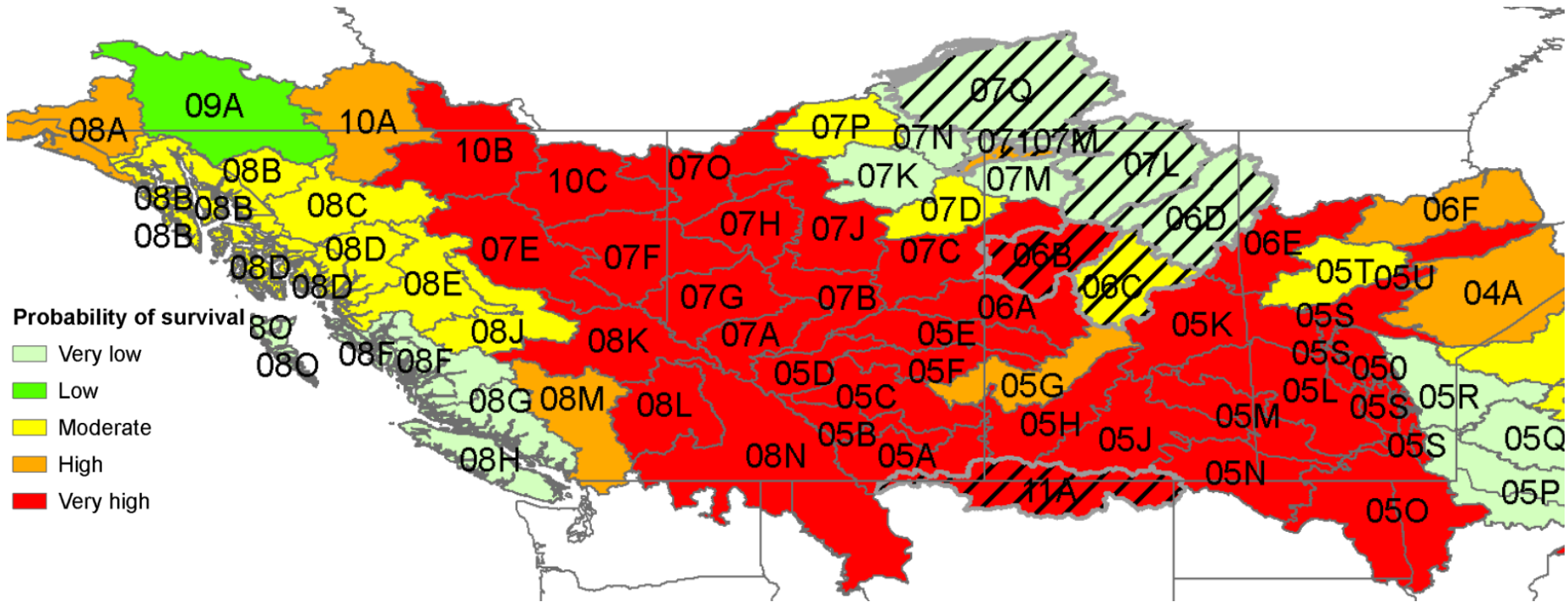
| <i>Impact category</i> | <i>Annual cost</i> |
|------------------------------------|----------------------------|
| Power generation | \$5,938,487 |
| Drinking water systems | \$20,839,921 |
| Boat maintenance | \$390,600 |
| Recreational fishing | \$21,830,892 |
| Water management structures | \$8,841,373 |
| Water diversion intakes | \$3,910,000 |
| Property value | \$13,789,500 |
| Non-use | No quantified at this time |
| Total annual cost estimated | \$75,540,773 |



British Columbia – Estimated annual costs

| | | |
|----------------------|----------------|---------------------|
| Costs to hydropower | \$612/MW | \$6,500,000 |
| Water supply | \$44-154K | \$9,300,000 |
| Recreational boating | \$578 per boat | \$12,300,000 |
| Fisheries values | | not assessed |
| Tourism | | not assessed |
| Property value | | not assessed |
| Total | | \$28,100,000 |

Environment



- Western Canada DFO risk assessment for zebra and quagga mussels
- Zebra mussel suitability based on calcium concentrations for BC

