Northwest **Power** and **Conservation** Council

May 6, 2025

MEMORANDUM

TO: **Council Members**

FROM: **Stacy Horton, Washington Policy Analyst, Biologist**

SUBJECT: **States of Washington and Oregon Invasive Mussel Prevention and Readiness**

BACKGROUND:

Presenters: Justin Bush, Aquatic Invasive Species Division Manager, Washington Department of Fish and Wildlife, and Keith DeHart, Invasive Species and Wildlife Integrity Supervisor, Oregon Department of Fish and Wildlife.

Summary: Current and historic efforts by the States of Washington and Oregon to prevent invasive freshwater quagga and zebra mussels will be summarized, including work with Columbia River Tribes, utilities, and potentially affected water users and managers, such as irrigation districts. This update is a preface to joint state efforts to increase prevention and readiness, through development and implementation of short-and long-term actions.

Relevance: The Council's 2014 Columbia River Basin Fish and Wildlife Program calls the introduction of zebra or quagga mussels "the greatest known threat in the Columbia River Basin from aquatic invasive species."(P. 46) Zebra and quagga mussels multiply rapidly, clogging pipes and intake structures. The potential economic, hydropower and ecological impacts from invasive quagga mussels should not be underestimated. Critical infrastructure including the hydropower system and associated fish passage, hatcheries, irrigation, fish screens, navigation, municipal water, recreational facilities including boat ramps and golf courses, and data center cooling systems could all be affected.

Harmful ecological impacts result from zebra and quagga mussel introductions. Potential serious threats to food webs can negatively transform ecosystem productivity and undermine species mitigation and conservation efforts. Tribal trust and treaty obligations will be harder to meet with a diminished capacity to restore and conserve ecosystem value.

The states of Idaho, Montana, Oregon, and Washington have watercraft inspection stations in place to prevent aquatic invasive species from unintentional transport into Columbia River Basin waters. All four states continue to encounter boats transported with invasive mussels attached. Rapid Response Plans exist in each state so that effective and organized action can respond to possible detections. Each state has continued to advocate and work to secure additional funding to address and further prepare for quagga mussel prevention actions.

Workplan: The Councils 2020 Addendum to the 2014 Columbia River Basin Fish and Wildlife Program supports a regional approach to establish a defensive perimeter to keep invasive mussels out of the Columbia River Basin. The Council is tracking the 'Number of watercraft inspected and decontaminated in the northwest states of the Columbia River Basin for zebra/quagga mussels' and the 'Ratio of positive detections of zebra/quagga mussels to number of inspected watercraft.' (P. 25)

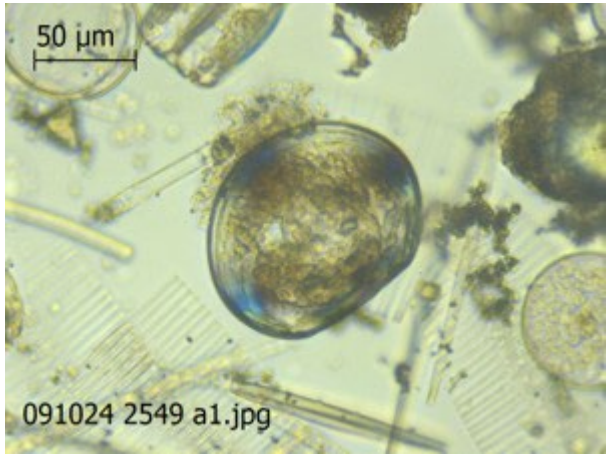
The 2014 Columbia River Basin Fish and Wildlife Program outlines multiple measures related to aquatic invasive species, including:

- Calling upon Bonneville and other federal agencies to "…assist the Northwest states' efforts to prevent the establishment of quagga and zebra mussels." (P. 47)
- Finding that "If quagga and zebra mussels become established in the Columbia Basin, BPA and other federal agencies, along with FERC-licensed utilities, shall support regional rapid-response efforts." (P. 48)
- Supporting the work of the PSMFC 100th Meridian Initiative-Columbia Basin Team to collaboratively report on regional efforts like inspection and decontamination efforts, protocols, research priorities, containment and prevention, and Lessons Learned. (P. 48)
- Assisting with legislative efforts to prevent an invasion and control the spread of non-native invasive species in the Columbia Basin. (P. 48)
- Coordinating with other federal, state, and tribal entities, and regional organizations such as the 100th Meridian Initiative-Columbia Basin Team, to track and monitor data on existing non-native invasive species distribution and population trend assessments in the Columbia Basin and encourage regional data sharing on rapid response, prevention, containment, control, eradication, enforcement, and education and outreach efforts. (P. 48)

Background: In August 2024, the Council had a presentation updating response efforts to the detection of quagga mussels in Idaho (Fall of 2023). For almost 20 years, the cumulative efforts of Columbia River Basin states and provinces have prevented the introduction and establishment of invasive freshwater quagga and zebra mussels. Routine early detection monitoring performed by the Idaho State Department of Agriculture in Fall 2023, detected free-floating quagga mussel larvae, triggering notification by Idaho Governor Brad Little and implementation of the Columbia River Basin invasive mussel rapid response plan. SCUBA surveys also located a single adult quagga mussel during scoping for a rapid response treatment which was performed in October 2024. Nic Zurfluh, Invasive Species Bureau Chief, summarized the rapid response treatment, lessons learned, and ongoing efforts to understand results. Justin Bush, Aquatic Invasive Species Policy Coordinator, summarized State of Washington efforts to increase prevention and early detection monitoring, including activities to prepare for downstream detections working with Columbia River Tribes, utilities, and potentially affected water users and managers, such as irrigation districts. Since that presentation, there have been additional detections of mussels, including contaminated Marimo moss balls in August of 2024, and golden mussels, detected for the first time in California in October 2024.

More info: Washington State Governor's Salmon Recovery Office State of Salmon in Watersheds Report, How Invasive Species Threaten Salmon Story map: https://wa-rco.maps.arcgis.com/apps/Cascade/index.html?appid=82845d44d6ee4e84813b160aee2ae123

