

ADVANCING A REGIONAL DEFENSE AGAINST DREISSENIDS AND AQUATIC INVASIVE SPECIES IN THE PACIFIC NORTHWEST

August 25, 2015

Council of State Governments West
Legislative Council on River Governance
Kalispell, Montana

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Creative Resource Strategies, LLC



"Unity is strength . . . When there is teamwork and collaboration, wonderful things can be achieved."
– Mattie Stepanek

AQUATIC INVASIVE SPECIES

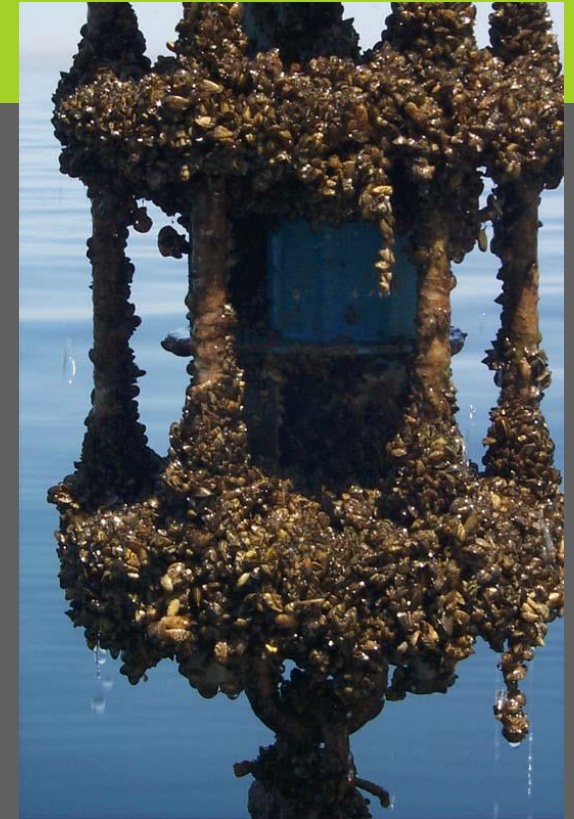
- **Nonindigenous species** that threaten:
 - Diversity or abundance of native species
 - Ecological stability of infested waters
 - Commercial, agricultural, aquacultural or recreational activities
- **Pathways and vectors**
 - Recreational watercraft, commercial vessels, maritime shipping, seaplanes, firefighters, water gardeners, recreationists, pet/aquarium husbandry



Bullfrog. Photo credit: ODFW; Quagga mussels. Photo credit: National Park Service; Nutria. Photo credit: ODFW; Spartina. Photo credit: Portland State University

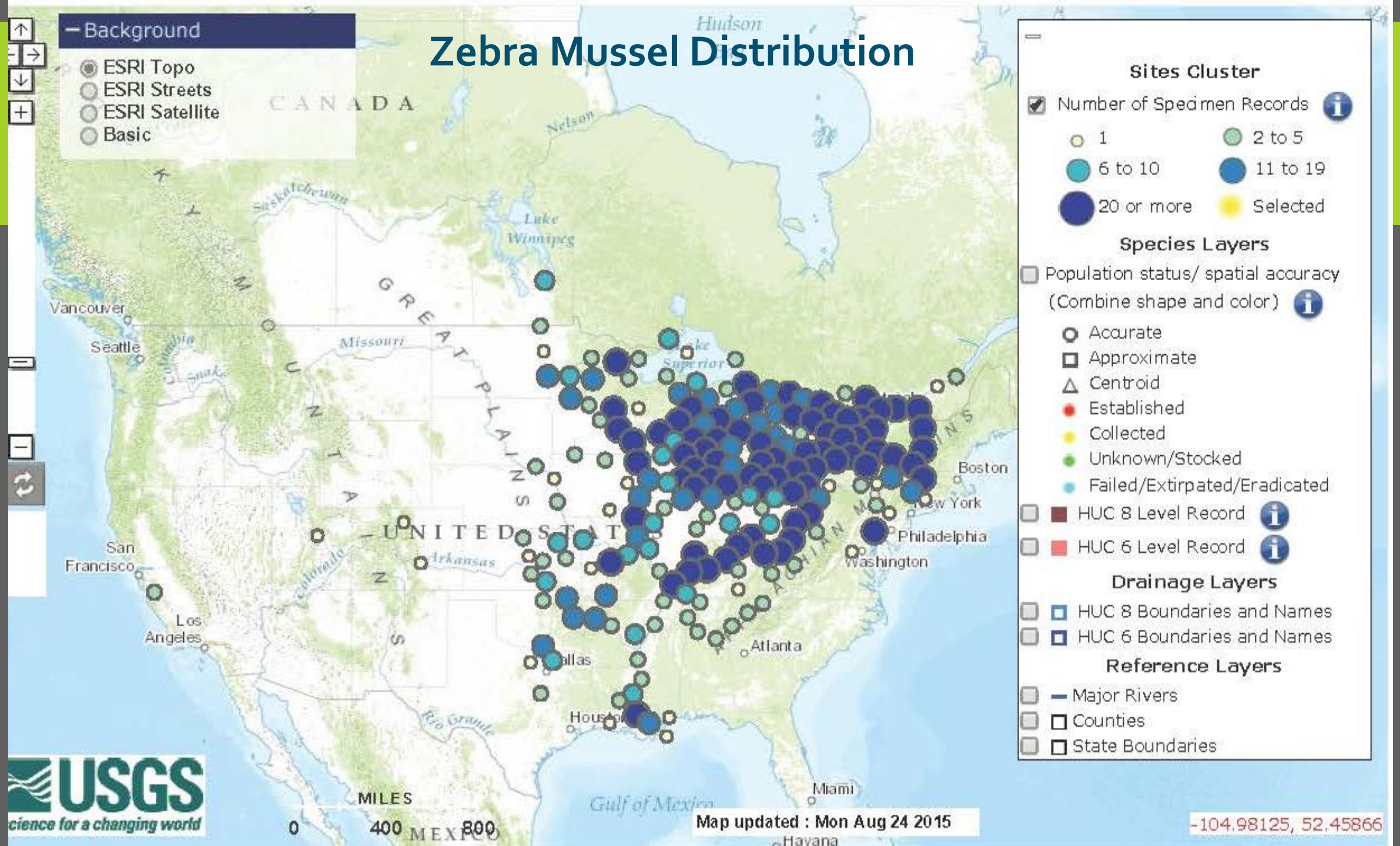
DREISSENIDS (*ZEBRA AND QUAGGA MUSSELS*)

- Zebra mussels
 - Native to the Black, Caspian, and Azov Seas
 - First discovered in North America in 1988 in the Great Lakes
- Quagga mussels
 - Native to Ukraine
 - First discovered in the Great Lakes in 1989
- Both species cause significant changes to water bodies
 - Physical alterations
 - Declining fish health
 - Elimination of native mussels
 - Promotion of benthic algae and harmful algal blooms
 - Altered food web
 - Economic damage – water intake pipes, boats, control mechanisms

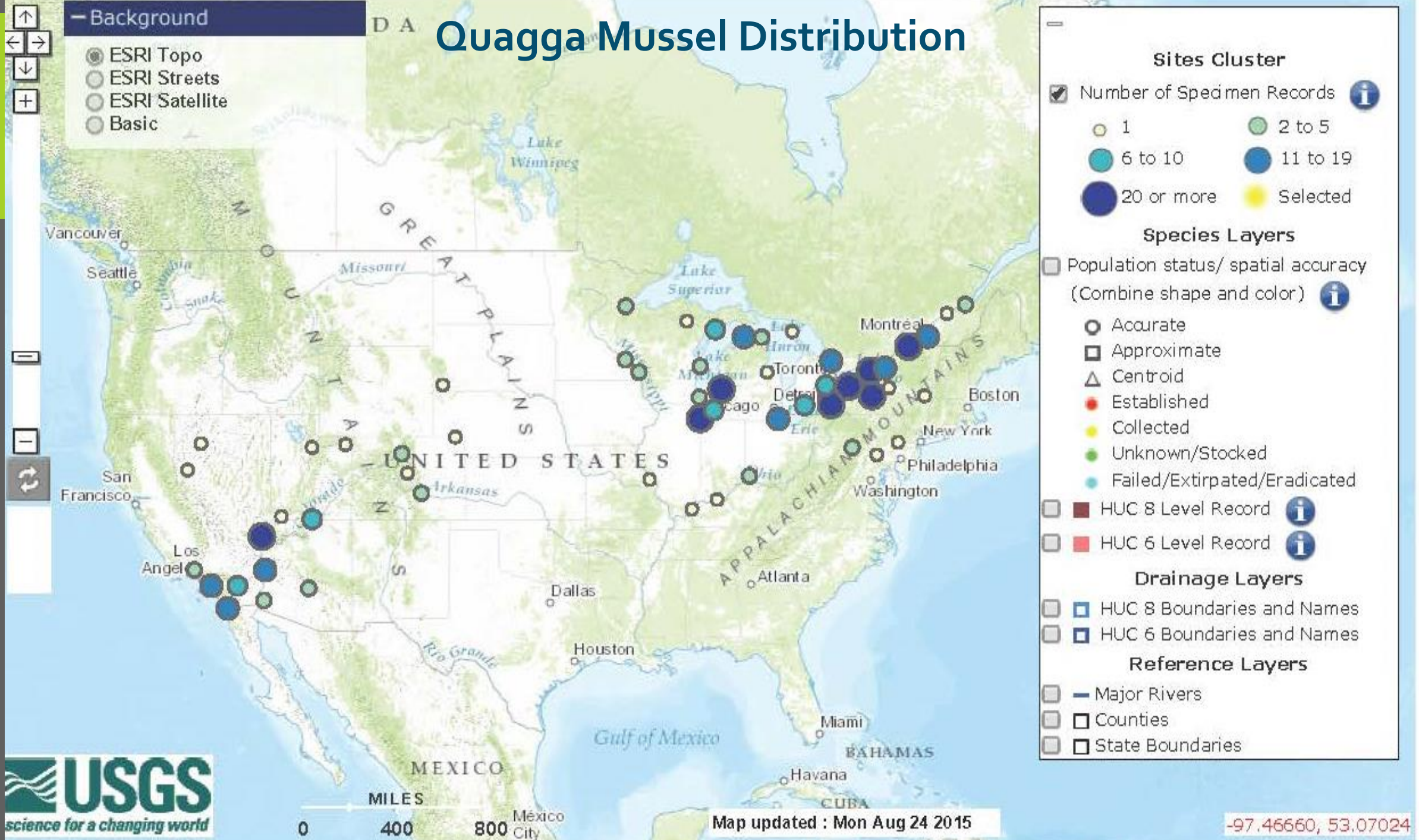


Dreissena polymorpha. Retrieval of zebra mussel-encrusted Vector Averaging Current Meter near Michigan City, IN. Lake Michigan, June 1999. Photo by M. McCormick.

