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# **Invasive Species Update**



**September 9, 2024  
PSMFC 77th Annual Meeting  
Monterey, California**

CLASS, TODAY WE'RE GOING  
TO STUDY WHY IT'S BAD  
TO INTRODUCE INVASIVE  
SPECIES...



# PSMFC Aquatic Invasive Species Program Since 1999

## Main Species of Concern: Zebra and Quagga Mussels

### Talk Outline

#### 1. 2023 Annual Meeting Resolution: 2023- O - Aquatic Invasive Species Treatment Tracking (zebra/quagga focus)

Through October 31, 2028, PSMFC will work with member states to track and report back on treatment efficacy of aquatic invasive species eradication or management efforts, so that member states can learn from ongoing efforts.

#### 2. European Green Crab

#### 3. Hawaii: The cryptogenic macroalgal invader *Chondria tumulosa* @ *Papahānaumokuākea Marine National Monument*.



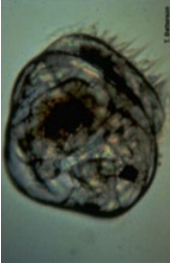
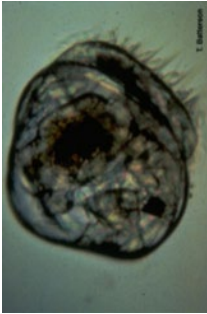
**US Army Corps  
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# Multi-Agency Quagga/Zebra Monitoring

(Veligers, eDNA, Visual)

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



## Quagga and Zebra Mussel Monitoring

Overview

2023

2022

2021

2020

2019

2018

2017



**50 % INCREASE IN CRB MONITORING EFFORT in 2024/2025**

**2023: \$2.3 Million spent on monitoring**

**2024/25 \$3.4 Million (because of ID Snake River find)**

**Funding Source: USACE "WRDA" APC Watercraft Inspection & Decontamination Program w/state 50% match**





Canyon Ferry - Hellgate Campground  
Aquatic Invasive Species Decontamination Station



## Montana FWP: “Live” Mussel Boat Intercepted (8/27/24)

Wibaux, Montana inspection station intercepted a mussel fouled pontoon. The boat was last in Vineyard Lake, MI **8/23/24** and was in water for 2 months. The boat was heading to Spokane, WA with intentions of **launching on the Columbia River**.



## Zebra and Quagga Mussel Sightings Distribution

*Dreissena polymorpha* and *Dreissena bugensis*



Zebra Mussel  
Species Profile



Quagga Mussel  
Species Profile

Snake River  
September 2023  
(still negative)

Lake Oahe  
December 2023

Colorado Mainstem  
Veligers Only, May 2024  
(Source Unknown)

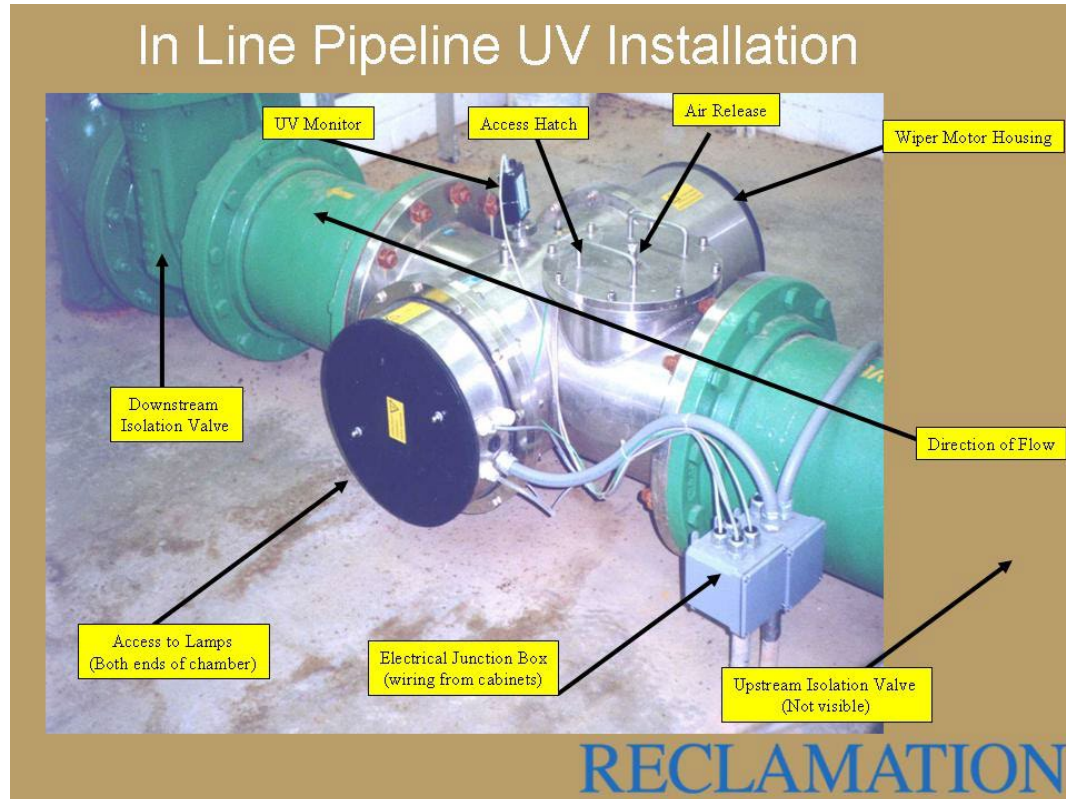
Highline Lake  
October 2022  
(Second TMT on hold)