State of Washington and Oregon Invasive Mussel Prevention and Readiness



📷: Idaho State Department of Agriculture

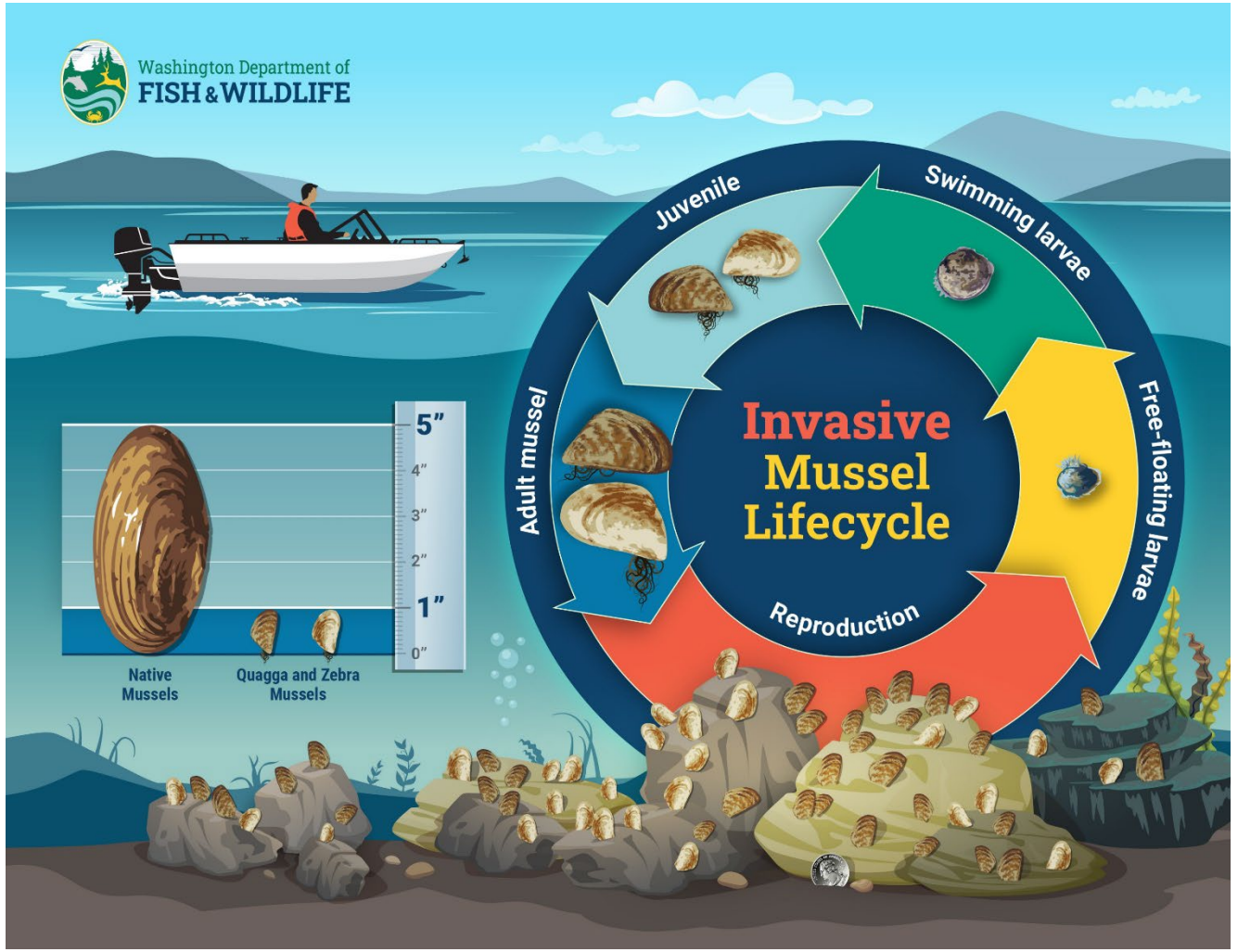
Justin Bush
Aquatic Invasive Species
Division Manager

Washington
Department of
FISH &
WILDLIFE

📷: Washington Department of Fish and Wildlife

Invasive Mussel Background

- Freshwater mussels
- Attach to hard surface with byssal threads
- Densities greater than 20,000 per square foot
- Larval life stage is microscopic and free-floating
- Introduced to North America through contaminated ballast water
- Transported domestically through movement of watercraft or downstream from infested waterbodies



Economic Risk

- $100 million annual hydroelectric mitigation and maintenance.

- Anticipated similar mitigation and maintenance costs for:
  - Fish Hatcheries
  - Fish Passage Infrastructure
  - Agricultural Irrigation Systems
  - Drinking and Wastewater Systems
  - Legacy Data Centers
  - Navigational Locks

Invasive mussels fouling a penstock gate at Davis Dam.
📷: U.S. Bureau of Reclamation

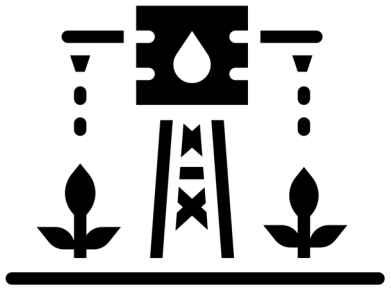
Dense colonies of zebra mussels can clog intake pipes.
📷: Marrone Bio Innovations

Economic Risk

$31.2 billion

Columbia river shipping

- Commodities and products
- Key U.S. trade gateway
  - **Leading** wheat export pathway
  - **Second** soy and corn export pathway



$9.6 billion

Irrigated agriculture

- 75% of Washington's agricultural output

$20.5 billion

Outdoor recreation and fisheries

- $5 billion in outdoor recreation involving public waters
- $1.5 billion in recreational fisheries
- $14 billion in commercial salmon fisheries

📈: Pacific Northwest Waterways Association

📈: Washington State Department of Agriculture

📈: Washington Recreation and Conservation Office (2020)

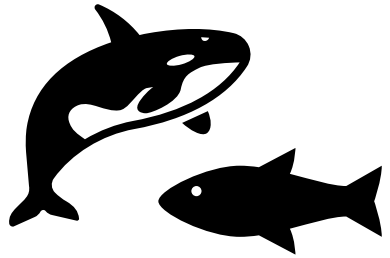
Environmental Risk

Aquatic habitat

- Reduce available habitat for native species
- Loss of native filtering and cleaning species
- Increases water transparency and aquatic weeds

Water quality and pollution

- Filter feeding impacts phytoplankton structures and increases bacteria
- Reduce dissolved oxygen
- Bioaccumulate pollutants, increasing native species exposure



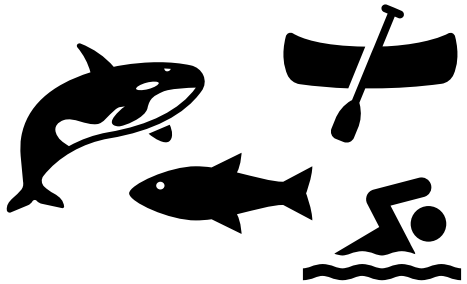
Native species

- Habitat loss leads to decreased populations of native species including salmon and steelhead
- Decreased salmon populations impact Southern Resident killer whale recovery

Cultural and Human Health Impacts

Human health concerns

- Increase in botulism causing bacteria, a serious neurotoxin
- Increase of harmful cyanobacteria and harmful algal blooms
- Bioaccumulated toxins in fish and wildlife may be consumed by humans



Cultural concerns

- A risk to the Northwest's identity and way of life
  - Impacted or lost treaty protected resources
  - Impacted or loss of place
  - Impacted or loss of beneficial and treasured species
  - Impacted or loss of economic and environmental resources
  - Mitigation, maintenance, and recovery costs a public burden