Zebra Mussel Distribution



Quagga Mussel Distribution



PNWER/PSMFC DREISSENID FRAMEWORK

FOUR OBJECTIVES

- Define and describe an effective, efficient, and practical perimeter strategy (framework)—structure, cost, and policy needs.
- Work with stakeholders to assess possible sources of long-term sustainable funding for perimeter defense.
- Provide a high-level estimate of the avoided costs saved by focusing on prevention.
- Produce and distribute the framework to member states/provinces, Congressional delegation, stakeholders, and others.

WESTERN AQUATIC INVASIVE SPECIES EFFORTS

Regional Defense Using resources in a cost-effective, interjurisdictional, coordinated, and collaborative response to prevent mussels/AIS from entering uninfested areas and to contain AIS at their source.



CRB

100TH MERIDIAN INITIATIVE



Goal: A cooperative effort between local, state, provincial, regional and federal agencies to prevent the westward spread of zebra/quagga mussels and other aquatic nuisance species in North America

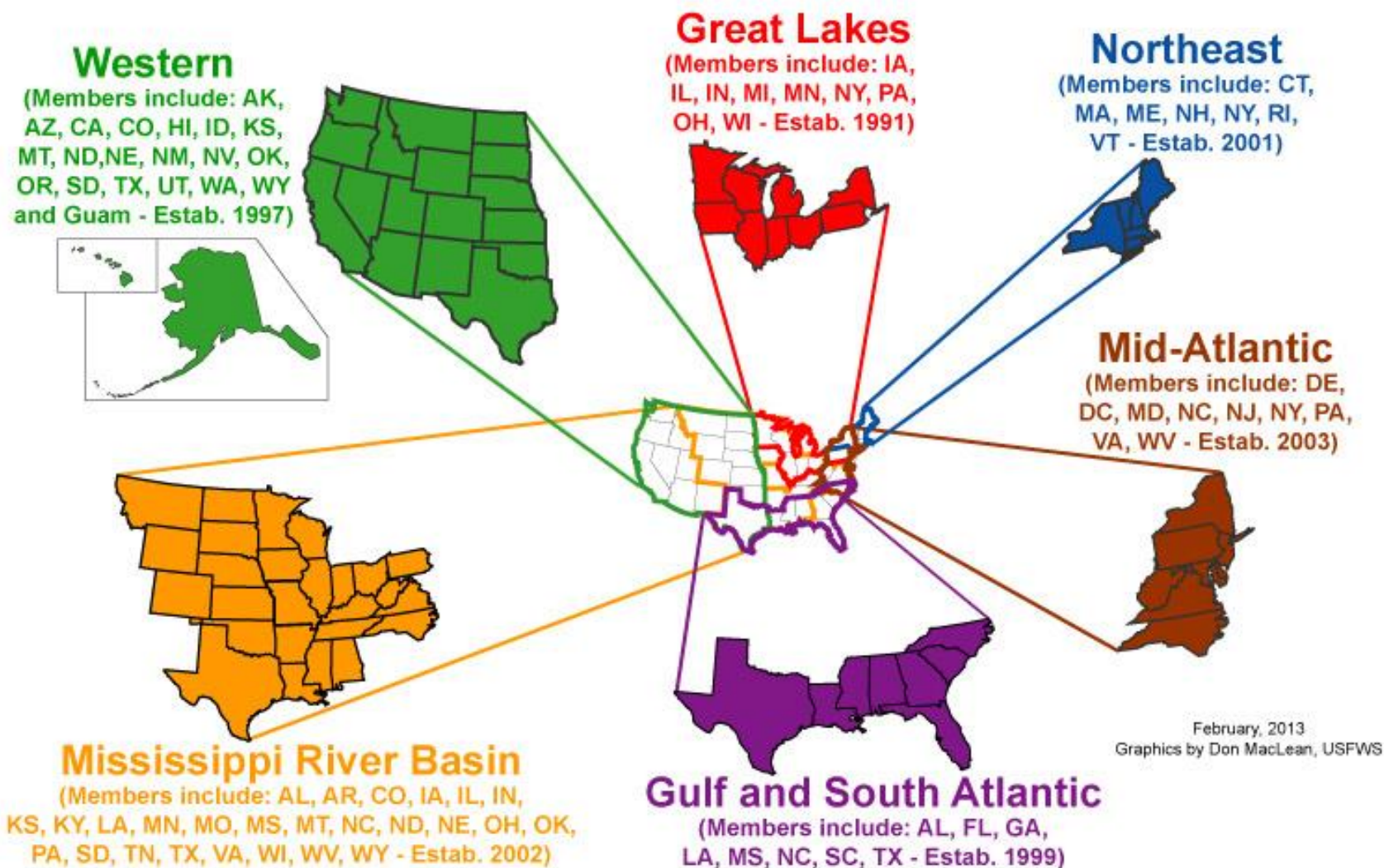
- **Watershed "Teams":** Columbia River Basin and Missouri River Basin Teams are active
- CRB Team Meeting Minutes - http://www.100thmeridian.org/Columbia_RBT.asp
- AIS News - <http://www.westernais.org/>
- Q/Z Monitoring - <http://crbais.psmfc.org/monitoring/monitoring-for-aquatic-animals>
- Rapid Response Plan and Exercises –
http://www.100thmeridian.org/Columbia_RBT.asp for exercise documents and plan

Website: <http://www.100thmeridian.org/> (D. Britton, USFWS)



- Established in 1991 - Collaborates and coordinates AIS activities across jurisdictional boundaries.
- Implements 100th Meridian Initiative
- Funds ANSTF Regional Panels and state ANS management plans
- Quagga-Zebra Mussel Action Plan for Western U.S. Waters
- Development of BMP's
 - Recreational, Water Garden, and Classroom Guidelines
- ANSTF Web Page: <http://www.anstaskforce.gov/default.php>
- HACCP Web Page: <http://www.haccp-nrm.org/>

The Regional Panels of the Aquatic Nuisance Species Task Force



WESTERN REGIONAL PANEL ON ANS

- Protects western aquatic resources by preventing the introduction and spread of non-native invasive or nuisance species into western marine, estuarine, and freshwater systems through the coordinated management and research activities of state, tribal, federal, commercial, environmental, research entities, industries and other regional panels.
- 19 states and 4 Canadian provinces
- Committees: Building Consensus, Coastal, Membership, Recreational Ballast

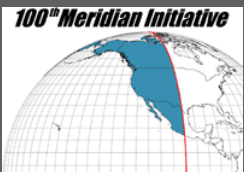


BUILDING CONSENSUS IN THE WEST

WESTERN REGIONAL PANEL COMMITTEE

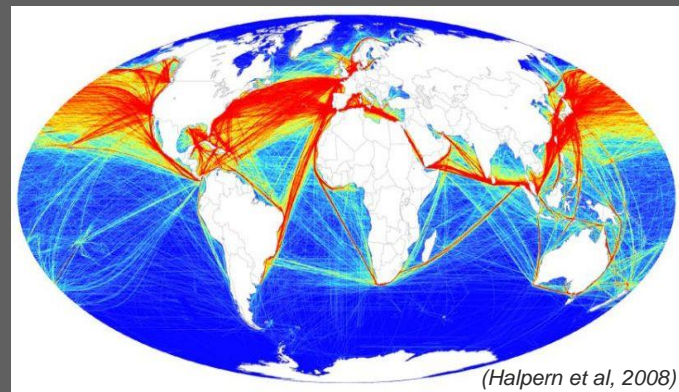


- Working Committee to Protect Uninfested Waters in the West
 - Covers the 19 state footprint of the Western Regional Panel and the 100th Meridian Initiative
- Action Plan to Implement Legal and Regulatory Efforts to Minimize Expansion of Invasive Mussels through Watercraft Movements in the Western United States
- Model Legislative Provisions for State Watercraft Inspection and Decontamination
- Comparison of Existing State Laws to the Model Provisions
- Consensus by Western State AIS Coordinators on Waterbody Classification Standards, Watercraft Inspection & Decontamination Protocols & Training Materials, and Standard Definitions
- Working with American recreational boat manufacturing design engineers on changing standards to decrease spread of invasive species by trailered boats.