Prevention in western Canada

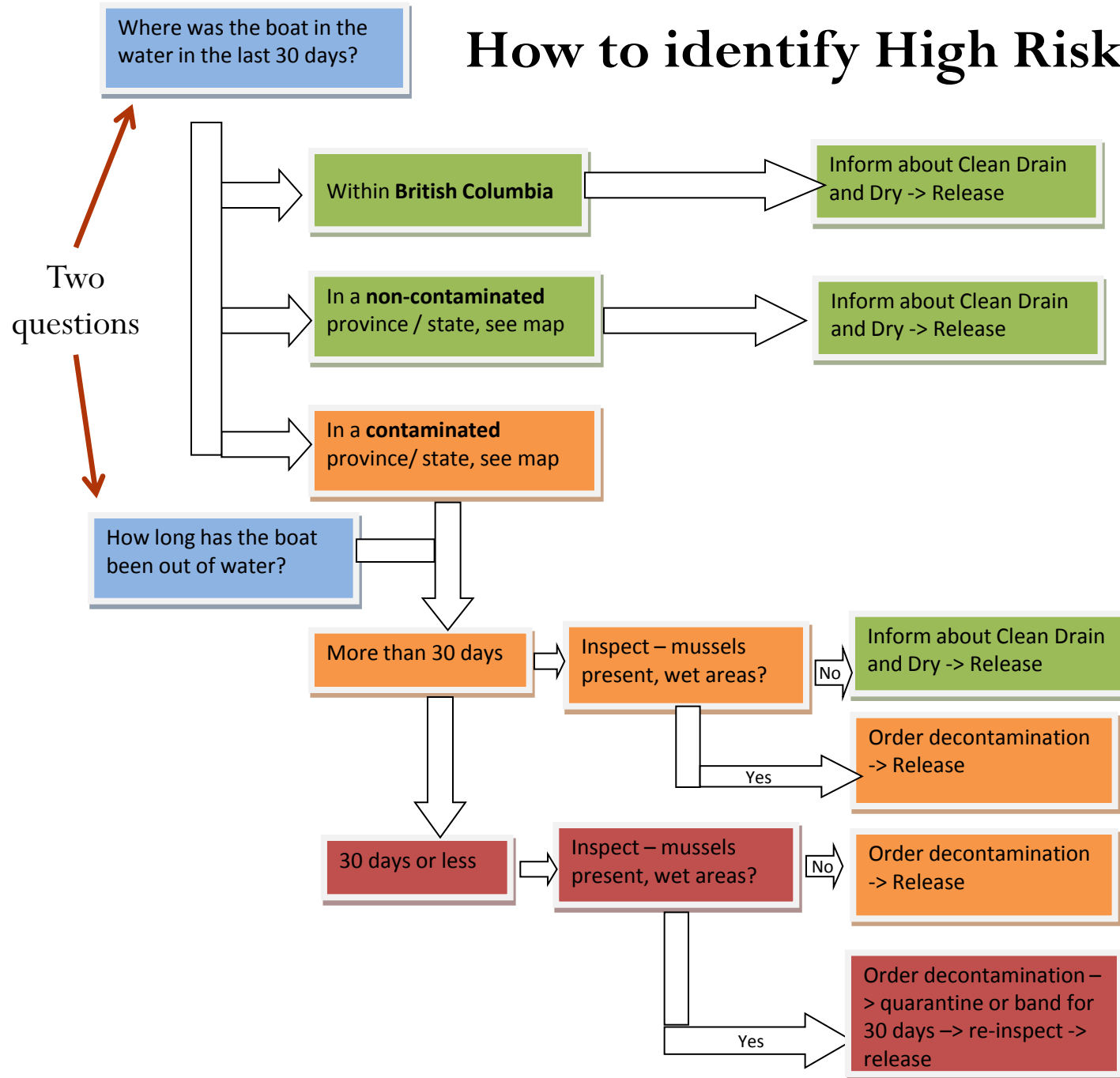
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| Training | Yes | Yes | Yes | No |
| Monitoring | Yes | Yes | In process | No |
| Inspections | Pilots | Yes | Pilots | No |

Training

- Training of enforcement staff is taking place across western Canada
- Protocols and training for inspections and decontamination
- Training: provincial natural resources enforcement staff (COS), some Federal Fisheries Officers, some CBSA officers

