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

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February 7, 2023

MEMORANDUM

TO: Council Members

FROM: Leslie Bach and Patty O'Toole

SUBJECT: Update on Zebra and Quagga mussel prevention efforts

BACKGROUND:

Presenter: Stephen Phillips, Pacific States Marine Fisheries Commission

Summary: The Council has been actively engaged in supporting federal-cost share funding for preventing quagga and zebra mussel invasion into the Columbia River Basin. We will hear an update on regional efforts on quagga and zebra mussel detection, prevention and rapid response, as well as an overview of the legislation and funding that supports these efforts.

Relevance: In the 2014 Fish and Wildlife Program the Non-native and Invasive Species strategy states: "Prevent the introduction of non-native and invasive species in the Columbia River Basin, and suppress or eradicate non-native and invasive species". The strategy notes that, "currently, the greatest known threat in the Columbia River Basin from aquatic invasive species is introduction into the basin of zebra or quagga mussels". The Program encourages a regional approach to establishing a defensive perimeter to keep invasive mussels out of Columbia River Basin waters, and supports monitoring and rapid response efforts. The program also identifies the need to share data and information among all entities working on efforts to prevent invasive mussels and to coordinate on education and outreach efforts.

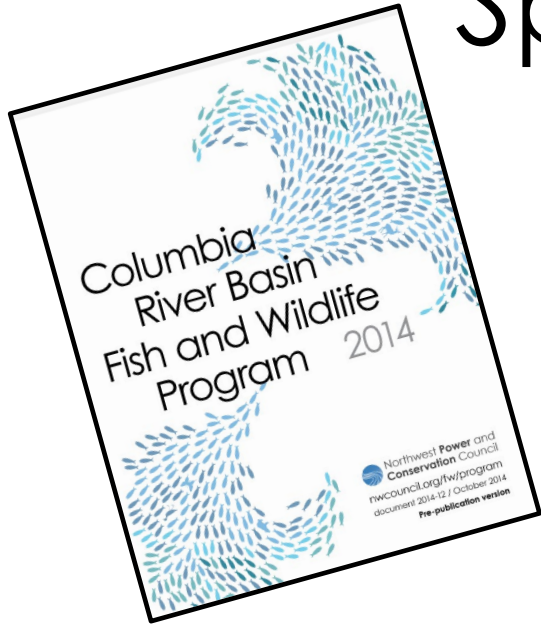
Background: The Columbia Basin is the only basin without an infestation of zebra and quagga mussels. Invasive mussels from other infested areas of the U.S. pose a direct threat to the regional hydropower system, affecting both native fish and wildlife and human uses of the system.

Each of the Northwest states has established Watercraft Inspection and Decontamination stations throughout the region to prevent the introduction and establishment of invasive mussels in the waters of the Columbia River Basin. In 2014, Congress passed new authorization for the U.S. Army Corps of Engineers that included a provision giving the Corps legal authority to enter into cost-sharing agreements with the four Northwest states to establish and operate Watercraft Inspection and Decontamination stations. The Council worked closely with regional partners in advancing the legislation and supporting continuing funding for this program.

The cost-share program is coordinated through Pacific States Marine Fisheries Commission. The funding has allowed the four Northwestern states to increase the number of watercraft inspection stations and their days and hours of operation. It has also supported ongoing monitoring and rapid response efforts.

More Info: [PSMFC Aquatic Invasive Species Program](#)

Non-native and Invasive Species Strategy



Columbia River Basin Fish and Wildlife Program

**National Invasive Species Awareness Week:
February 20 to February 26, 2023**

Definitions

(NPCC's Fish and Wildlife Program)

- **Non-native species:** An introduced species living outside its native distributional range, which has arrived there by human activity, either deliberate or accidental.
- **Invasive species:** A species that establishes and reproduces rapidly outside of its native range.
- Both aquatic and terrestrial



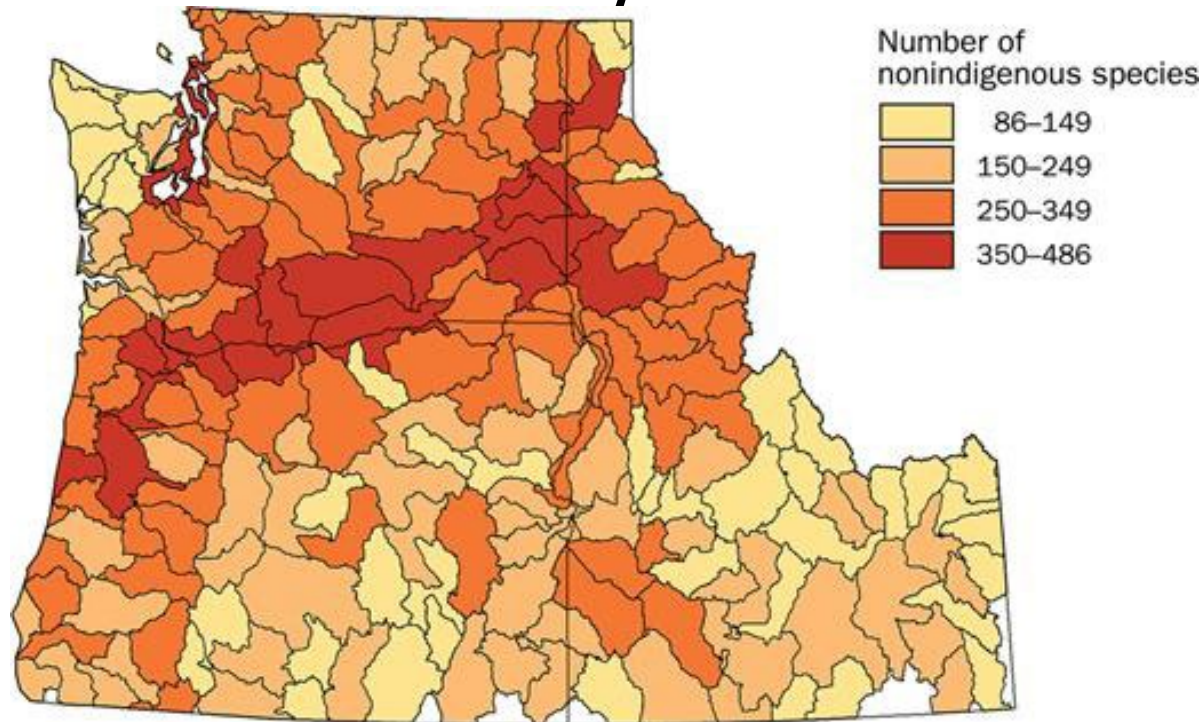
What are the issues?

- Predation
- Competition for food, habitat
- Food web changes
- Disease transmission
- Infrastructure damage
- High cost to address

Northern Pike



Non-native species in Oregon, Washington, Idaho (Montana too)



Sanderson, 2009

2014 Fish and Wildlife Program

- Non-native and invasive species strategy
 - Prevent the introduction of non-native and invasive species in the Columbia River Basin and suppress or eradicate non-native and invasive species.
- Numerous measures
- Emerging Program Priorities: aggressively addressing non-native and invasive species
- 2020 Addendum to the Program: continue to implement these priorities.



Yellow star thistle

Independent Scientific Advisory Board Reports

- Report on American Shad (2021)
- Predation Impacts and Management (2019)
- Critical Uncertainties for the Columbia River Basin Fish and Wildlife Program (2016)
- Non-native Species Impacts on Native Salmonids in the Columbia River Basin (2008)



What can the Council do?