Sharp shells of dead mussels litter beaches.
📷: Milwaukee Journal Sentinel

Invasive mussels encrusting recreational boat motor.
📷: Pacific States Marine Fisheries Commission

State Fiscal Year 2025 One-Time Proviso to Enhance Prevention and Readiness

- State Fiscal Year (SFY) 2025
  - July 1, 2024, to June 30, 2025
- Prevention, Monitoring, and Preparedness
  - General Fund-State Appropriation - $1,810,000
  - Federal Funds - $1,810,000

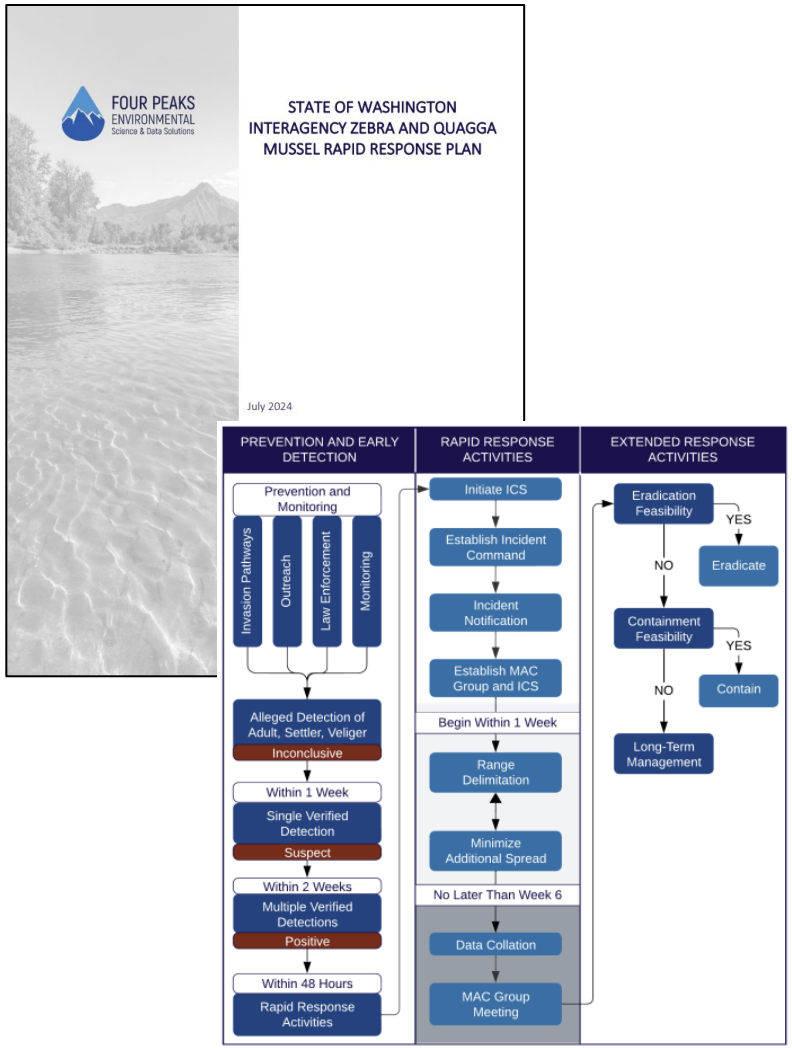
Fiscal Year 2025 Short Term Actions

1. Develop and deploy a long-term leadership, planning, and command structure that includes internal and external partners including tribal, federal, regional, state, and local governments.

2. Fully staff Southeast Region mandatory watercraft inspection and decontamination stations in Clarkston and Pasco.

3. Procure and deploy one additional invasive mussel detection canine to support Southeast Region check stations and early detection monitoring.

4. Perform intensive Snake River and Middle Columbia River early detection and monitoring to detect downstream quagga mussel establishment.



Fiscal Year 2025 Short Term Actions

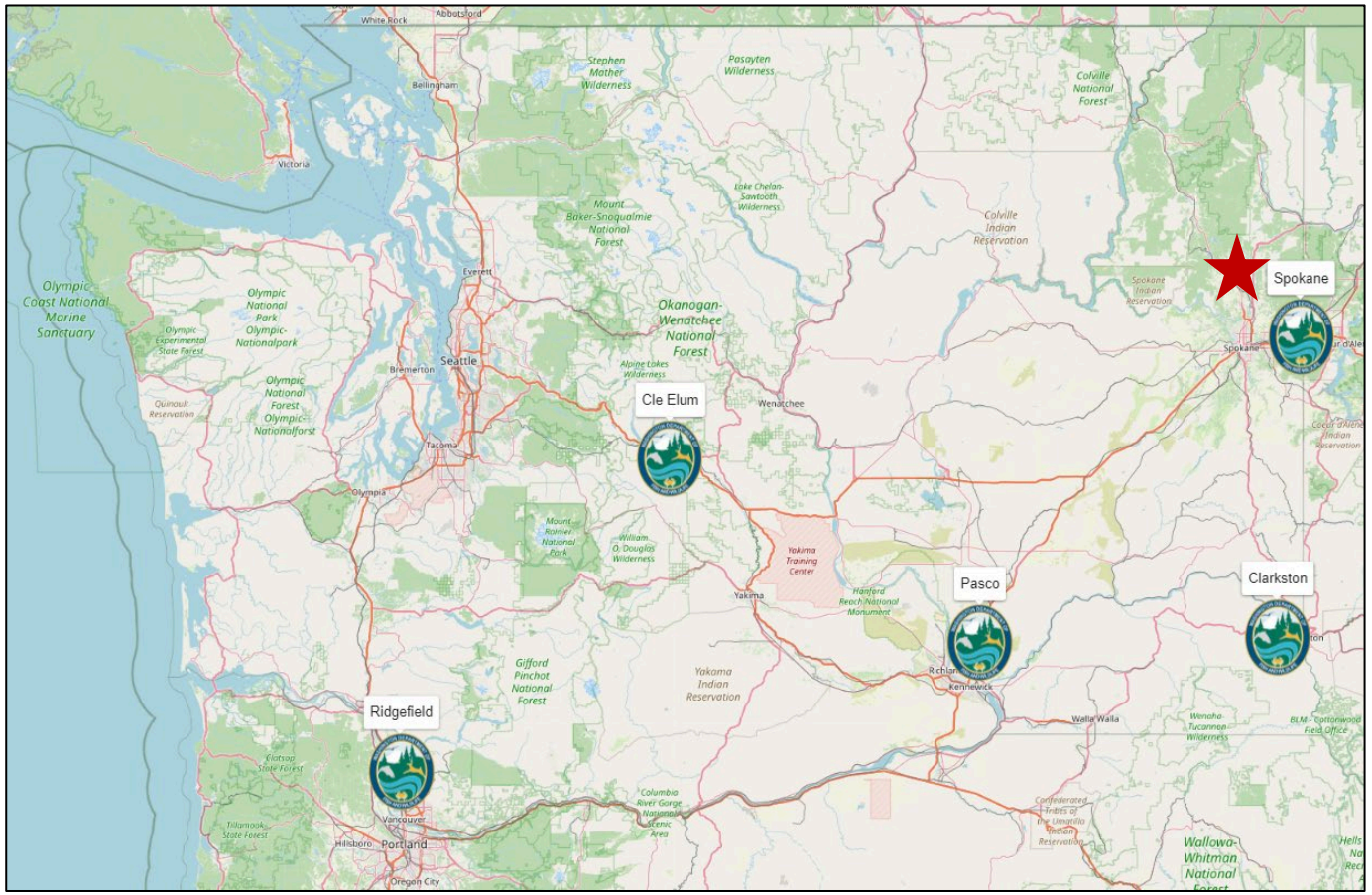
5. Strengthen prevention of quagga mussel importation from both recreational and commercial pathways by addressing pet trade, food fish aquaculture, and recreational transportation of live fish.