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



# MUSSEL MANAGEMENT

In closed systems we can control mussels – chemicals (copper, chlorine), filters, and UV such as Hoover Dam raw water lines -- \$\$\$\$\$\$





## **MUSSEL MANAGEMENT: ERADICATION**

**Snake River, Twin Falls Fabulous Eradication – An outlier?, no ESA listed species, no anadromous salmonids..emergency ESA/consultation went smoothly for downstream listed snail species**

**In open systems, lakes, reservoirs, and rivers ..... eradicating mussels needs to consider complicating factors such as **Moving water**, water chemistry, and size of the treatment area for the chemical application**

**Must treat it early at the source (e.g. a marina) ..manageable treatment size**

**Permitting Approval (ESA) for chemical application – ID had a registered copper product for mussel control (Natrix) and got **swift** USFWS Emergency approval**

**Anadromous Zone... Potash (KCL) – less lethal to salmonids ... NMFS less nervous ...but KCL needs more contact time**

**Non-Anadromous Zone –Copper preferred, less time – but are there bull trout, listed snails ? Tribal/NGO concerns on take of fish/ 5 foot sturgeon?**



**THE SNAKE RIVER IN THE HELLS  
CANYON COMPLEX**



**What if ? Drano Lake Example:** The million \$ question – Do we have a salmon “take” if there is a chance for eradication?

- **Popular fishing site, hatchery,**
- **Narrow Treatment Window**
- **ESA listed chum & Chinook**
  - **Enclosable**
  - **Copper?? Potash??**
  - **hmmmmm**



## Billmeyer Quarry, PA

Goal

EPE

Pre-treatment Monitoring

DS

Treatment Year

2017

Hide 12 hidden fields ^

Product

EarthTec QZ

Treatment Area (ha) (% of waterbody)

5.99 (50%)

Treatment Duration (days)

37.00

Treatment depth

Multiple

Barrier Use (Y/N)

No

Non-target monitoring

Phyto

Fish

Zoop

Environmental/Water Chemistry

Alk

Cu

DO

Hard

Temp

Post-treatment monitoring

eDNA

Vel

Wade

# Mussel Eradication – Successful Examples

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, desiccation - freezing)
- 2014: Lake Waco, Texas (2014): impermeable benthic barrier (polyvinyl chloride) covering 3,900 m<sup>2</sup> (example of getting it early)
- 2017: Billmeyer Quarry, Bainbridge, PA 29 acres Earthtek (copper)



# Mussel Eradication

**2023, Snake River, Twin Falls Idaho**



Single Adult Mussel, Snake River 2023

Monitoring is Negative so far in 2024 with ~ two months of monitoring season left



USACE Cost Share (Rapid Response): PSMFC helped develop the content for the Corps Biological Assessment for the state of Idaho to (eventually) recoup \$ 1.1 million of the Snake River Eradication costs...March 2025 (waiting on USFWS approval)

WDFW also will be receiving funds this year for rapid response preparedness

We will need significant funds in the future years ...but states are match-limited

# **Water Resources Development Act 2024**

**USACE/PSMFC “WRDA” Watercraft Inspection/monitoring/rapid response is a 50% / 50% cost-share program**

**FY 2025 \$14 Million program (OR, WA, ID, MT, WY, and NV) of PSMFC managed projects ....other non psmfc states too: ND, SD, UT and CO**

**Goal: Change To cost-share 75% / 25% in 2024 WRDA**

**States are match limited, a change to match = \$ millions more for states**

**Senate language (S.4367): 65%/35% (Merkley)**

**House language (H.R.8812): A little more complicated**

**(c) Priority projects.—The Secretary shall make a determination under section 103(m) of the WRDA of 1986, ...of the ability to pay of the non-Federal interest for the following projects: (Watercraft Cost-Share program) ...**