- The Council can:
 - Recommend direct program funding from Bonneville: suppression and eradication work
 - Use its role in the basin to call attention to these issues and seek other types of funding or action.
 - Work with legislators to ensure passage and funding of non-native species prevention programs

Zebra and Quagga Mussel Prevention Efforts



NWPCC, Portland
February 14, 2023

Stephen Phillips, Senior Program Manager

PSMFC Aquatic Invasive Species Program Since 1999

Main Species of Concern: Zebra and Quagga Mussels

PSMFC Staff: GIS Manager: Van Hare; AA: Amy Stark

Contractors: Lisa A. DeBruyckere, Debra "Quagga D" Davis, Leah Elwell and Robyn Draheim;



**US Army Corps
of Engineers®**

ZEBRA/QUAGGA MUSSEL (AKA Dreissenids) FACTS

- ❑ Zebra /Quagga Mussels were introduced into the Great Lakes in the 1980's by means of contaminated ballast water from Europe and in 2007 were discovered in Lake Mead**
- ❑ Uninfested western states are NM, MT, OR, ID, WA, WY, and AK**
- ❑ Can live out of water for up to two weeks – move by attaching to watercraft/equipment (adults) or by contaminated water (downstream flow) (larvae AKA “veligers”)**
- ❑ Significant Biofouler: Mussels will colonize surfaces of equipment and conveyances using raw water – Navigation buoys, locks, turbine cooling lines, pumps, irrigation pipes, trash racks, fish screens, fish ladders**
- ❑ Forms thick mats up to 750,000 per square meter (Lake Mead 50,000+)**
- ❑ Filters enormous amounts of algae, disrupting the food chain, impacting water quality (e.g. increase in blue green algae blooms {cyanobacteria}, linked to crash of Lake Huron salmon population)**
- ❑ No natural predators of consequence in North America**
- ❑ Impossible at this time to eradicate in large water bodies (CRB Reservoirs)**



**Cooler Unit w/Mussel Biofouling
Ontario Hydro
Early 1990's**



**Trash Racks – Hoover Dam
Circa 2010**

Fouled Shorelines.. Lake Powell 2018



Salmon Migration in the Basin: Mussel Fouling Threat

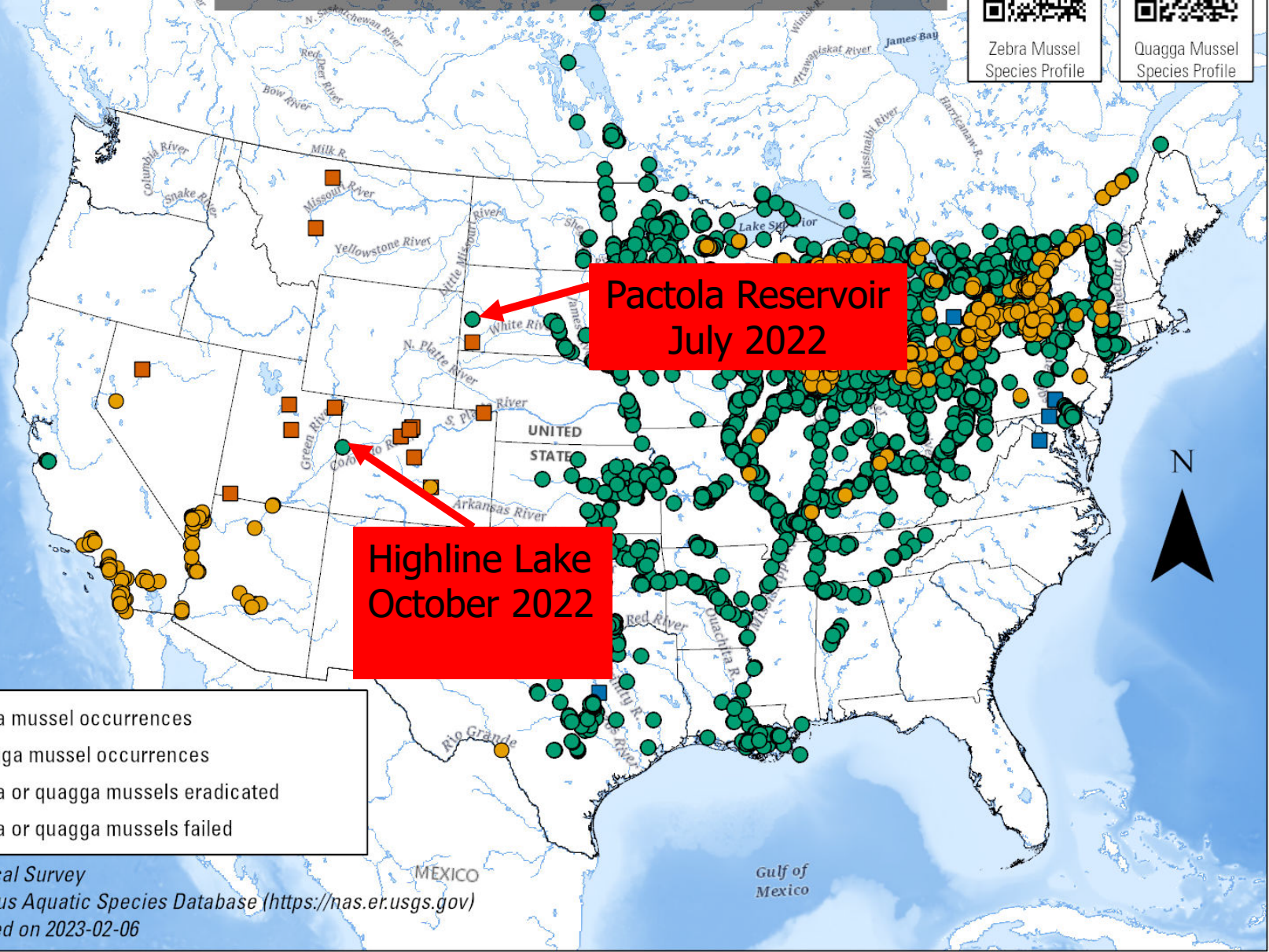


**Travelling Fish Screens
Bonneville Dam**



Fish Ladder, Bonneville Dam

Zebra and Quagga Mussel Sightings Distribution
Dreissena polymorpha and *Dreissena bugensis*



- Zebra mussel occurrences
- Quagga mussel occurrences
- Zebra or quagga mussels eradicated
- Zebra or quagga mussels failed

**Houseboat w/Quagga, Lake Mead ~ 2015
(Watercraft Decontaminated Using Hot Pressure Wash)**



Some Important AIS Legislation with Western Implications

Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA):
Created *Aquatic Nuisance Species Task Force*, and the REGIONAL PANELS (Western Regional Panel, FACA)

NISA: National Invasive Species Act of 1996:

USFWS' 100th Meridian Initiative (2001, Morphed into Quagga Zebra Action Plan)..genesis of CRB/MRB AIS Teams



LAKE MEAD

January 8, 2007

Quagga Mussels discovered in Lake Mead (Las Vegas Boat Harbor)



This is going to be expensive..we need “Great Lakes like \$\$\$\$\$”

2008 Senator Dianne Feinstein request’s *Quagga Zebra Action Plan*, completed in 2010...resulted in some DOI funding...but still insufficient

WESTERN STATE AIS BIPARTISAN LEGISLATIVE PUSH

Water Resources Reform and Development Act (WRDA/WRRDA/AWIA)

~ **2012:** WRDA identified as an AIS funding vehicle

Rep.' s Thompson (D-CA), Hastings (R-WA) Simpson (R-ID), Herrera-Beutler (R-WA) and DeFazio (D-OR); Senator Baucus (D-MT)

NWPCC, PNWER, FBC, PSMFC, State Rep Eric Anderson (ID), NW States and Tribes and many others...