6. Expand state preparedness for containment and rapid response treatment for quagga mussels through procurement of equipment and training.

7. Understand risk to infrastructure such as irrigation systems and fish hatcheries to develop strategies to prevent and mitigate quagga mussel establishment and impacts.

8. Increase communications and outreach capacity focused on invasive mussel prevention, response, and enforcement to grow awareness and support among decisionmakers, media, communities, and the public in the Snake and Columbia River basins.

Watercraft Inspections



🗺️ & 📷: Washington Department of Fish and Wildlife

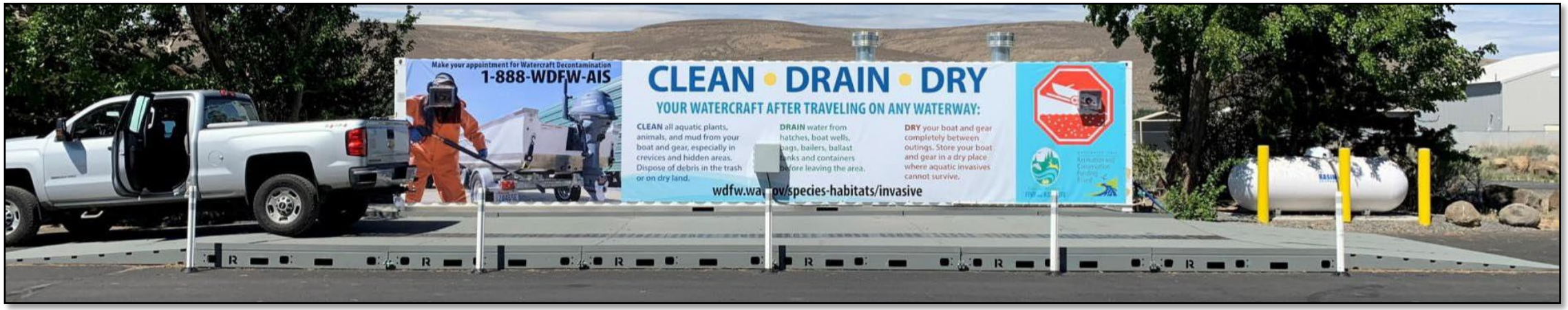
	2021	2022	2023	2024	2025*
Watercraft Inspected	55,812	51,942	58,618	54,790	5,943
Mussel Fouled Watercraft	39	25	25	13	6

★ Highway 2 near Elk, WA pilot station opened May 5, 2025.

*January 1, 2025, to April 30, 2025

Decontamination

January 1, 2024 to December 31, 2024: 2,130 decontaminations
January 1, 2025 to April 30, 2025: 186 decontaminations



📷: Washington Department of Fish and Wildlife

January Largest Interception on Record:
Increased Prevention and Readiness in Action

- Conveyance:
  - 2 Tugboats; 1 infested
  - 30 feet length
- Origin: Lake Michigan

- Interception Point: Spokane (Liberty Lake)

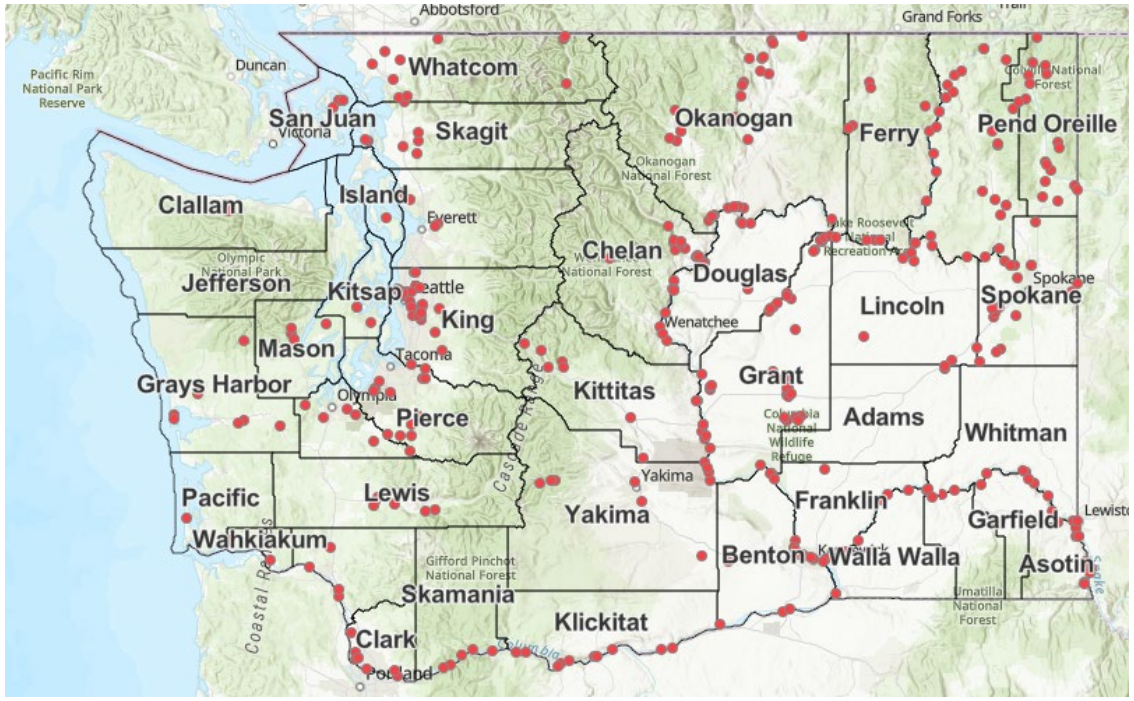
- Interception: 21 gallons of invasive mussels – analysis indicates some may have been **alive**
- Staff Time: 20 hours

📷: Washington Department of Fish and Wildlife

Early Detection Monitoring

January 1, 2024 – December 31, 2024:
173 waterbodies (+6%), 392 sites (+12), 7,519 (+13%) total samples)