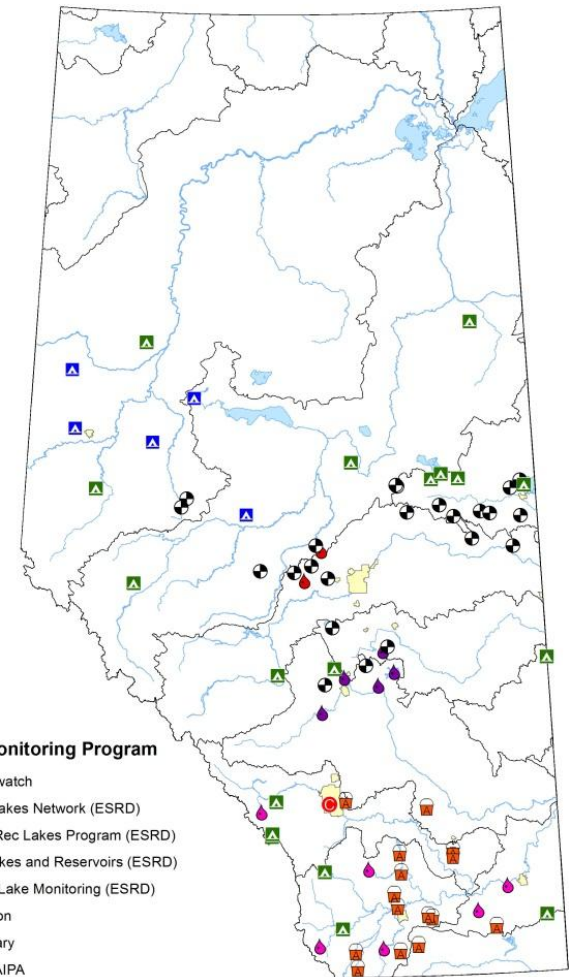


How to identify High Risk boats ?