Water Resources Development Act

Created Invasive Species USACE APC WID COST SHARE

2014

Water Resources Reform and Development Act
[Public Law 113-121]

Reauthorized in **2016, 2018, 2020, 2022**

2017: CRB Watercraft Inspection and Monitoring Cost Share Program Begins;

- PSMFC signs agreement (PPA) to administer the program on behalf of OR, ID, MT and WA

2018: Upper Missouri, South Platte, Upper Colorado Basins Added, Rapid Response Added

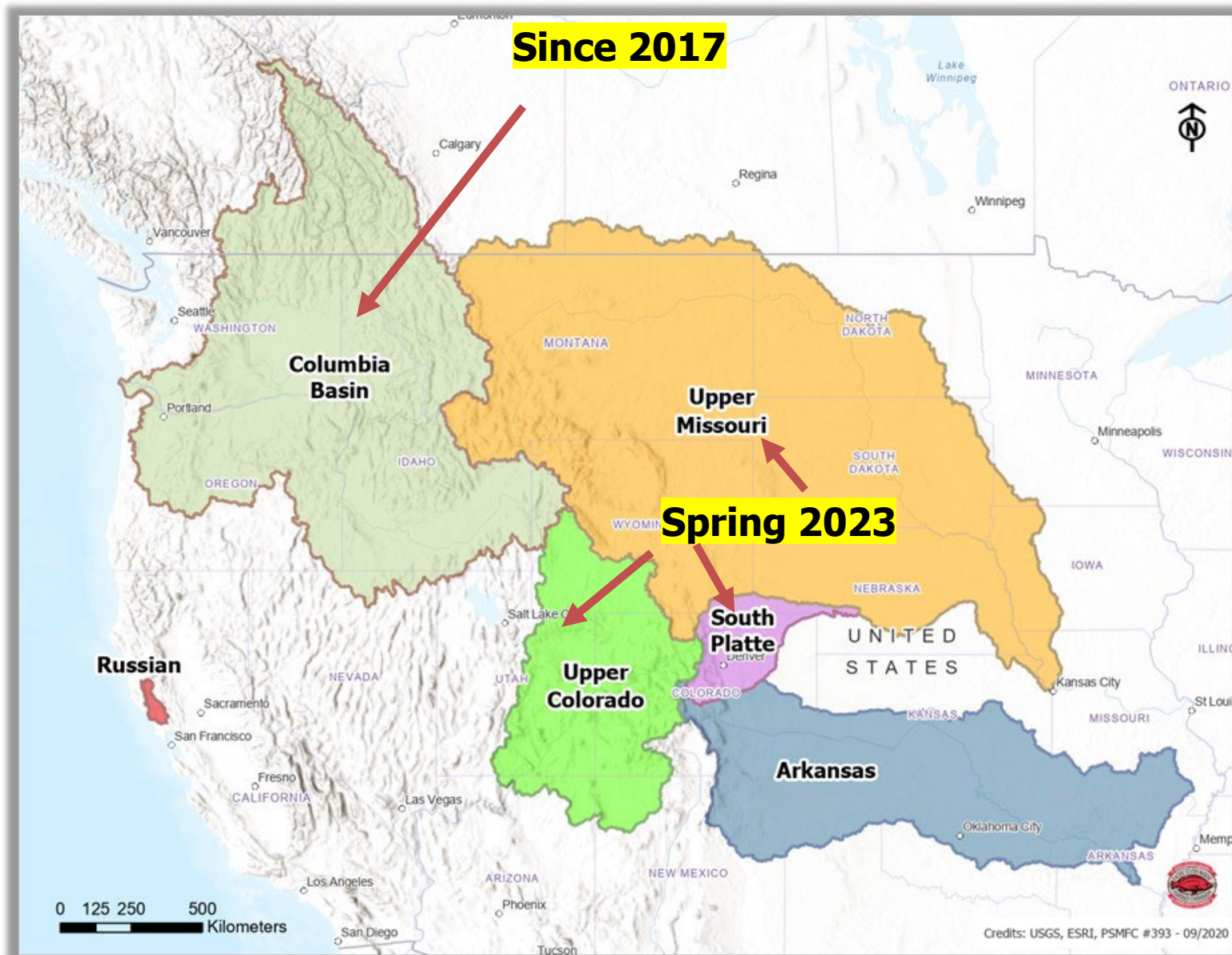
2018: federal budget included language for the **control** of the flowering rush

- 2022 Program Begins, [and now hydrilla]

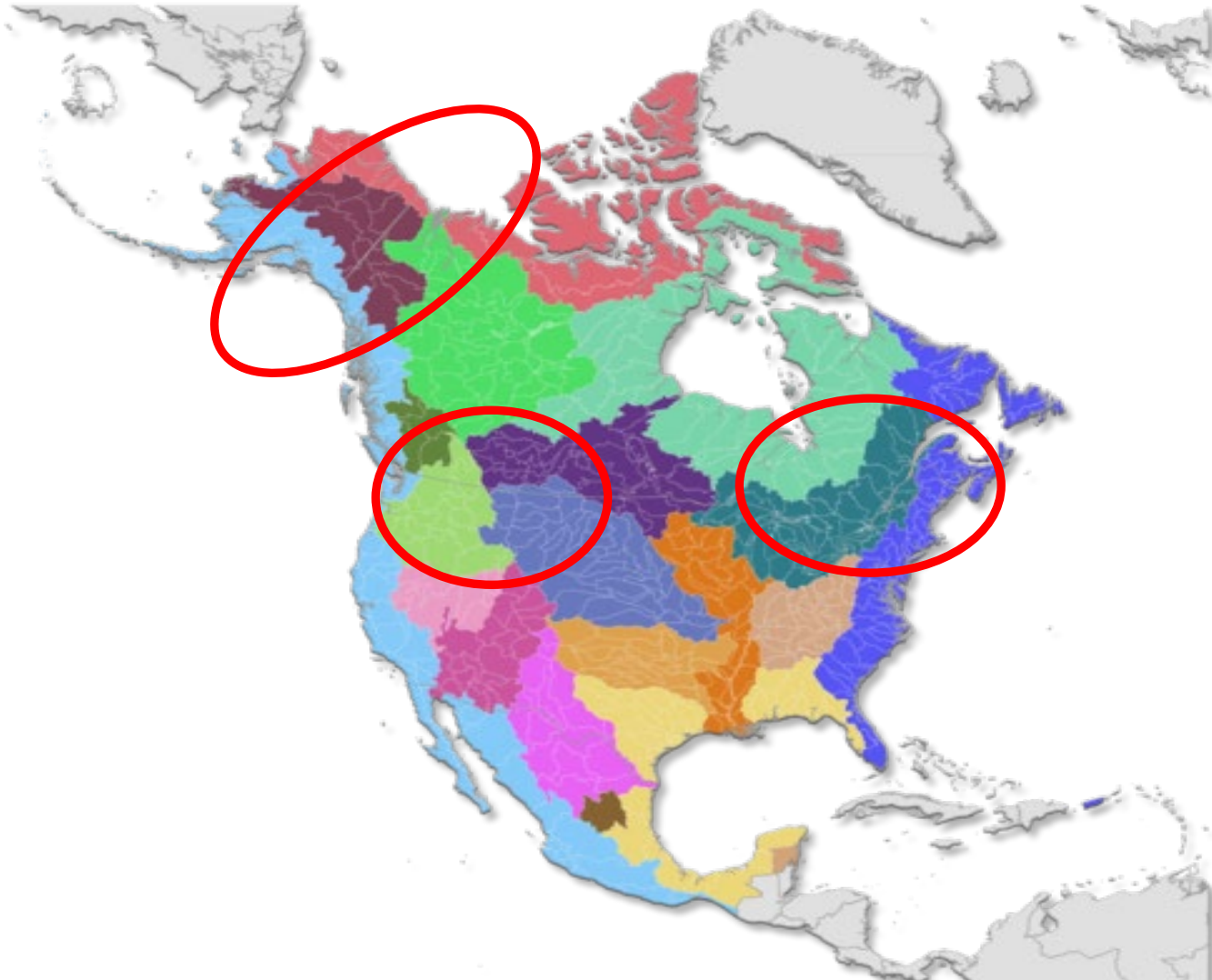
2020: Arkansas and Russian River added, and watersheds that adjoin an international border between the United States and **Canada**.”;

2022: Nevada and Wyoming added to CRB

USASE APC WID Cost Share (50/50) Set up cost-share Basins, dreissenid Monitoring, Watercraft Inspection, Rapid Response and Flowering Rush,



WRDA 2020: Added Adjoining watersheds between the United States and Canada to cost-share program. PNWER working with USACE on US/Canada Agreement (provinces)..2024 start date?