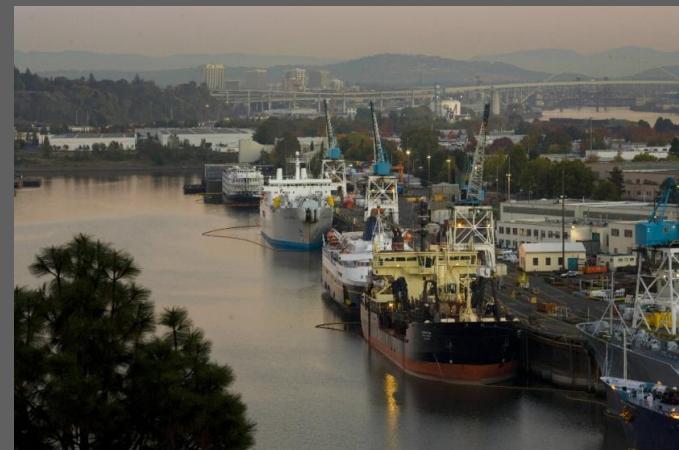
PACIFIC BALLAST WORK GROUP (PBWG)

COORDINATION FOR AIS MANAGEMENT POLICY DEVELOPMENT AND RESEARCH ASSOCIATED WITH WEST COAST SHIPPING ACTIVITIES



- **Mission:** Foster coordination and formulate consensus solutions for management strategies
- **Participating Entities:** States, Feds, Research institutions, maritime industry
 - Mid-Ocean Ballast Water Exchange
 - Vessel inspection, compliance verification, and enforcement
 - Pursuit of safe and practical prevention methods

<http://www.westernais.org>



PACIFIC NORTHWEST ECONOMIC REGION



IV. Pacific Northwest Economic Region

- a. Public/private non-profit
- b. Works across borders
- c. Drafted WGA resolution on funding WRRDA and implementing containment at the source
- d. State capital visits



NORTHWEST POWER AND CONSERVATION COUNCIL



Northwest **Power** and
Conservation Council

- Interstate Compact among 4 NW states (ID, MT, OR, WA)
- Council to prepare a 20-year Power Plan
 - Address hydropower impacts on fish and wildlife
- 2014 Fish and Wildlife Program
 - Reducing threats from **invasive species**, predators, toxic substances and climate change
 - Preventing the establishment of AIS such as Q/Z mussels is a key measure in Program
-
- For more information about the Council, see:
www.nwcouncil.org
- For more information about the F&WL Program, see:
www.nwcouncil.org/fw/program/2014-12/Program

Columbia
River Basin
Fish and Wildlife
Program 2014

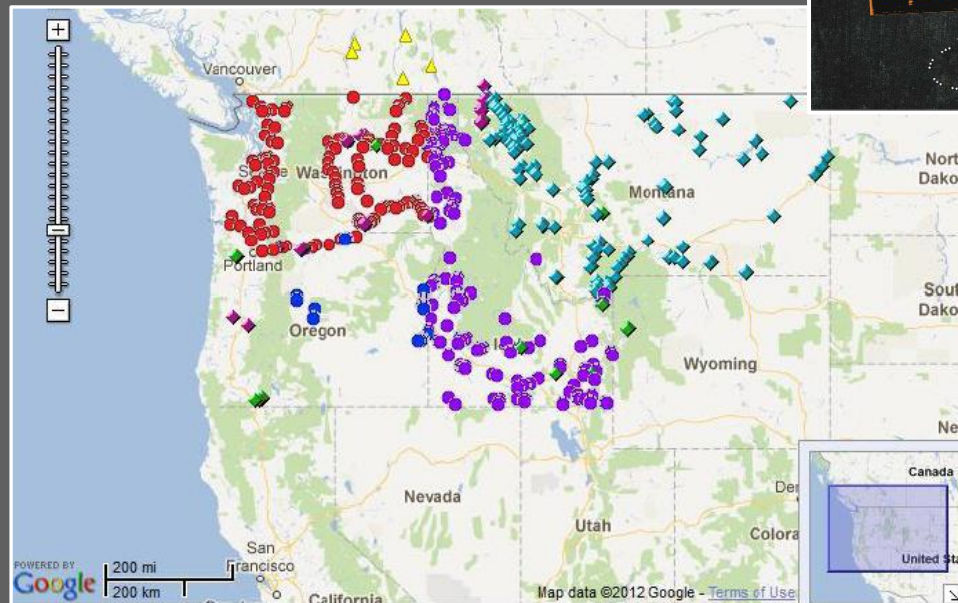


REGIONAL COORDINATION ON INVASIVE SPECIES



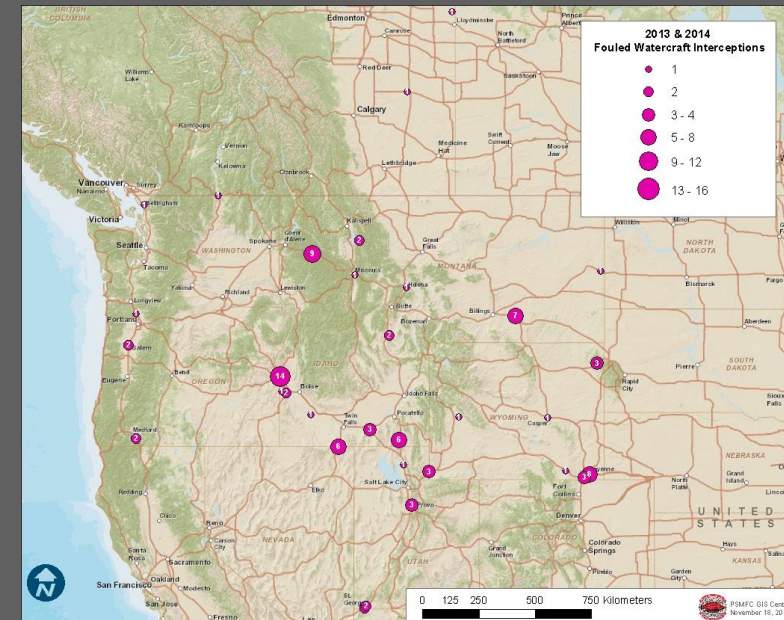
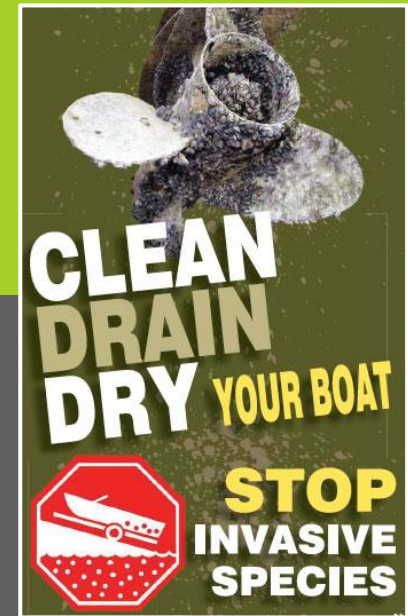
COORDINATED OUTREACH, MONITORING, WID

Common messaging on signage and educational materials throughout the NW states



Contributing Agencies

- ◆ BOR = Bureau of Reclamation
- ◆ IDA = Idaho Department of Agriculture
- ◆ PSU = Portland State University
- ◆ USACE = U.S. Army Corps of Engineers
- ◆ USGS = U.S. Geological Survey
- ◆ WDFW = Washington Department of Fish and Wildlife
- ◆ MFWP = Montana Fish, Wildlife, and Parks
- ◆ BCME = British Columbia Ministry of the Environment
- ◆ ODFW = Oregon Department of Fish and Wildlife

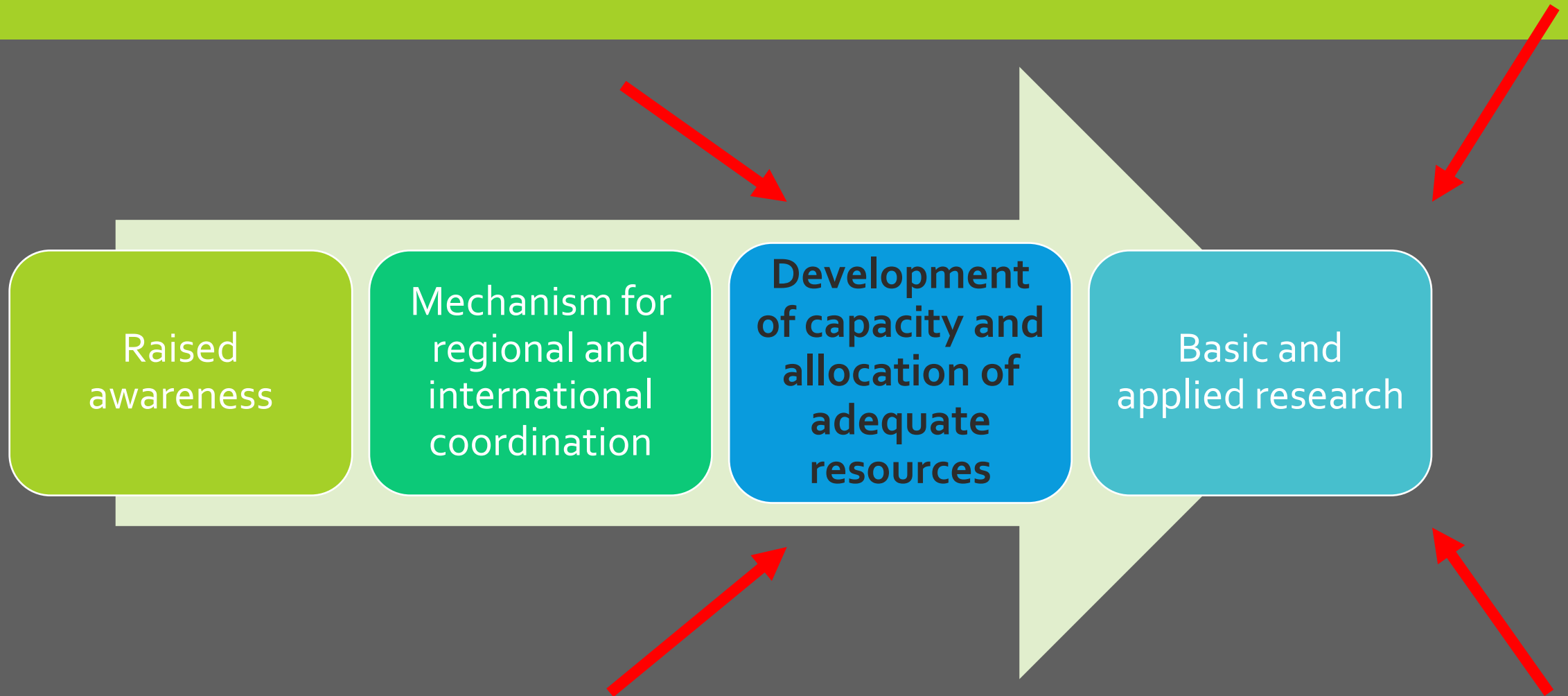


GOALS OF A REGIONAL FRAMEWORK

- Prevent the introduction of dreissenids (and other AIS) to the PNW
- Prevent the spread of dreissenids in North America
- Improve surveillance and monitoring of dreissenids
- Improve rapid response and management capabilities
- Create an aware, informed, and educated public
- Develop and enhance detection and response tools and technologies
- Improve communication and information about key vectors and pathways
- Help to ensure states and provinces collaborate and cooperate on a regular basis throughout the year