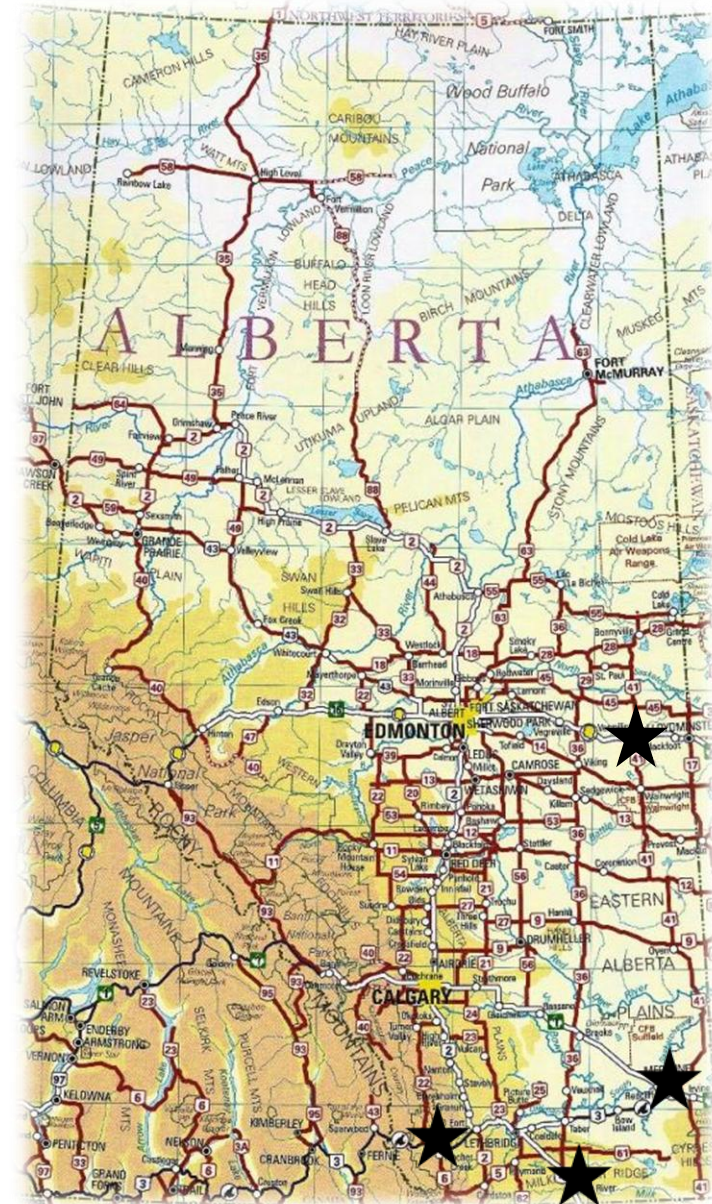
Monitoring

Monitoring protocols are standardized across the PNW including Alberta and BC



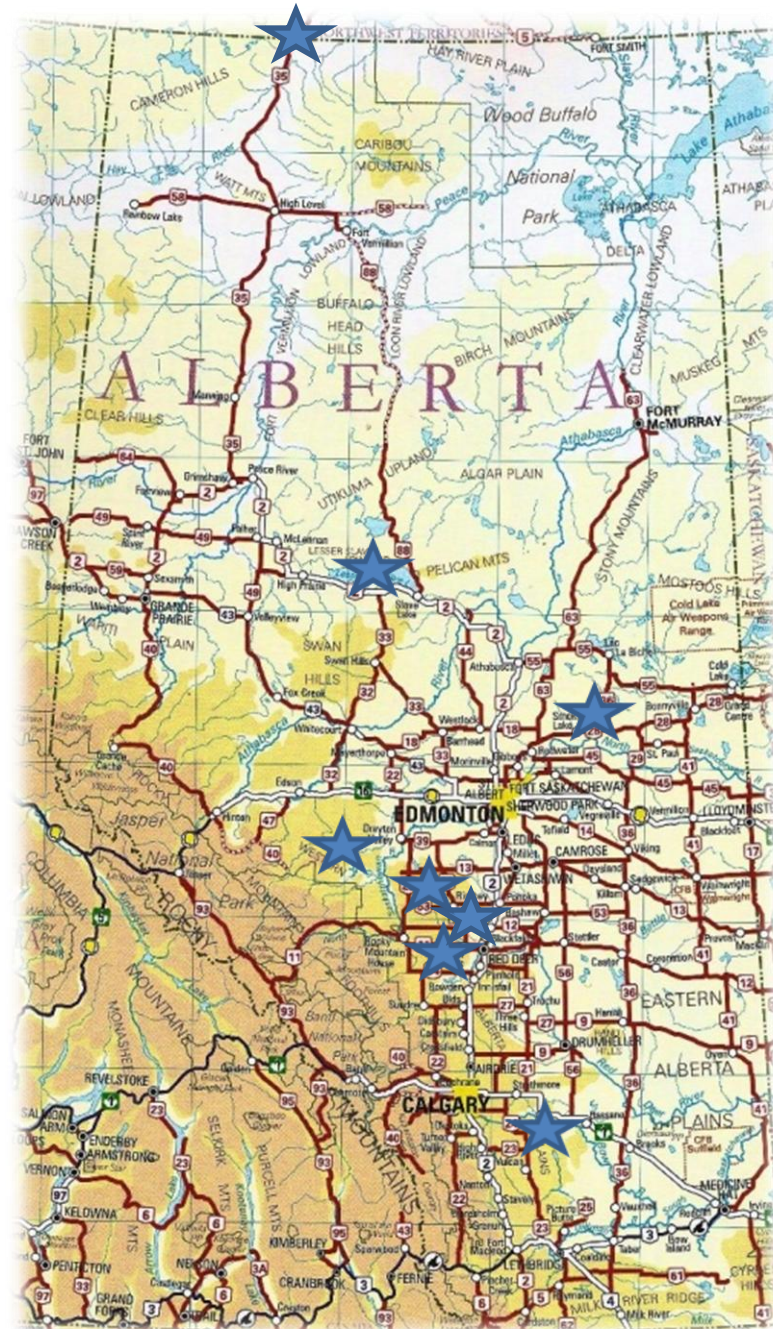
Alberta – Watercraft inspections

- Focus on eastern highways
 - Crowsnest Pass (Hwy 3)
 - Coutts (Hwy 4)
 - Dunmore (Hwy 1)
 - Vermillion (Hwy 16)
- Piloting use of commercial vehicle scales
- Modeled after inspections in western states
 - Major highways
 - Temporary/seasonal staff
- Voluntary until legislative provides for compliance



Destination of intercepted boats

1. Sylvan Lake
2. Pigeon Lake
3. Gull Lake
4. Wabamun Lake
5. Slave Lake
6. Whitefish Lake
7. Hay River
8. Chestermere Lake



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Collaboration in western Canada