Congressional APC WID Appropriation

(Source J. Grundman, USACE)

FISCAL YEAR	TOTAL APC (WRDA COST-SHARE)	SUBPROGRAM APPROPRIATIONS
FY16	\$4.0M	4M - R&D of Aquatic Invasive Plants
FY17	\$9.0M (5M CS)	4M - R&D of Aquatic Invasive Plants 4M - Watercraft Inspection Stations 1M - Monitoring and Contingency Planning
FY18	\$11.0M (6M CS)	5M - R&D of Aquatic Invasive Plants 6M - Watercraft Inspection Stations <i>- Also control of Flowering Rush</i>
FY19	\$12.0M (6M CS)	5M - R&D of Aquatic Invasive Plants 5M - Watercraft Inspection Stations 1M - Monitoring related to WISP 1M - Control of Flowering Rush
FY20	\$24.0M (18M CS)	5M - R&D of Aquatic Invasive Plants 15M - Watercraft Inspection Station 3M - Monitoring related to WISP 1M - Control of Flowering Rush
FY21	\$25.0M (18M CS)	1M - Flowering Rush & Hydrilla 15M - Watercraft Inspection Stations <i>- equal split between subsections i, ii, and iii</i> 3M - Monitoring related to WISP 6M - Nationwide R&D of Aquatic Invasive Plants
FY22	\$30.0M (20M CS)	17M - Watercraft Inspection Stations <i>- Equal split between subsections i, ii, and iii</i> 3M - Monitoring related to APC-WIDS 1M - Control & Monitoring of Flowering Rush & Hydrilla 7M - R&D of Invasive Aquatic Plants 150K - Activities under Sec. 509 of WRDA 2020 Additional Funds for Activities under Sec. 505 of WRDA 2020

Increase \$\$\$\$\$/New Basins

FY 2023: \$16M Watercraft Inspection; \$3M Monitoring; \$ 2M Flowering Rush and Hydrilla

USACE /State APC-WID 2023 Estimated Budgets

	Watercraft Inspection	Monitoring	Total
OREGON	\$1.32M	\$240K	\$1.56M
WASHINGTON	\$2.0M	\$1.3M	\$3.3M
IDAHO	\$3.1M	\$122k	\$3.22M
MONTANA	\$4.7M	\$774K	\$5.47M
WYOMING	\$670k		\$670K
NEVADA	\$163 k		\$163K
Flowering Rush: ID, MT, WA since 2022: Estimating \$900k for 2023 Rapid Response: Funds available			

Watercraft Inspection (and Decontamination) Stations

PREVENTION: WATERCRAFT INSPECTION STATIONS

Samuels, ID

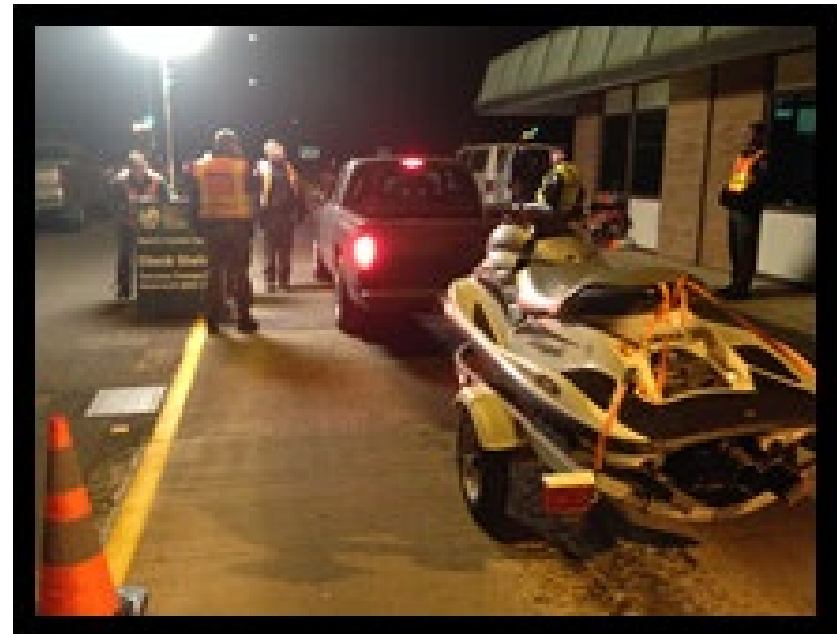


Canyon Ferry - Hellgate Campground
Aquatic Invasive Species Decontamination Station

Ashland, OR

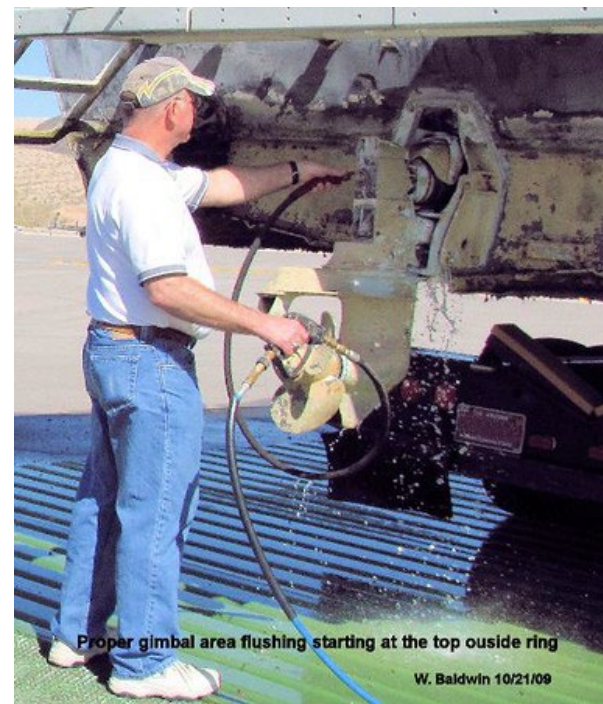
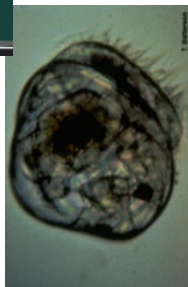