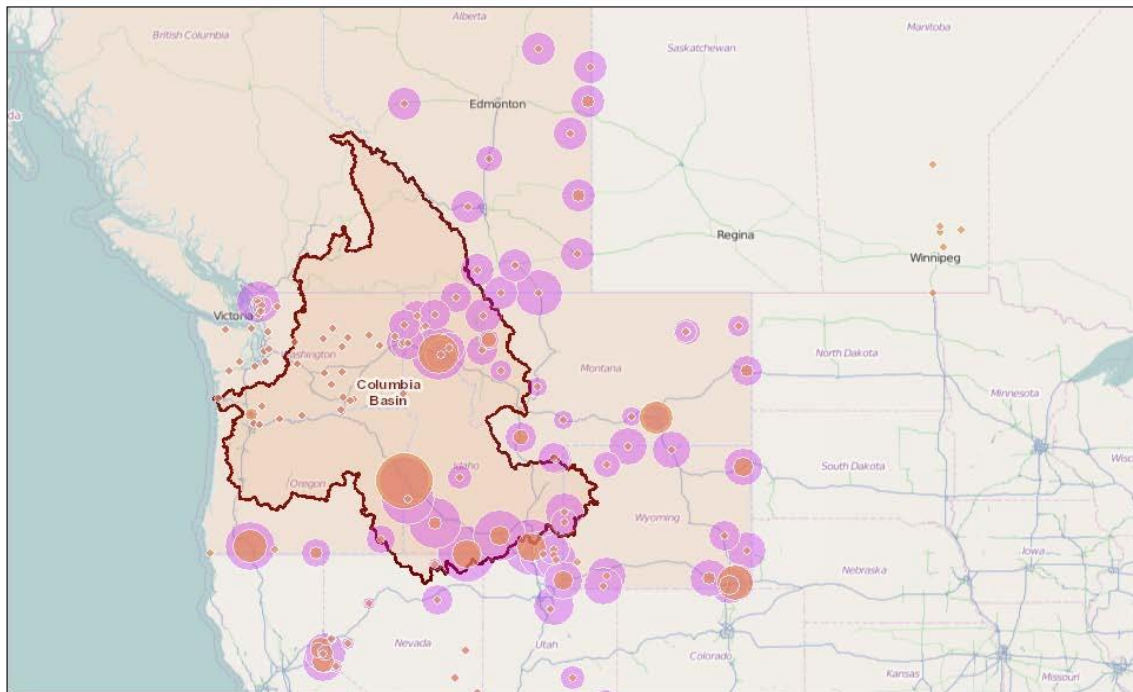


REGIONAL FRAMEWORK PREREQUISITES



AN ONLINE WATERCRAFT INSPECTION STATION TOOL

2015 Regional Watercraft Inspection & Decontamination Planning



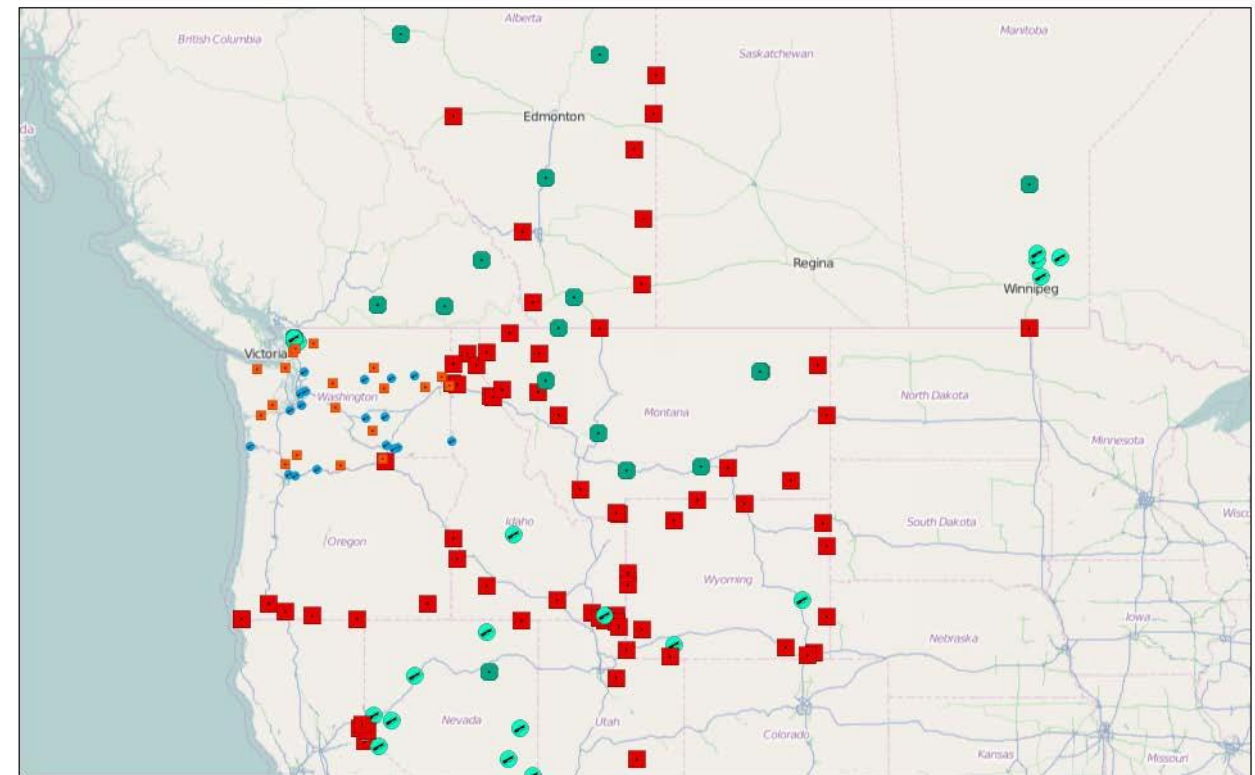
May 25, 2015

PNW Region States & Provinces
Columbia Basin Boundary

1:18,489,298
0 160 320 640 mi
0 245 490 980 km
USGS, PSMP GIS Center

2015 Regional Watercraft Inspection & Decontamination Planning Team
Aquatic Invasive Species Program, Pacific States Marine Fisheries Commission

2015 Regional Watercraft Inspection & Decontamination Planning



May 25, 2015

Watercraft Inspection Stations (Proposed and Current 2015)

Roving
Highway Inspection Station

Rampside Inspection Station
Temporary Rampside
Temporary Roadside

1:18,489,298
0 160 320 640 mi
0 245 490 980 km

2015 Regional Watercraft Inspection & Decontamination Planning Team
Aquatic Invasive Species Program, Pacific States Marine Fisheries Commission