January 30, 2025 – April 30, 2025:
14 waterbodies, 65 sites, 554 total samples



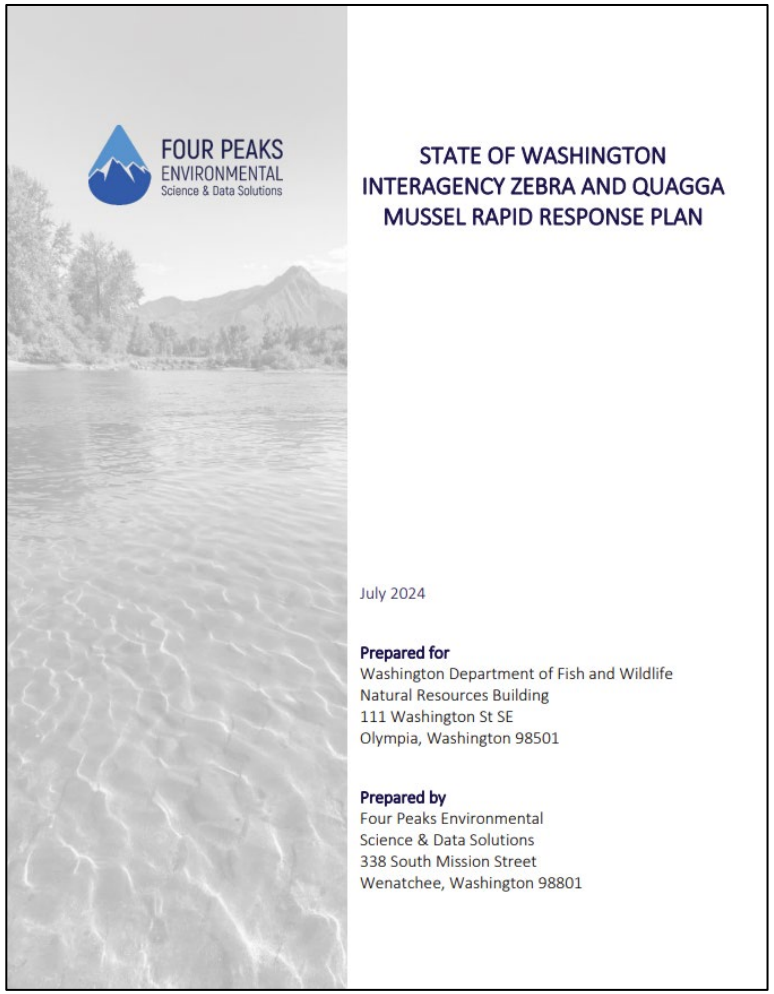
📘 & 📷 : Washington Department of Fish and Wildlife

Early Detection Monitoring Partners

Partners	Water Body Common Name
Chelan County Public Utility District (PUD)	Lake Entiat
Confederated Tribes of the Colville Reservation	Lake Roosevelt, Rufus Woods Lake, and Kettle River
Douglas County PUD	Lake Pateros
Grant County PUD	Priest Rapids Lake and Wanapum Lake
Kalispel Tribe of Indians*	Boundary Reservoir
Portland State University	Columbia River, Snake River, Lake Umatilla, Lake Wallula, Boundary Reservoir, and Box Canyon Reservoir
Seattle City Light	Boundary Reservoir
Snohomish County PUD	Spada Lake
Spokane Tribe of Indians	Lake Roosevelt
U.S. Bureau of Reclamation	Lake Roosevelt

* New partner in State Fiscal Year 2025

Response Readiness



📷: Washington Department of Fish and Wildlife & Washington Invasive Species Council

Aquatic Invasive Species Prevention and Response

May 13, 2025: Northwest Power and Conservation Council

Keith DeHart
Invasive Species & Wildlife Integrity Coordinator
Oregon Department of Fish and Wildlife
503-947-6308
keith.b.dehart@odfw.oregon.gov

Photo Credit: Mussel, Golden - Alberta Invasive Species Council

Oregon AIS Program Overview

OSMB	• AISPP Financial and Contract Management • Outreach and Education Materials
ODFW	• Conduct Watercraft Inspections • Both Aquatic and Terrestrial Responsibilities
ODEQ	• Ballast water inspections
OSP	• Enforcement
Portland State University	• Early detection waterbody monitoring
Oregon Invasive Species Council	• Interagency/partner coordination