Spokane, WA, note: night time

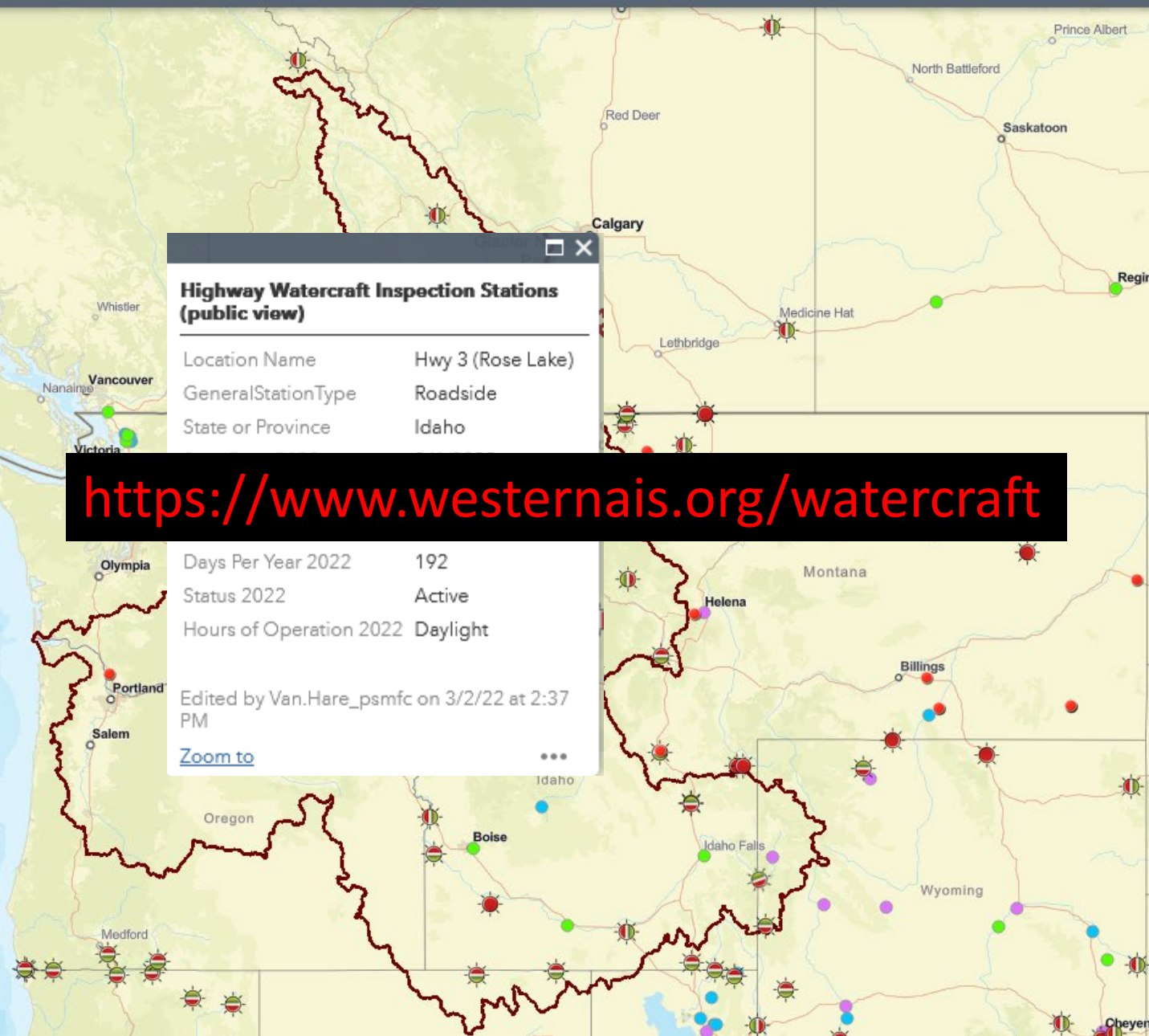


Decontamination of Watercraft, 140/120 Degrees F

Uniform Minimum Protocols
and Standards for Watercraft Inspection
and Decontamination Programs
for Dreissenid Mussels in the
Western United States



Find address or place



Highway Watercraft Inspection Stations (public view)

Location Name	Hwy 3 (Rose Lake)
GeneralStationType	Roadside
State or Province	Idaho

<https://www.westernais.org/watercraft>

Days Per Year 2022	192
Status 2022	Active
Hours of Operation 2022	Daylight

Edited by Van.Hare_psmfc on 3/2/22 at 2:37 PM

[Zoom to](#)

Data Sharing: Regional WID Data Sharing System



Owned and Administered by CPW Tool For Recording, Viewing, Editing &

LOGOUT
Dashboard

Start Inspection

Upload Inspections 0

Watercraft Movement Notice

Upload Notices 0

Search Inspections

Settings

Signed In As rwalters

CALL BEFORE YOU HAUL

1-844-311-4873

States have requirements for commercially hauled watercraft. If you are transporting a boat to Washington, Oregon, Idaho, or Montana, Call Before You Haul to avoid costly delays.

You Provide . . .

- Waterbody origin
- Travel route
- Time frame
- Destination
- Hauler and boat owner contact info
- Last waterbody
- Est. time out of water

What Happens After You Call?

The destination state will contact you to ensure your boat is inspected, and if necessary, decontaminated, before or upon arrival to its destination.

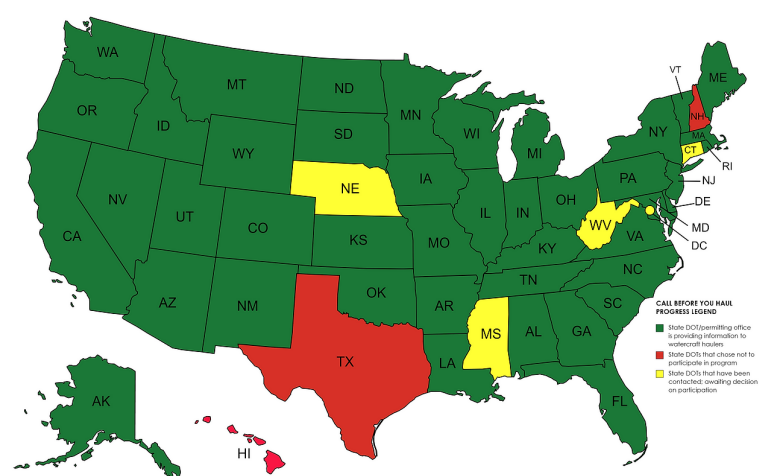
Why is This Important?

Call Before You Haul prevents unnecessary delays for you and your customers and ensures you will not be violating state or federal laws pertaining to unlawful transport of invasive species.

Prevent Delays

Aquatic invasive species hitchhike on boats, trailers, and motors in both visible and hidden locations. Trained professionals will inspect and certify your boat to prevent costly delays.