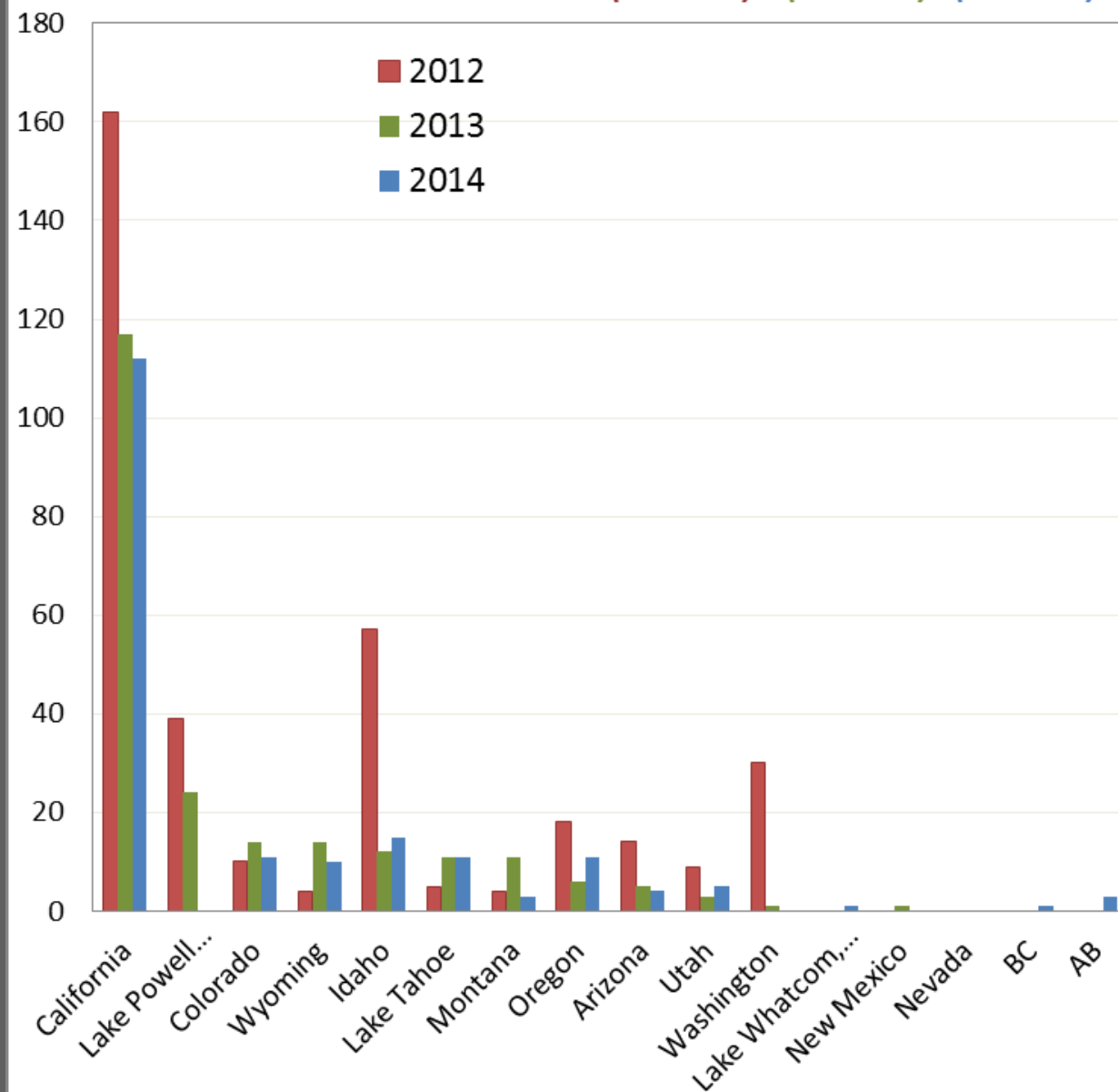
WATERCRAFT INSPECTION/INTERCEPTION PROGRAM DATA BY STATE - 2014

| | MT | OR | WA | ID | WY | UT | CO | CA | TAH OE | AZ | NM | NV | AL | BC | TOTAL |
|--------------------|--------|--------|--------|--------|--------|---------|---------|---------|-----------|----|-------|-------|-------|-----|---------|
| BOATS INSPECTED | 34,121 | 11,490 | 22,899 | 49,380 | 40,587 | 106,000 | 428,457 | 110,053 | 8,000 | 96 | 7,899 | 1,331 | 3,747 | 132 | 759,772 |
| FOULED BOATS | 3 | 11 | 4 | 15 | 10 | 5 | 11 | 112 | 11 | 4 | 0 | 0 | 3 | 1 | 190 |



Contaminated Dreissenid Watercraft Intercepted by State/Province

2012 vs. 2013 vs. 2014 (*N* = 352) (*N* = 219) (*N* = 187)

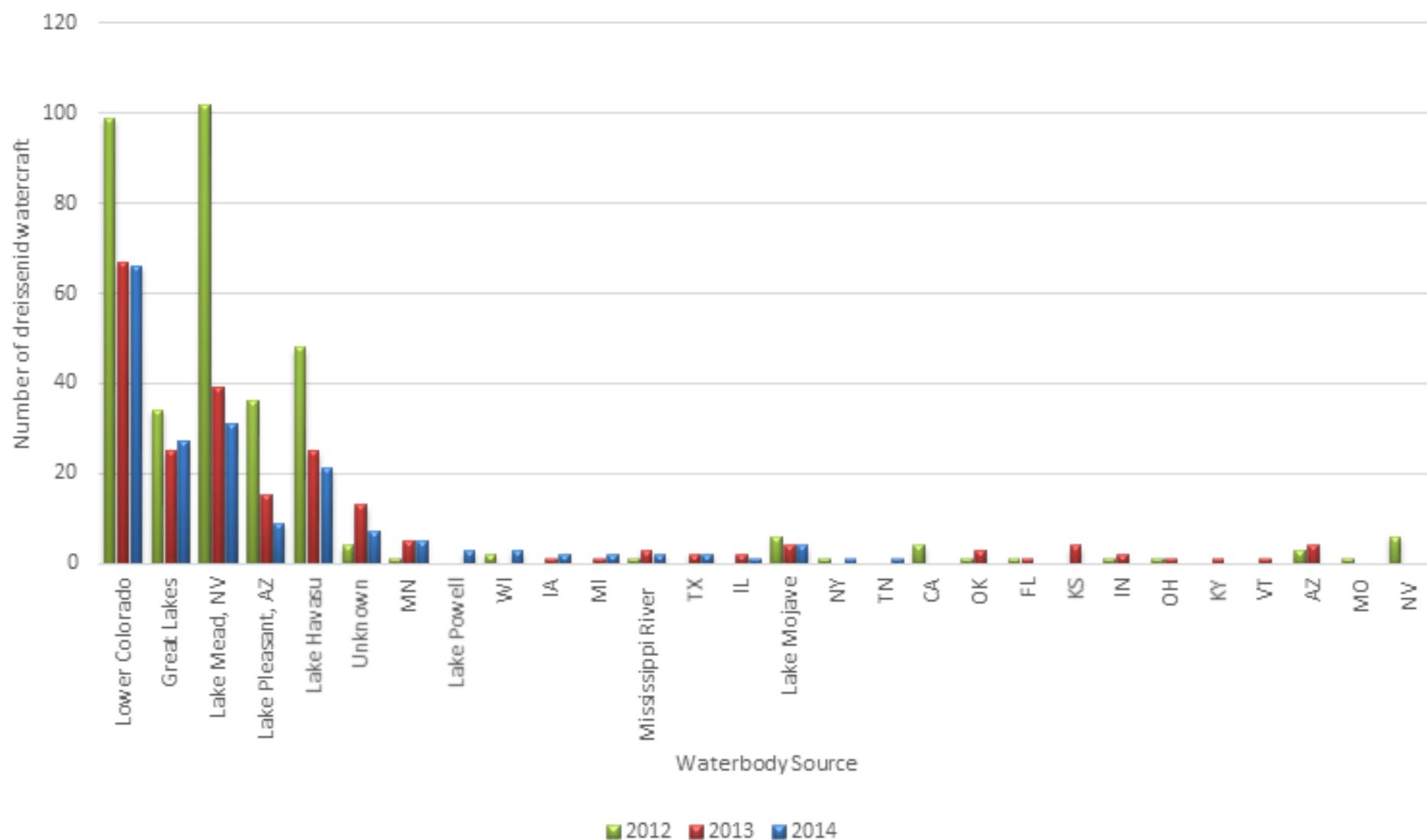




Source of Intercepted Watercraft with Adult Dreissenid Mussels 2012-2014

For: CA,OR,ID,MT,WA,WY,NV,UT,CO,AZ,TRPA,BC,AB,NM

N = 352 (2012), 219 (2013), 187 (2014)



| PACIFIC NORTHWEST STATES AND PROVINCES | AMOUNT | SOURCE |
|--|--------------|------------|
| ALBERTA | \$1,500,000 | K. WILSON |
| BRITISH COLUMBIA | \$814,834 | M. HERBORG |
| SASKATCHEWAN | \$274,149 | C. DOHERTY |
| IDAHO | \$1,250,000 | T. WOOLF |
| MONTANA | \$1,140,000 | T. BOOS |
| OREGON | \$542,340 | R. BOATNER |
| WASHINGTON | \$420,000 | A. PLEUS |
| STATES AND PROVINCES ADJACENT TO THE PNW | AMOUNT | SOURCE |
| WYOMING | \$800,000 | B. BEAR |
| CALIFORNIA/NEVADA – LAKE TAHOE | \$1,500,000 | D. ZABAGLO |
| CALIFORNIA | \$2,931,207 | D. NORTON |
| NEVADA | \$700,000 | K. VARGAS |
| UTAH | \$1,350,000 | J. NIELSON |
| GRAND TOTAL | \$13,222,530 | |

| POTENTIAL COSTS OF A DREISSENID INTRODUCTION | ALBERTA | BRITISH COLUMBIA | NORTHWEST TERRITORIES | SASKATCHEWAN | YUKON TERRITORIES |
|--|---------------------------------|------------------|-----------------------|--------------|-------------------|
| | Power Generation | \$5,938,487 | \$6,524,532 | | |
| | Drinking Water Systems | \$20,839,921 | \$9,251,608 | | |
| | Boat Maintenance | \$390,060 | | | |
| | Recreational Fishing | \$21,830,892 | \$12,385,962 | | |
| | Water Management Structures | \$8,841,373 | | | |
| | Water Diversion Intakes | \$3,910,000 | | | |
| | Property Value | \$13,789,500 | \$10,867 | | |
| | Golf Courses | | | | |
| | TOTAL ANNUAL COST ESTIMATED | \$75,540,773 | \$28,172,969 | EST. \$30M | EST. \$30M |
| | ALASKA | IDAHO | OREGON | MONTANA | WASHINGTON |
| | Hydropower | \$47,242,000 | | | |
| | Other Dams | \$148,700 | | | |
| | Drinking Water Intakes | \$4,287,000 | | | |
| | Boating Facilities | \$285,000 | | | |
| | Fish Hatcheries and Aquaculture | \$1,136,800 | | | |
| | Boater Costs/Maintenance | \$23,850,000 | | | |
| | Fishing Use | \$17,507,500 | | | |
| | Golf Courses | \$17,100 | | | |
| | Irrigation | | | | |
| | TOTAL ANNUAL COST ESTIMATED | EST. \$5M | \$94,474,000 | EST. \$100M | EST. \$80M |

TOTAL ESTIMATED COST TO THE PNW = MORE THAN \$0.5 BILLION ANNUALLY

FUNDING NEEDED

- **Watercraft inspection and decontamination station expansion (\$1,977,969)**
 - Oregon-\$410,000; Montana-\$83,000; Washington-\$694,000; Wyoming-\$718,000
- Build and fund the institutional capacity for collaboration in the region to monitor, assess, and renew regional AIS strategies, including enhancing the effectiveness of perimeter defense, on an annual basis - \$647,030
- Produce *Clean, Drain, Dry* pamphlets and support training for United States/Canada border patrol) - \$25,000
- Produce highway signs at the borders of the United States and Canada - \$100,000
- Increase monitoring to ensure early detection of dreissenids in the region - \$200,000
- Conduct research - Development of boater movement models to predict the most likely locations for an introduction of dreissenids in the Pacific Northwest - \$50,000
- Contain at the source (outside of the PNW and CRB) - directed at contaminated sources of water bodies that pose the greatest risk to the PNW - \$1,000,000
- Fund ANS Management Plans - \$16,000,000

BEST MANAGEMENT PRACTICES

- Standards and protocols
- Research for early detection and monitoring
- Water manager actions to prevent and minimize veliger movements
- Notification/communication databases
- Messaging
- Monitoring
- Boater behavior
- Fishing tournaments
- Hydropower facilities and dams
- Local inspection programs



ALBERTA'S CLEAN, DRAIN, DRY BOAT LAUNCH SIGN.