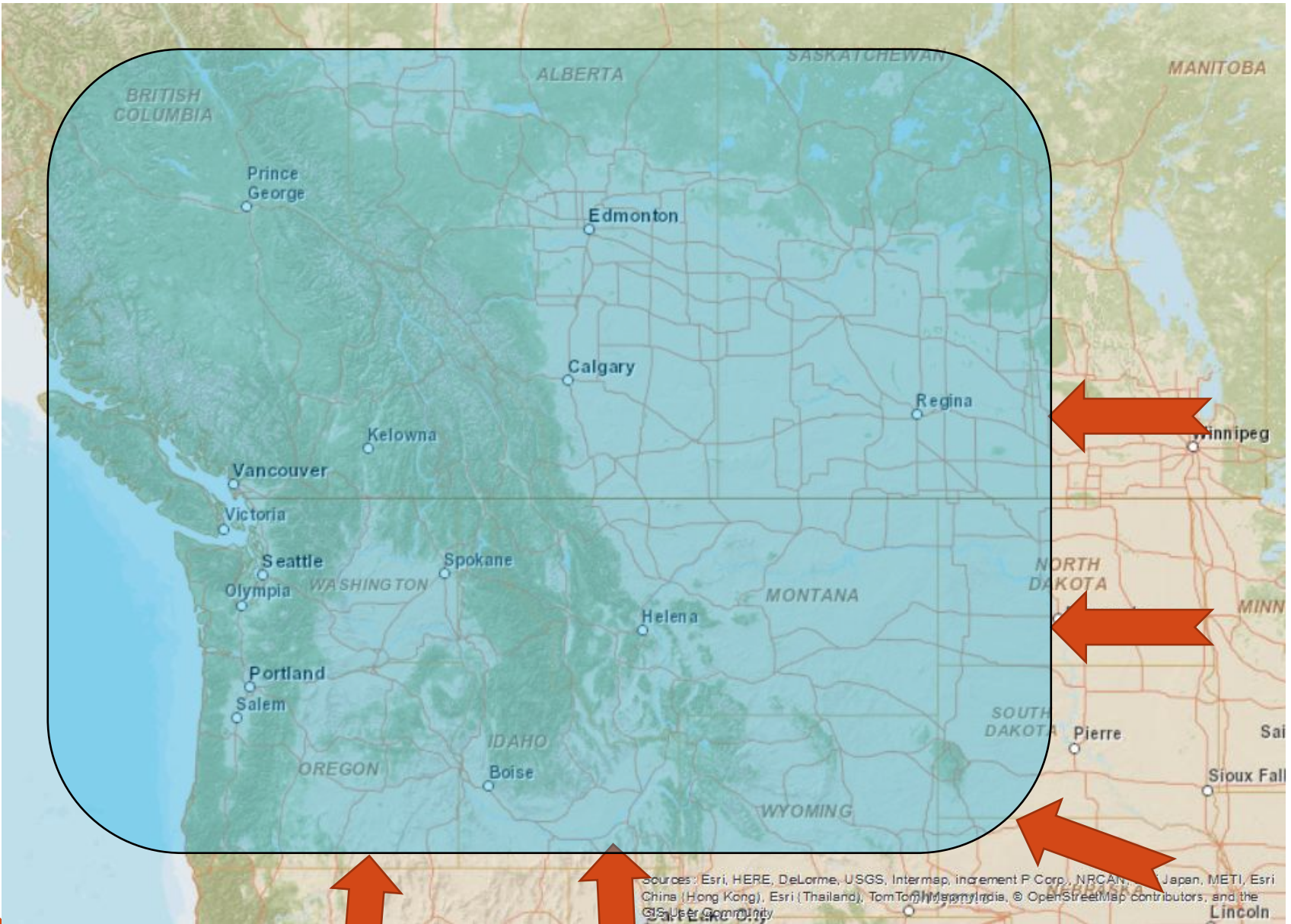
- Shared protocols and training for monitoring, inspection, decontamination and rapid response
- Coordination of programs for inspection, and outreach
- Notification and information sharing of high risk boats
- New West Partnership

Building a regional defence

- Right timing for regional prevention program
- Federal support for joint funding request
- A regional defence would be built on the existing collaborations and coordination
- Focus to increase the perimeter defence AND each province's program

Building a regional defence

- Increased monitoring across western Canada
- Public education in the region
- Expand existing boat inspection programs within the provinces AND on our eastern edge – in coordination with the US
- Create capacity to support CBSA staff with boat inspections and decontamination
- Enhance our rapid response tools by working with pesticide regulators
- **When boaters to Clean, Drain, Dry we prevent not only mussels but the majority of other aquatic invasive species**



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri, Japan, METI, Esri, China (Hong Kong), Esri (Thailand), TomTom, NextGIS, OpenStreetMap contributors, and the GIS User Community

Conclusion

- Zebra and quagga mussels are high risk invaders with an expectation by the public for a government response
- Boaters do not have access to proper decontamination equipment
- Moving towards a regional defence strategy would greatly increase our effectiveness
- The western Provinces are at the strategic right time to establish perimeter defence
- Collaboration and coordination is already in place

Questions



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