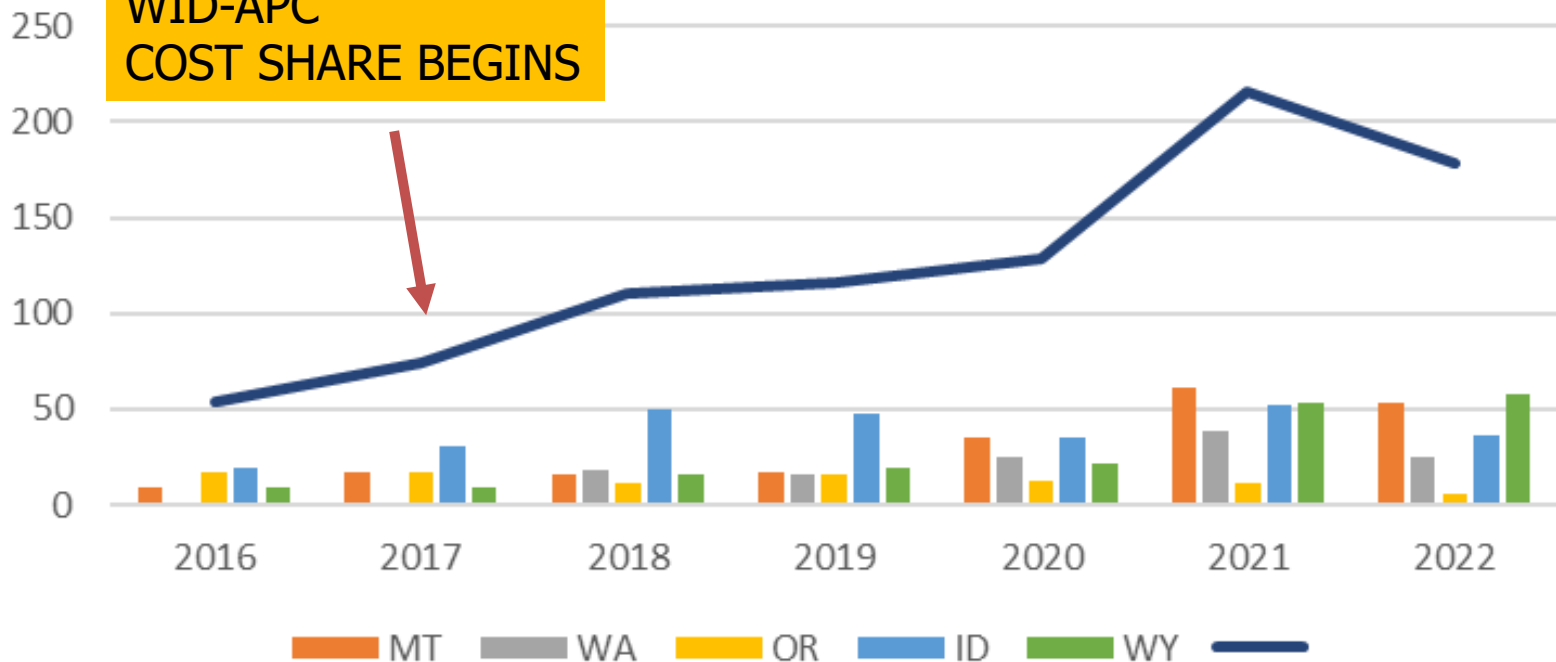
A commercial trucking company, or hauler, may be held legally responsible for violations of state law and the federal Lacey Act if a company driver is intercepted hauling a vessel infested with quagga or zebra mussels. Boat brokers may also be held liable if the broker contracts with an independent contractor to haul a contaminated watercraft across state lines. Save yourself costly delays. Call Before You Haul to ensure your destination state can provide you with the services needed to inspect your cargo. One toll-free call notifies all four western states.