RESEARCH PRIORITIES (2010 QZAP) (2015 GNLCC)

- Determine physiological tolerances to estimate potential range
- Develop a method to track dispersal via genetic fingerprints
- Develop alternative decontamination methods
- Develop biological control methods
- Develop eco-friendly chemical control methods



COMPARISON TO MODEL LAW



| | IDAHO | OREGON | MONTANA | WASHINGTON | WYOMING |
|--|--|---|---|---|---|
| % of core authorities suggested in Model Law | 70 | 75 | 55 | 75 | 90 |
| LEGISLATIVE FINDINGS | √ | X | √ | √ | X |
| DEFINITIONS | No definitions for decontamination or inspection | No explicit definition for inspection | No definitions for inspection, decontamination, and waters | Does not define inspection | √ |
| POWERS AND DUTIES | √ | √ | √ | √ | √ |
| PROHIBITIONS | √ | √ | No launching prohibitions | No prohibition on launching out-of-compliance conveyances | √ |
| OWNER RESPONSIBILITIES | No general obligation to Clean, Drain, Dry | X | No cleaning and drying obligations | √ | Does not impose Clean, Drain, Dry obligations |
| INSPECTION | √ | √ | No provisions to authorize law enforcement stops | No express authority for law enforcement stops | √ |
| DECONTAMINATION | √ | No express authority to impound conveyances or impose costs | No express authority to impound conveyances or impose costs | √ | √ |
| CERTIFICATION | Authorizes issuance of receipts/seals only for decontamination | √ | X | No provisions for seals or reciprocity | √ |
| PENALTIES | √ | √ | √ | √ | √ |

HIGHEST PRIORITY LEGISLATION

- Support appropriation of Water Resources Reform and Development Act funds to Columbia River Basin dreissenid activities.
- Support mandatory decontamination of fouled watercraft at federally managed waterbodies.
- Support reauthorization of the National Invasive Species Act.
- Support adding quagga mussels as “Injurious species” under the Lacey Act.
- Support the implementation of federal aquatic invasive species legislation in Canada.
- Support the Western Governors Association (WGA) resolution on dreissenid prevention efforts.

FIVE PRIORITY RECOMMENDATIONS

1. Contain dreissenids at the source.
2. Develop and foster long-term sustainable funding solutions for dreissenid and other aquatic invasive species prevention efforts, including industry participation.
3. Build and fund the institutional capacity for collaboration in the region to monitor, assess, and renew regional AIS strategies, including enhancing the effectiveness of perimeter defense, on an annual basis.
4. Establish and implement a real-time rapid response notification database.
5. Coordinate annual watercraft inspection and decontamination stations in the Pacific Northwest and with neighboring states and provinces annually using an online database.

OTHER CRB ACTIVITIES

PREVENTING AN INVASION



I. Workshop May 15, 2013 – 90 individuals

- Declaration of Cooperation
 - Regulatory, policy, outreach, funding, research, coordination
- Conducted workshops to advance regulatory review for non-chemical/pesticide control
- Updated CRB plan appendices (control/eradication methods)
- Supported Rapid Response Plans
 - Oregon, Washington, Idaho
- Vulnerability Assessment Team
- Rapid Response Working Group

<http://www.westernais.org>

OTHER CRB ACTIVITIES

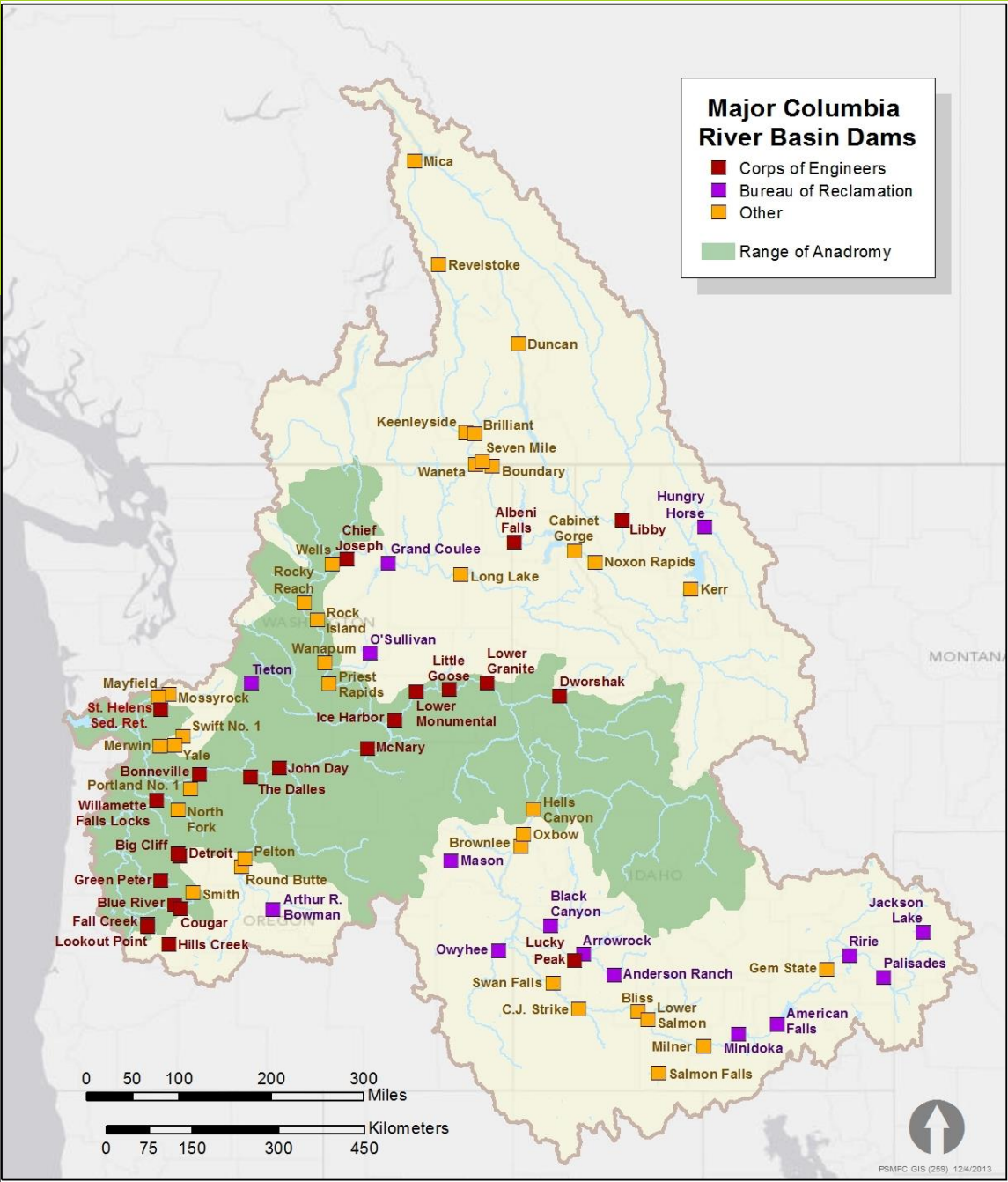
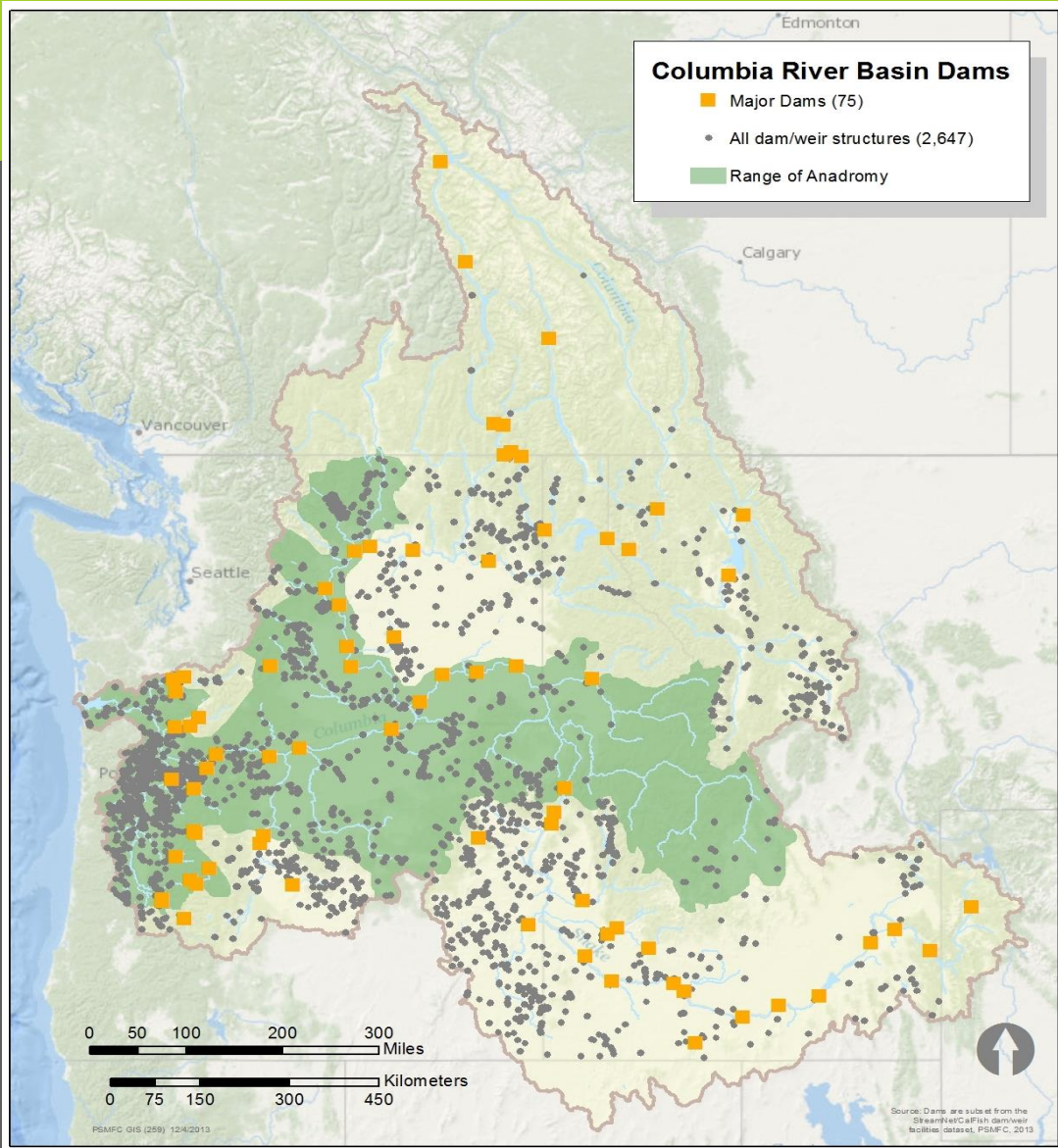
VULNERABILITY ASSESSMENT TEAM