Prevention

ODFW: watercraft inspection program

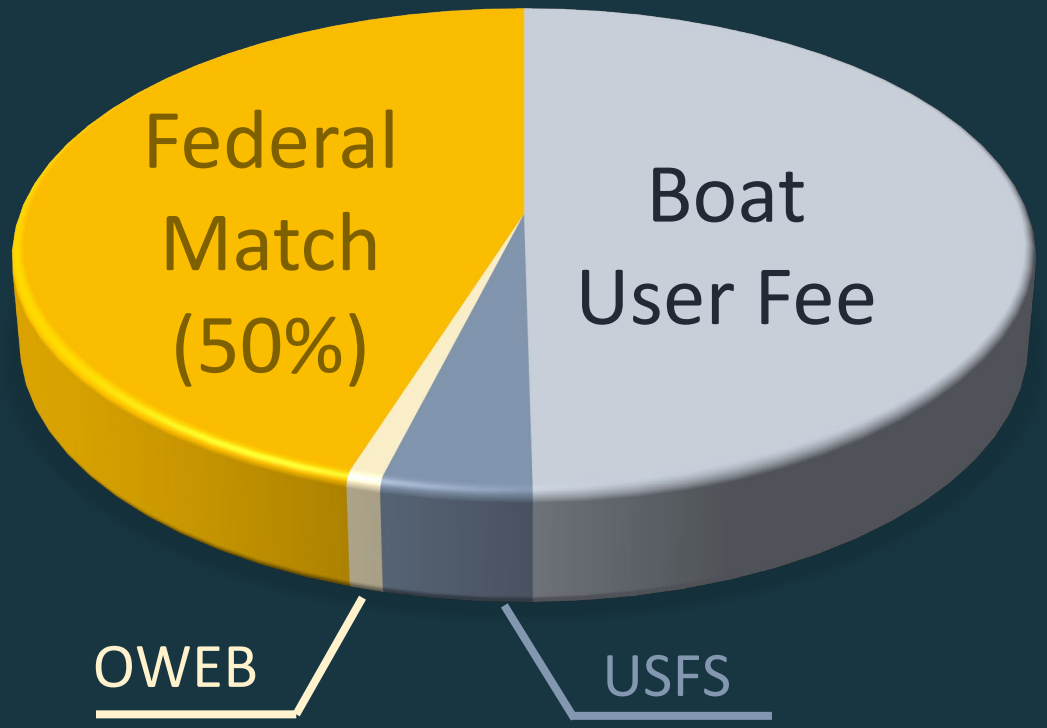
ODEQ: Ballast Water Inspection Program

Watercraft inspection program

5.5 permanent positions

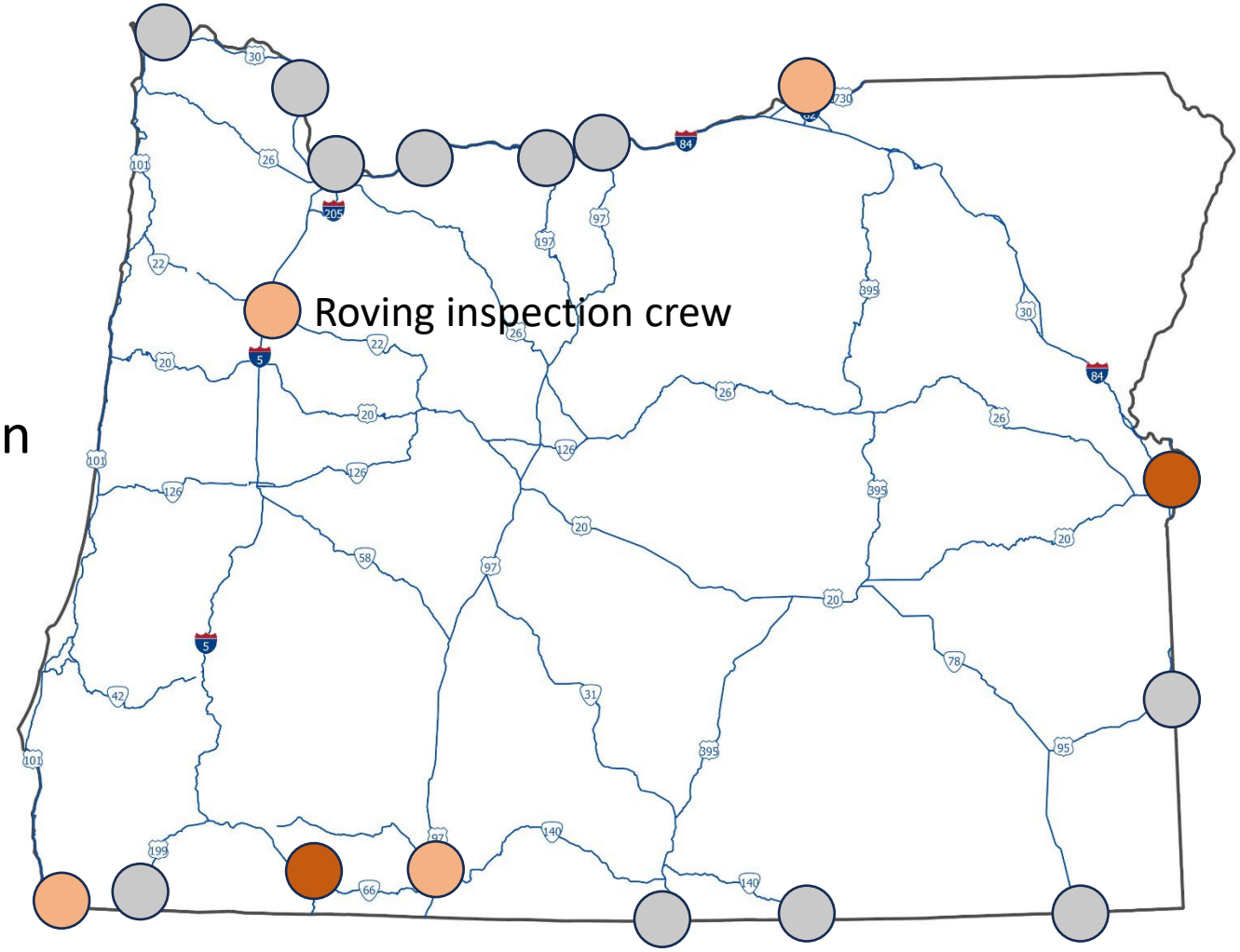
14 seasonal positions

~$2M Total Program Funding 23-25 Biennia

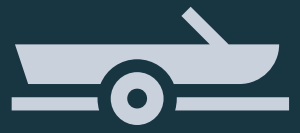


Existing Watercraft Inspection Stations

- Permanent Check Station
- Seasonal Check Station
- Unchecked Entry Point



Oregon Inspections (2010 – 2024)



226,524

Total Watercraft Inspected

3,636

Biofouled Watercraft

173

Mussel Fouled Watercraft

Oregon's Ballast Water Program

- Statutes established in 2001
- 1.5 FTE since 2012
- Supported by 50/50 cost share between arrival fee and GF allocation

Center for Lakes and Reservoirs (CLR)

at Portland State University

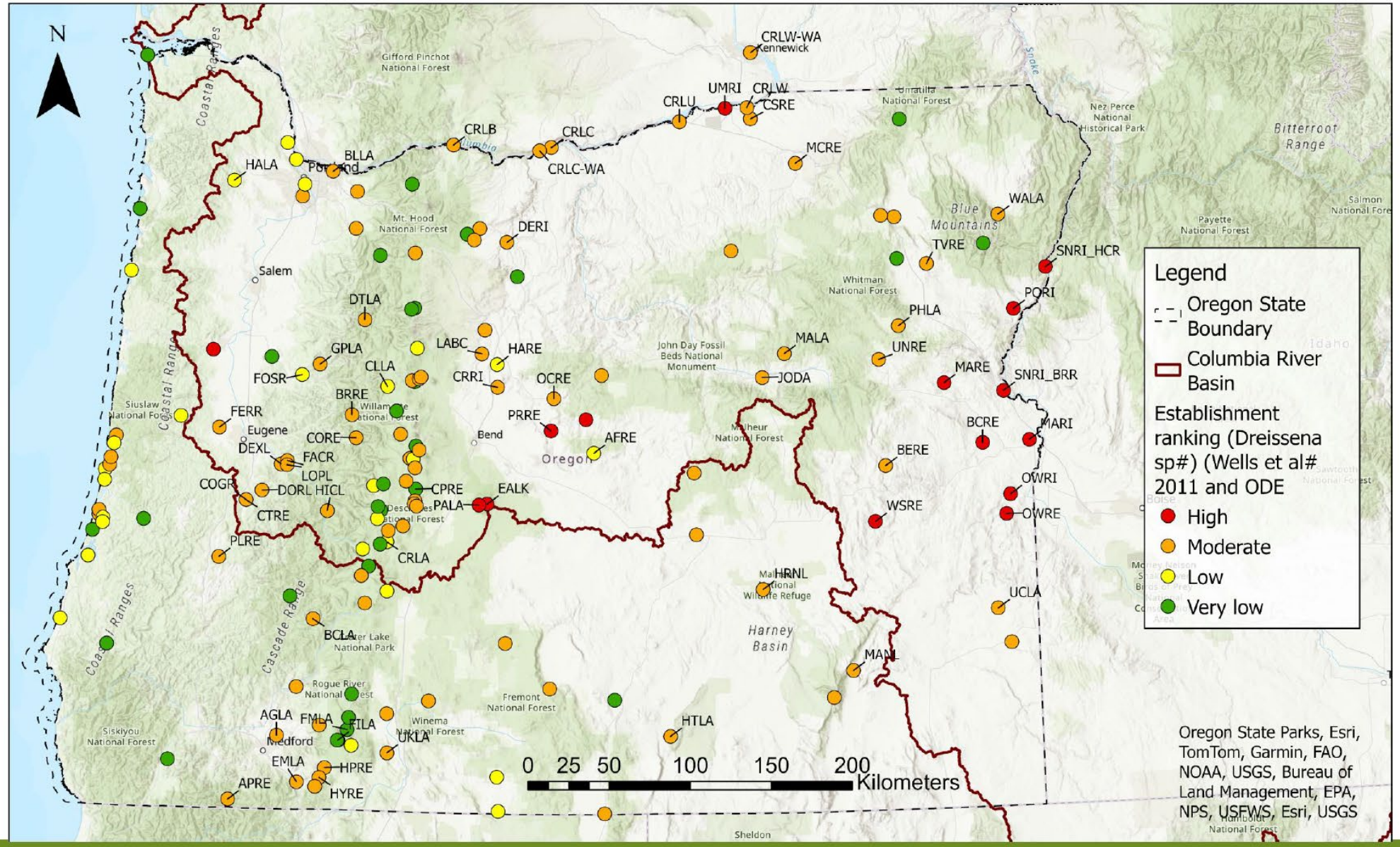
- ✓ **Established** by ORS 352.691 to be administered by Portland State University
- ✓ **Assist state and federal agencies in researching and mitigating nonindigenous, invasive aquatic species in Oregon**
- ✓ Work with communities in developing effective management of lakes and reservoirs