Dreissenid Fouled Watercraft Interceptions by Year 2016-2022

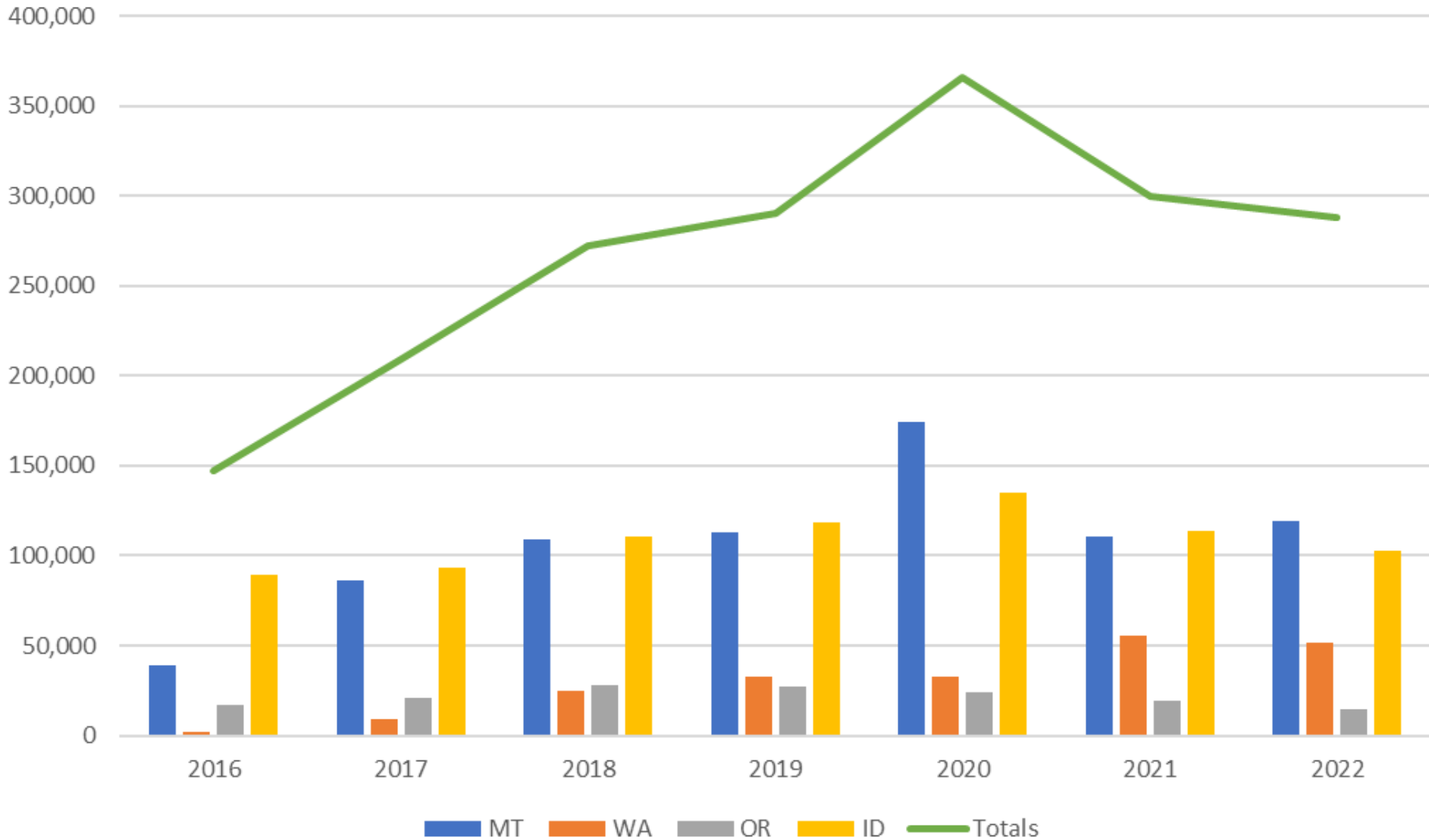
MT, WA, OR, ID & WY

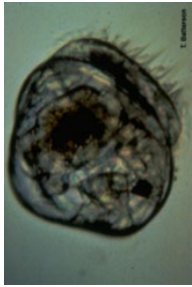
WID-APC
COST SHARE BEGINS



Watercraft Inspections, 2016-2022

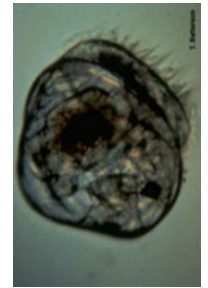
ID, OR, WA, MT



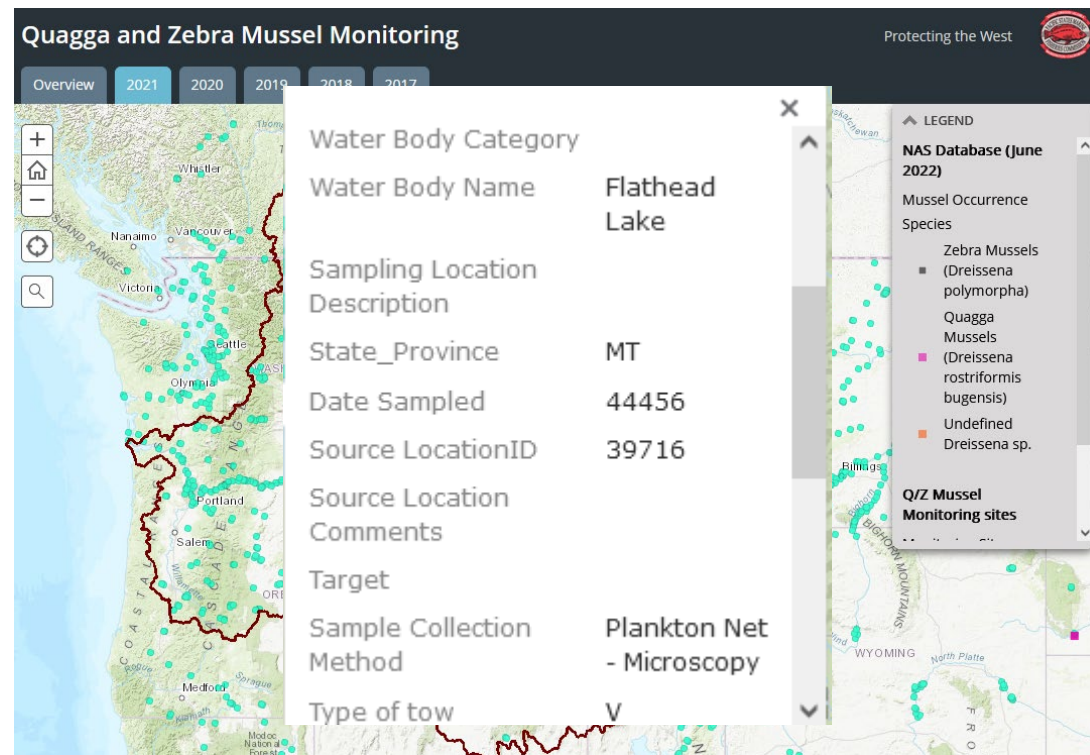


Historic Q/Z Monitoring Effort Dataset

(Veligers, eDNA, Visual)



- Data compiled by PSMFC with assistance from USGS Goal is to identify and map sampling effort across the west to help inform the planning process
- Always aiming to improve the efficiency of the data call process and the quality and utility of the resulting dataset...?nationalize?
- <https://www.westernais.org/monitoring>



Rapid Response -- Q/Z Infestation

Numerous Attempts of Eradication over the years, mostly failed

Successful Eradications:

- 2006, Millbrook Quarry, VA 12 acres; (KCL)
- 2011, Lake Zorinsky, Omaha, NE 225 acres (drawdown)
- 2017, Billmeyer Quarry, Bainbridge, PA 29 acres Earthtek, QZ (copper)

Pending

- 2023, Highline Lake, CO, 563 acres (50 FT Depth) Earthtek, QZ (Cost ~<\$100k)

Steps

FIND EM (currently under-sampled, expanded use of eDNA should help)

ORGANIZE RESPONSE (ICS if needed, YES)

PERMIT THE KILL (ESA, NEPA, NOAA USFWS on-board)) (Copper products an issue)

KILL EM (manageable location, e.g. Lake Winnipeg, MB 2016) (Cost ~\$500k)

PAY FOR IT (yes, \$\$\$ should be available, USACE cost share)

**TIME FRAME FOR MANAGEMENT ACTION TO GET CHEMICALS IN THE WATER:
30-60 days?**

Resource for Q/Z Mussel Rapid Response

CRBDIRT.COM

Home

Columbia River Basin

Dreissenids

Incident Response

ESA Consultation

Reference Docs

COLUMBIA RIVER BASIN DREISSENID INCIDENT RESPONSE TOOLKIT

A resource to facilitate a response to an introduction of dreissenids in the Columbia River Basin