- Goals:
 - Determine the status of VA at key hydropower projects in the CRB
 - Determine the risk of these hydropower projects to dreissenids
 - Recommend highest priority VAs and associated costs

Members

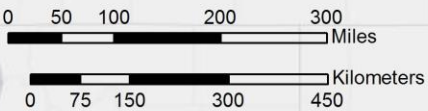
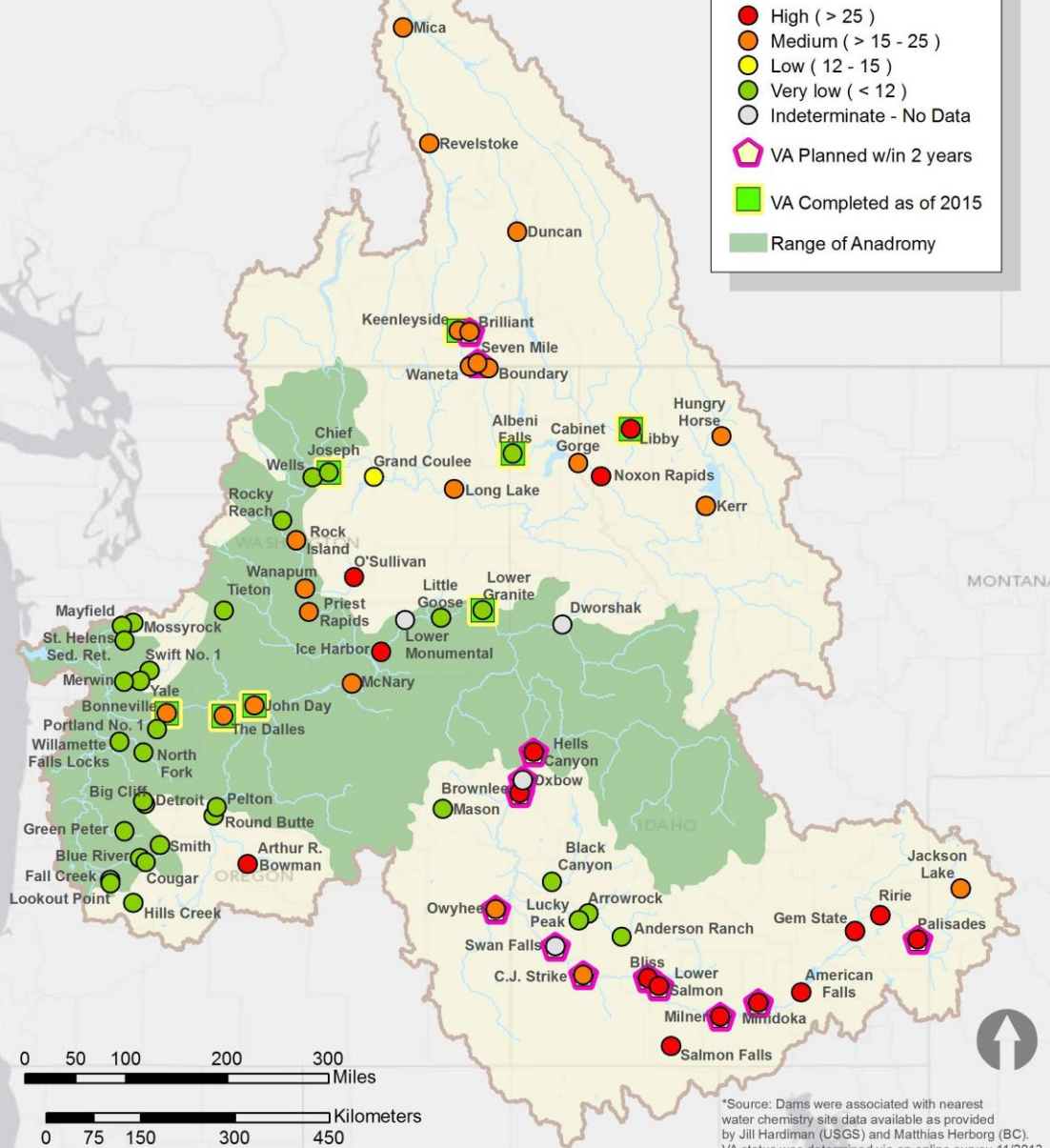
Lisa DeBruyckere, Coordinator
Dave Arbaugh, Arbaugh Associates
Arnie Aspelund, Puget Sound Energy
Chris Brueske, Whatcom County
Lori Campbell, PGN
Renata Claudi, RNT Consulting
David DeRosa, Teck Metals, LTD
Kimberly Johnson, BPA
Tom Dresser, Public Utility No. 2 of Grant County
Tim Dykstra, USACE
Todd Gatewood, GE Power and Water
Micah Goo, Centralia City and Light
Ritchie Graves, NOAA
Jackson Gross, Smith-Root
Michele Hanson, USACE
Bruce Howard, Avista Corp.
Doug Johnson, BC Hydro
Mark Jones, BPA
Keith Kirkendall, NOAA
Chas Kyger, Douglas County PUD
Scott Lindsay, Northwest Public Power Association
Clyde Lay, USBR
Carrie Link, Marrone Bio Innovations
Madelyn Martinez, USACE
Stephen Phillips, PSMFC
Christine Pratt, Seattle City Light
Jared Rubin, EWEB
Michael Stephenson, Idaho Power
Sheila Street, FortisBC
Andrew Talabere, EWEB
Krista Watts, Columbia Power
Steve Wells, PSU
Leonard Willett, USBR

2,657 dam/weir facilities in the CRB
75 of most prominent included in analysis
Map source: PSMFC



Major Columbia River Basin Dams

- High (> 25)
- Medium (> 15 - 25)
- Low (12 - 15)
- Very low (< 12)
- Indeterminate - No Data
- ☆ VA Planned w/in 2 years
- VA Completed as of 2015
- Range of Anadromy