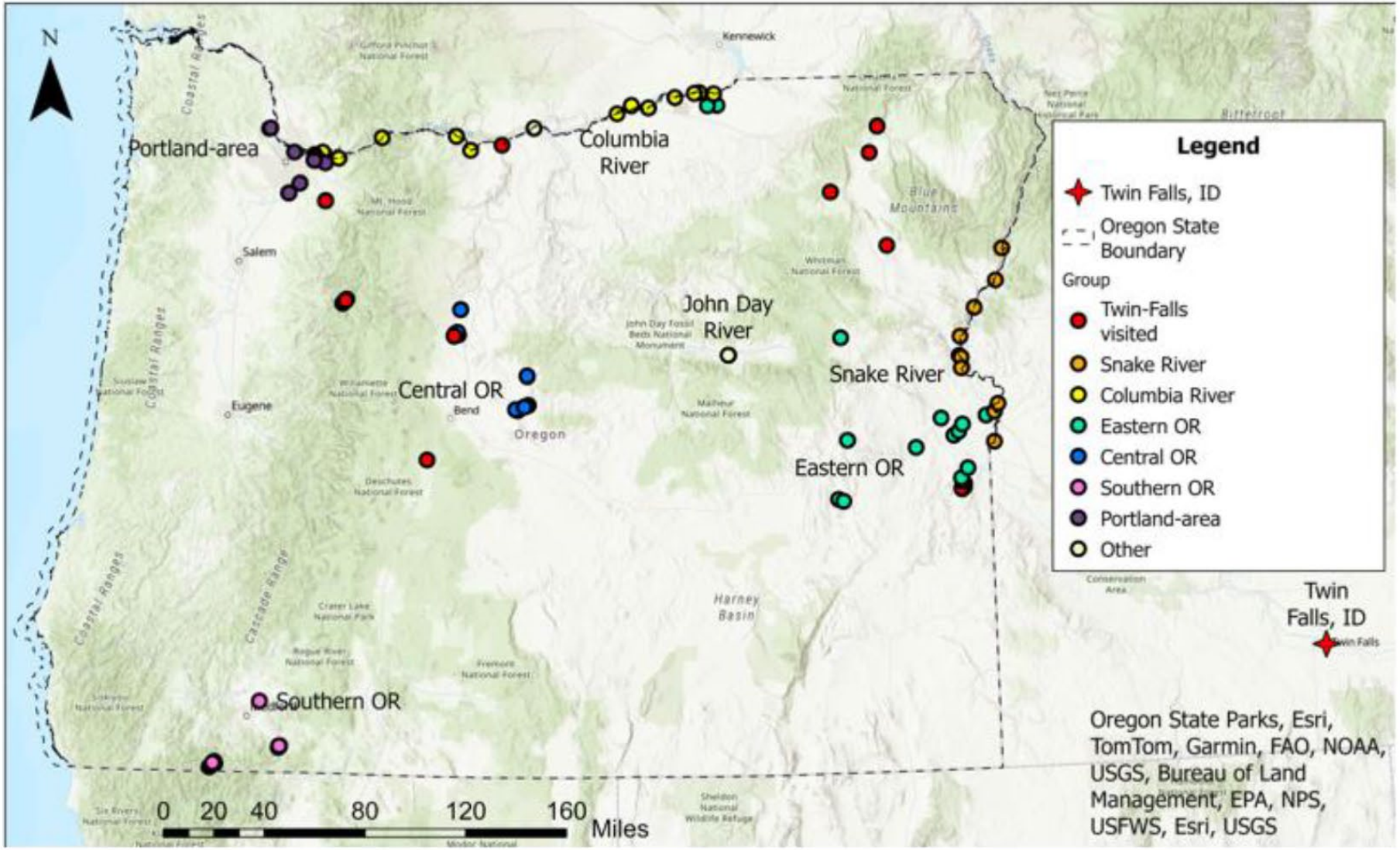




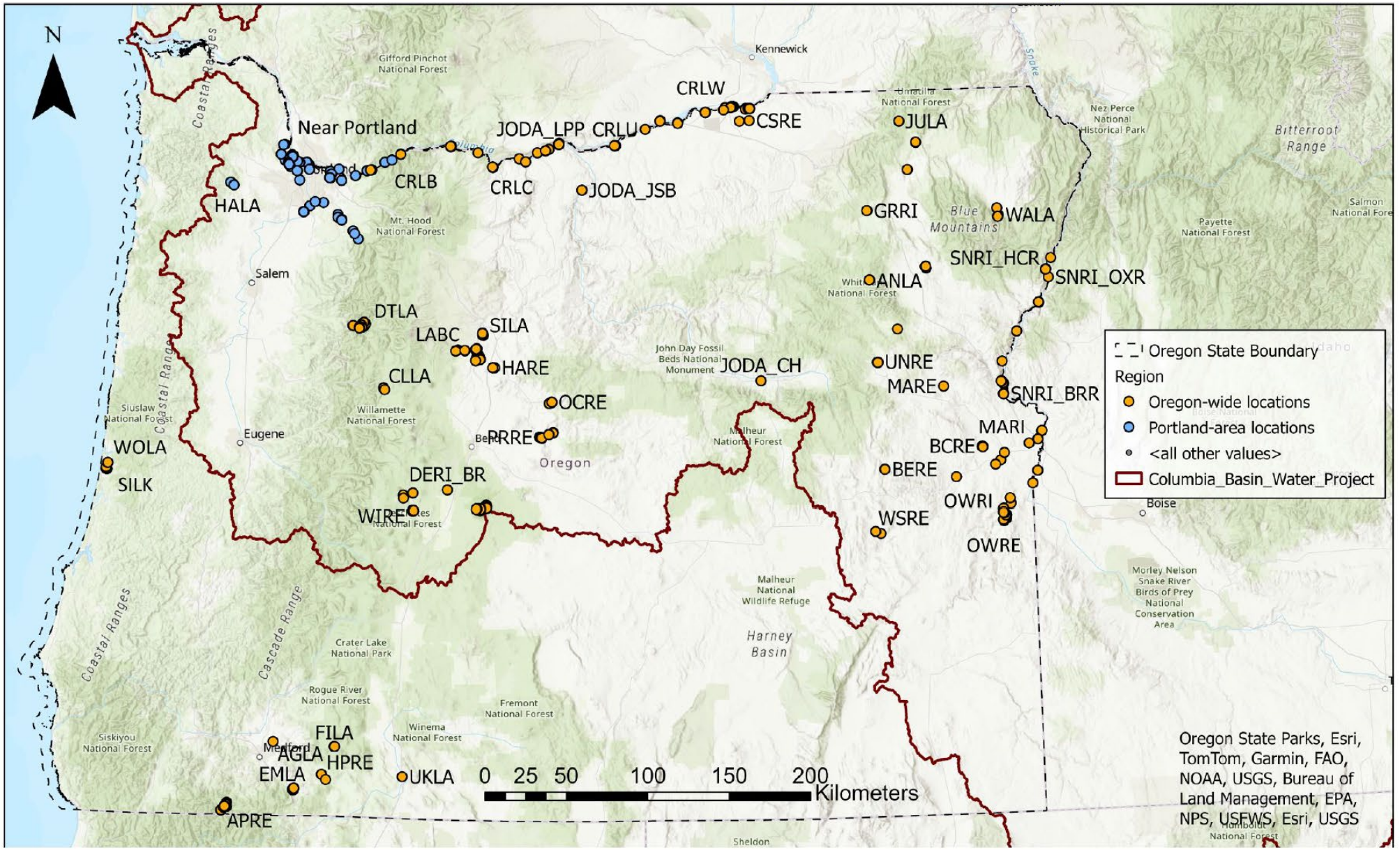

CLR Early Detection Monitoring Locations



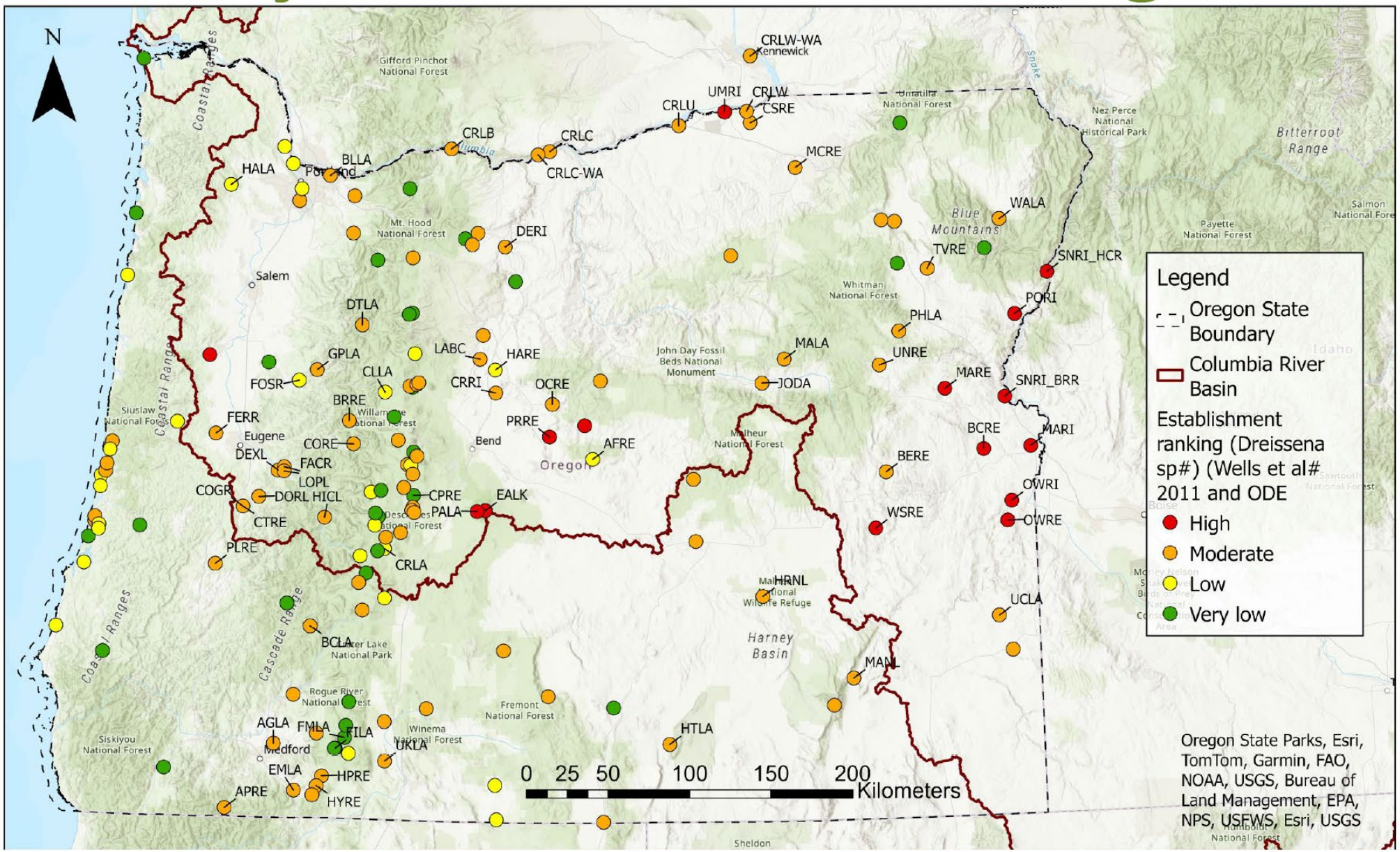
Water bodies visited by boats from Twin Falls around Quagga event in 2023



CLR AIS Monitoring Surveys 2024



CLR Early Detection Monitoring Locations



Questions?

Keith DeHart
Invasive Species & Wildlife Integrity Coordinator
Oregon Department of Fish and Wildlife
503-947-6308
keith.b.dehart@odfw.oregon.gov

Photo Credit: Mussel, Golden - Alberta Invasive Species Council