Introduction

Since their introduction to the Great Lakes region of North America in the



Toolkit Purpose

This toolkit provides resource managers with the tools and

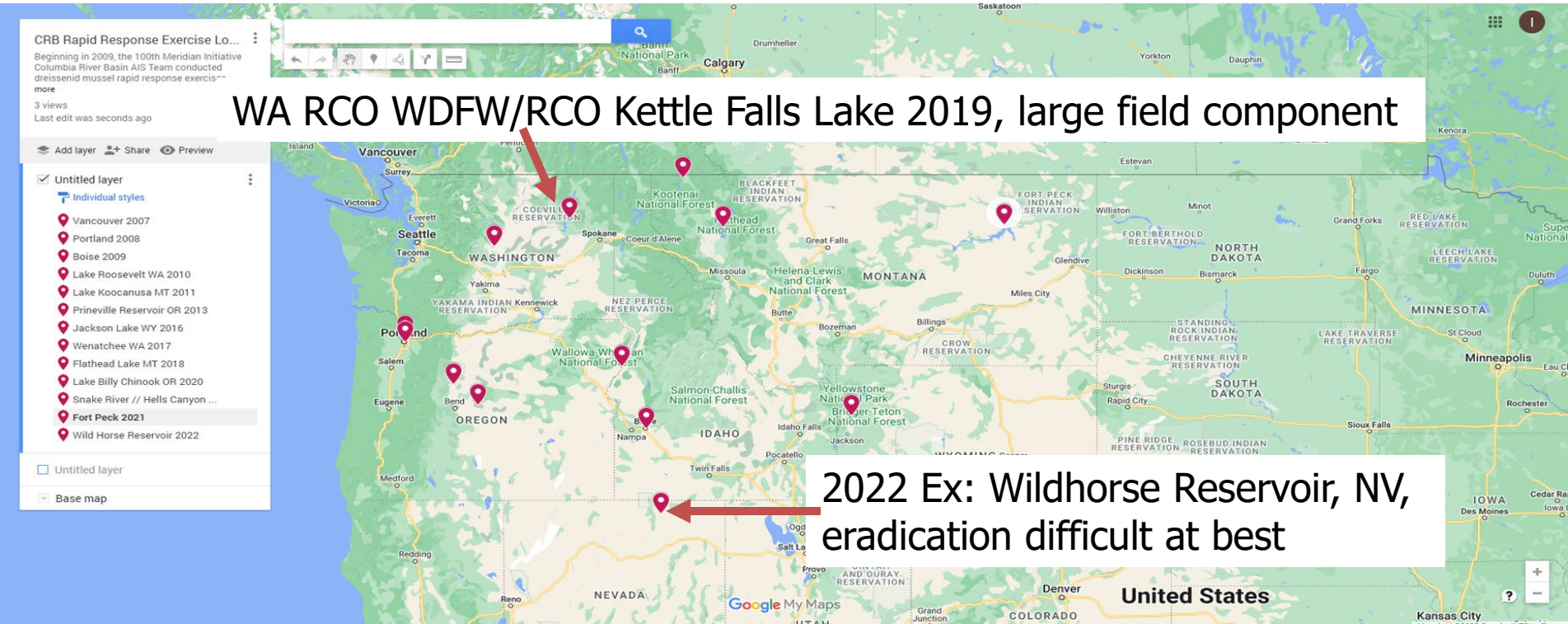


Consequences of No Action

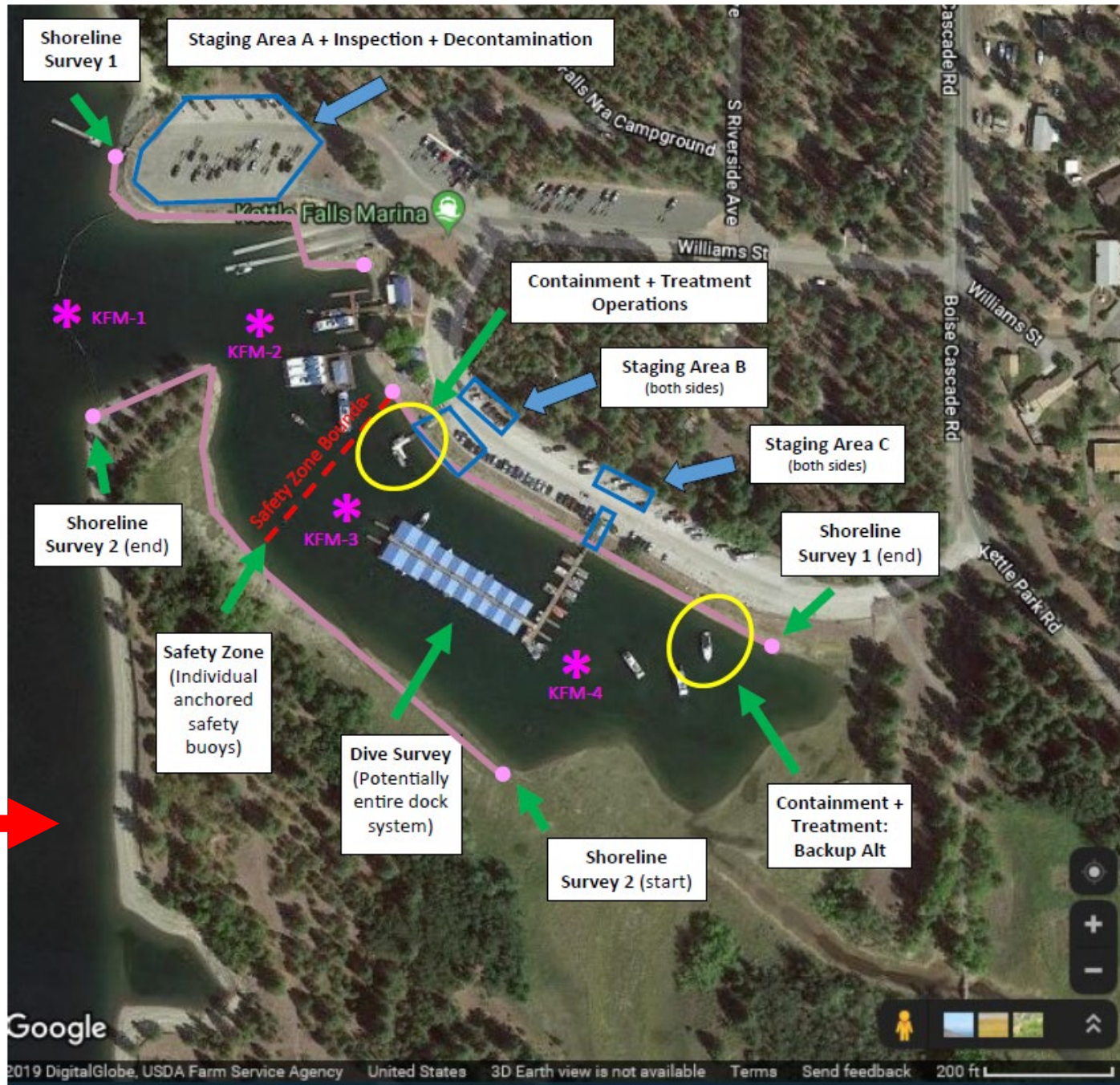
Rapid Response Exercises (Follows ICS)

WA RCO WDFW/RCO Kettle Falls Lake 2019, large field component

2022 Ex: Wildhorse Reservoir, NV,
eradication difficult at best



Kettle Falls Marina Rapid Response Exercise Planning Map



Google

OTHER ITEMS OF INTEREST

© Colorado Parks and Wildlife



Decontamination of ballast boats extremely time intensive, Hot Water Dip Tank, \$750k, UDWR, 1 @ Lake Powell, additional units being built



Puddles, Fin mussel detecting dogs, WDFW , Veligers too



Management of Biological Invasions (2016) Volume 7, Issue 4: 419–428

DOI: <http://dx.doi.org/10.3391/mbi.2016.7.4.11>

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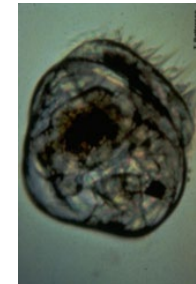
Open Access

Research Article

The ability of scent detection canines to detect the presence of quagga mussel (*Dreissena rostriformis bugensis*) veligers

Debra L. DeShon¹, Wai Hing Wong^{2,3,*}, Debbie Farmer⁴ and Ashley J. Jensen¹

¹Mussel Dogs[®], PO Box 238, Danner, CA 95316, USA



Infrastructure Investment and Jobs Act (IIJA), [\[HR 3684, Public Law 117-58 \]](#)

DOI PROJECTS INCLUDE

Activity 6 Developing the Departmental Molecular-Based Early Detection Architecture to Support a National

Early Detection and Rapid Response
(EDRR) Framework,
(USGS) \$2,500,000

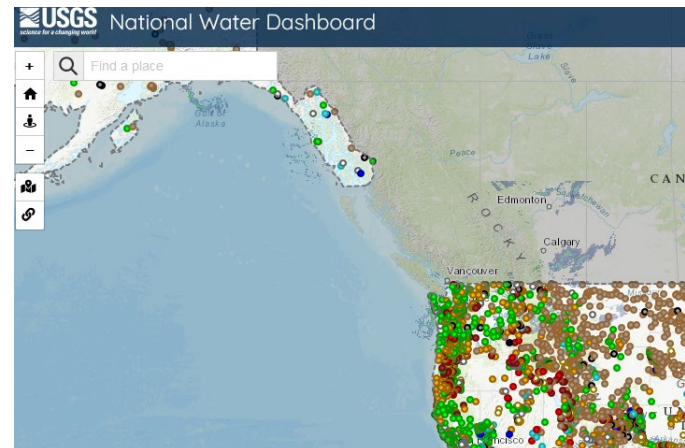
Activity 6 (Invasive Species) Developing a National Early Detection and Rapid Response (EDRR) Information System to Support a National EDRR Framework National-scale
(USGS) \$550,000

DNA Tracker, NS2

Coordination between Federal agencies and States/Tribes will be critical for informed management of eDNA results

AUTONOMOUS, CONTINUOUS DETECTION

- A genetic "smoke alarm" for species and pathogens of concern



ISSUES

USACE WID-APC Cost Share 50% Match: has proven limiting for states, change to 25%

USACE WID-APC Cost Share Program Implementation

Great Lakes: Need to encourage decontamination at the source.. 2001: “Stop Westward Aquatic Threats Act’ of 2001 Brian Baird (D-WA) [Failed] -- *work with States to establish check stations on highways and waterways that cross the 100th meridian..* will USACE APC WID make this possible ?

Pactola Reservoir, SD: Good working relationship with SDGFP staff, good partnerships BOR, U. S. Forest Service, MTFWP, WYGFD, APC WID coming on line in 2023...however, additional decon measures needed at Pactola

NOAA – Need to re-establish their “Office of Invasive Species for AIS in Silver Spring... regional office participation would follow..will require \$\$\$’s and relatedly:

Reauthorization of National Invasive Species Act of 1996: Its been 27 years.....the playing field has changed

N. PIKE: cue *Jaws* music, corps cost share \$\$\$’s coming

Recovering America’s Wildlife Act (RAWA) – will be reintroduced

ISSUES (Continued)

State Law: It is illegal in Western states to transport dreissenid mussels

Federal Law: Lacey Act, prohibits interstate transport

However....

NPS Lake Mead/ National Recreation Area said this about mandatory decontamination at national parks:

Interior: "Staff from Lake Mead NRA and Glen Canyon NRA (Lake Powell) consulted the Department of the Interior Office of the Solicitor. The NPS was advised it does not have regulatory authority to require the inspection and / or cleaning of boats that are leaving NPS areas."

To end on a positive note :] prevention gaps have been filled in recent years through partnerships, PNW regional defense, funding increases, boat tracking, education and outreach, enforcement partnerships and regulations...and all of the outstanding AIS agency staff in the West (especially the CRB)!

Thank You!

Questions?

PSMFC AIS WEBSITE: WWW.WESTERNAIS.ORG



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