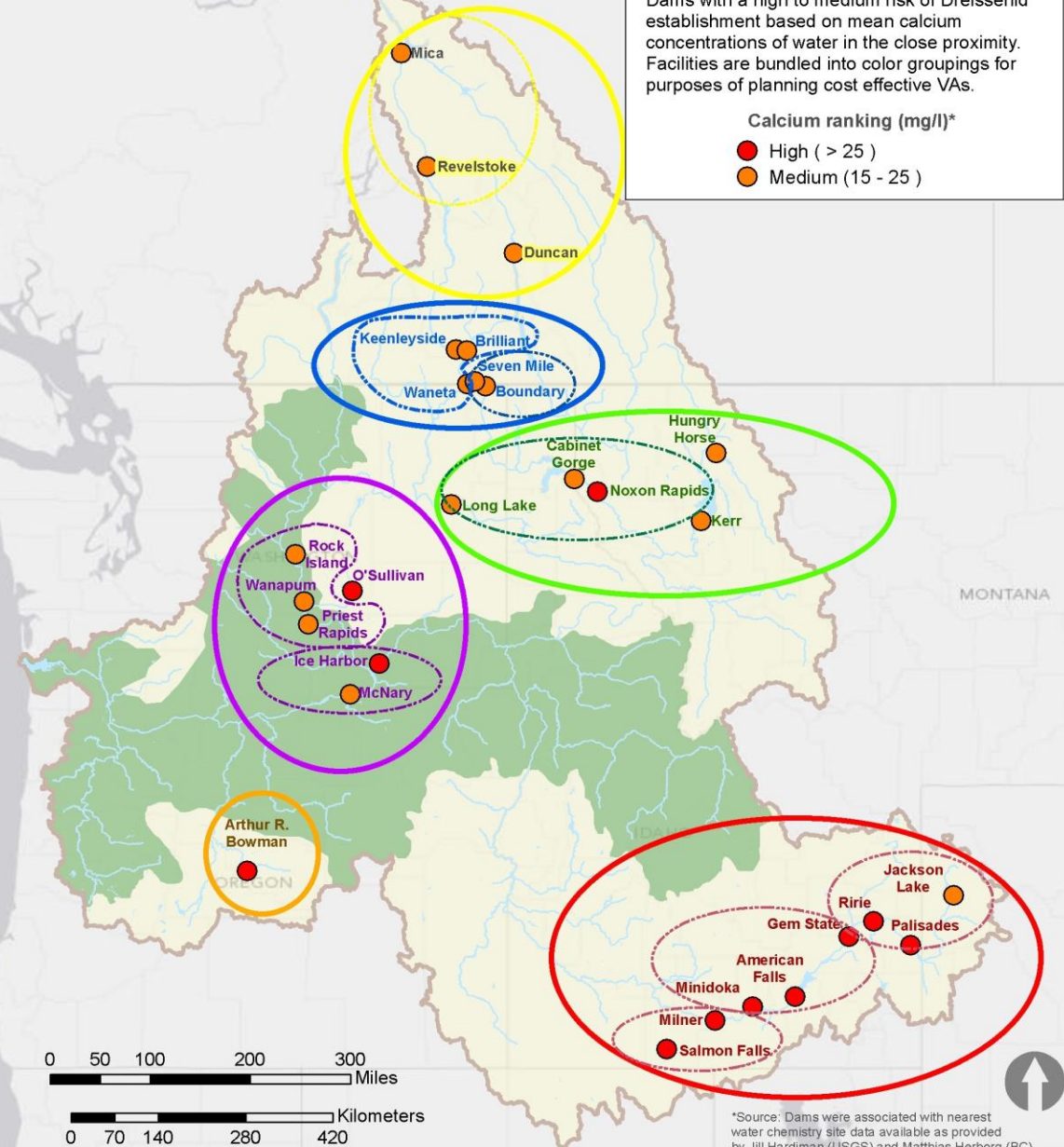
*Source: Dams were associated with nearest water chemistry site data available as provided by Jill Hardiman (USGS) and Matthias Herborg (BC). VA status was determined via an online survey 11/2013. Updates to VA status were last made on 5/20/15.

Major Columbia River Dams Bundled for Vulnerability Assessment (VA) Planning

Dams with a high to medium risk of Dreissenid establishment based on mean calcium concentrations of water in the close proximity. Facilities are bundled into color groupings for purposes of planning cost effective VAs.

Calcium ranking (mg/l)*

- High (> 25)
- Medium (15 - 25)

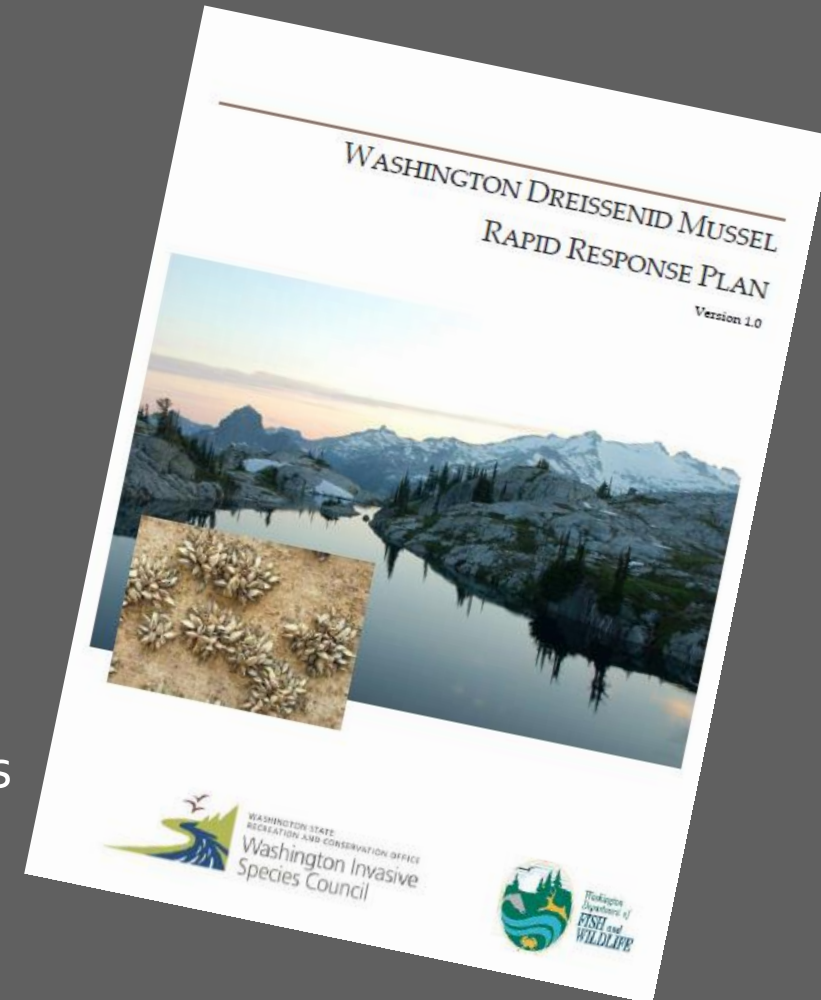


*Source: Dams were associated with nearest water chemistry site data available as provided by Jill Hardiman (USGS) and Matthias Herborg (BC). VA priority groupings proposed by VAT 1/2014.

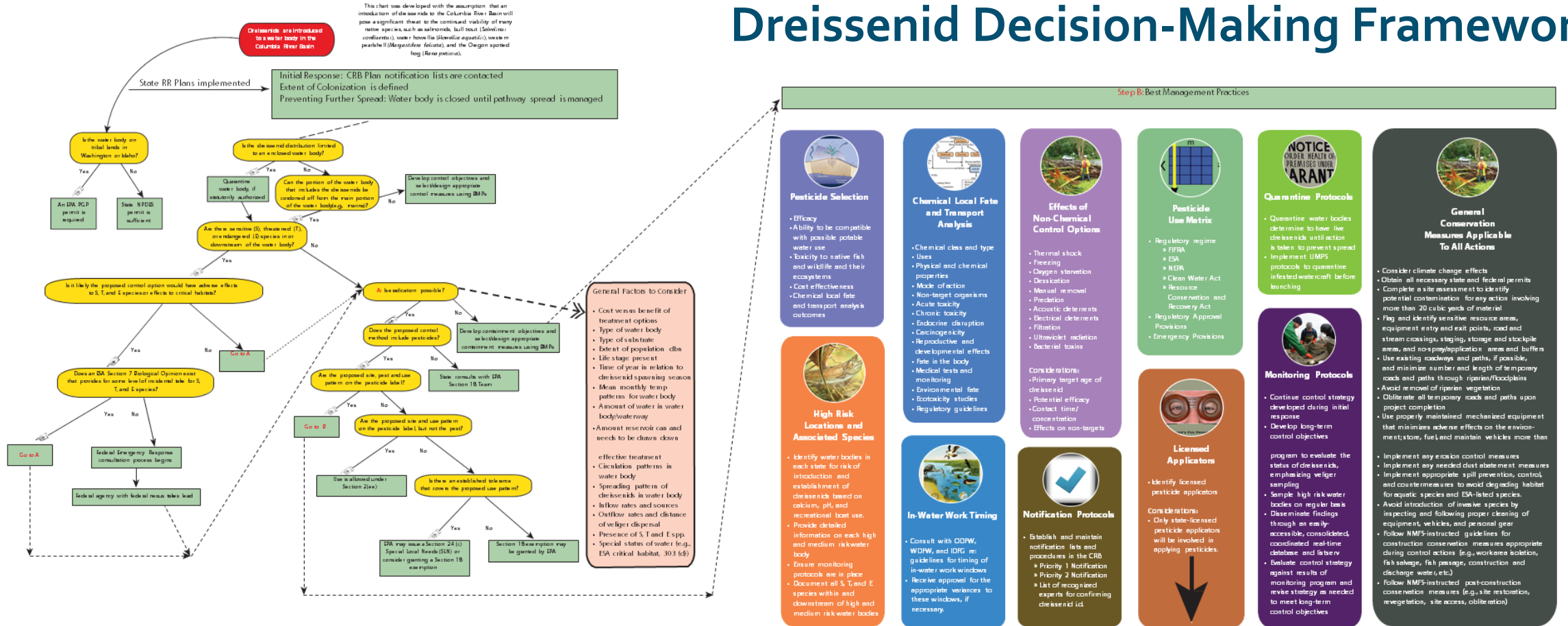
OTHER CRB ACTIVITIES

RAPID RESPONSE WORKING GROUP

- Update CRB documents
- Produce state RR plans
 - OR and WA complete
 - ID has contingency plan
 - MT - 2015
- Conduct contingency planning exercise – December 2013
- Address pesticide registration issues in PNW
- Develop new website
- Conduct programmatic consultation with federal agencies



Dreissenid Decision-Making Framework



Oregon - <http://oda.state.or.us/dbs/licenses/search.lasso?&division=pest>

Washington - <http://agr.wa.gov/PestFert/LicensingEd/lists/>

Idaho - <http://www.agri.state.id.us/Categories/Pesticides/licensing/licenseLookup.php>



Chinook salmon



Bull trout



Water hyacinth



Western pikeminnow



Oregon spotted frog



Tule wren

RAPID RESPONSE WORKING GROUP

NEXT STEPS:

1. CONVENE FEDERAL AGENCIES
2. CREATE BIOLOGICAL ASSESSMENT



Responding to an Introduction of
dreissenids in Oregon and
Washington

Best Management Practices, Effects Analysis



Page associated with video resource
Source: California Department of Fish and Wildlife

QUESTIONS?