# European Green Crab AKA “Five Spine”

(*Carcinus maenas*)

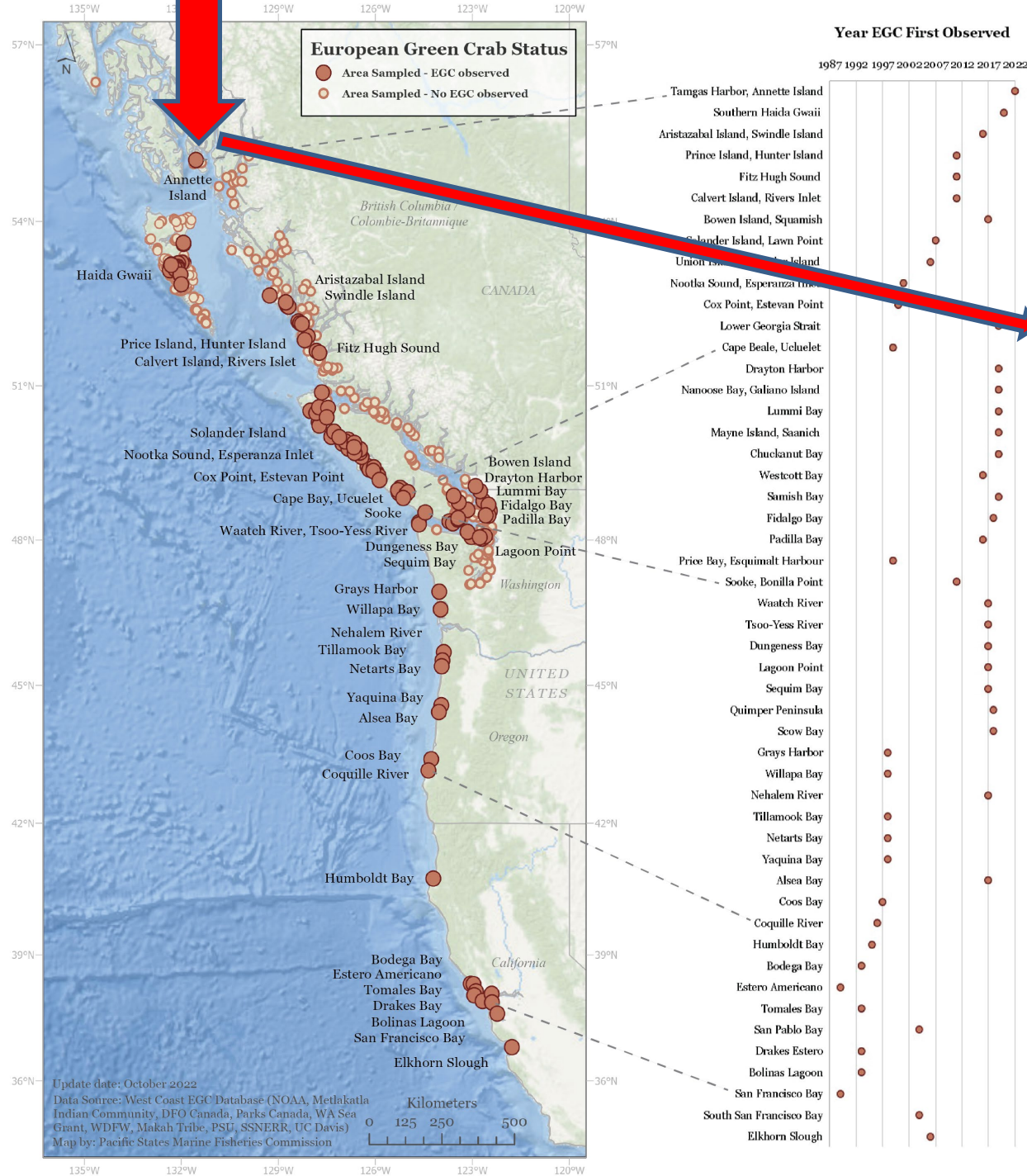


They prey on clams, oysters, mussels, “potentially” compete with Dungeness crab; **can decimate eelgrass beds**

Range expansion during **el Niño / positive PDO** years ..population BOOMING...or tail end of boom ?? La Niña cometh? EGC Here to Stay?

## Control of Green Crab

- **Functional eradication:** will massive trapping in WA work in the long term, trap in perpetuity ??
- Pheromones...Jury out on effectiveness, still worth investigating
- OSU – Magnetized trap experiment... negative
- Market it ? Niche



*Alaska: Metlakatla I.C. ,  
 Annette Island: 2022- 2024 =  
**3,100 Caught***

And nearby...

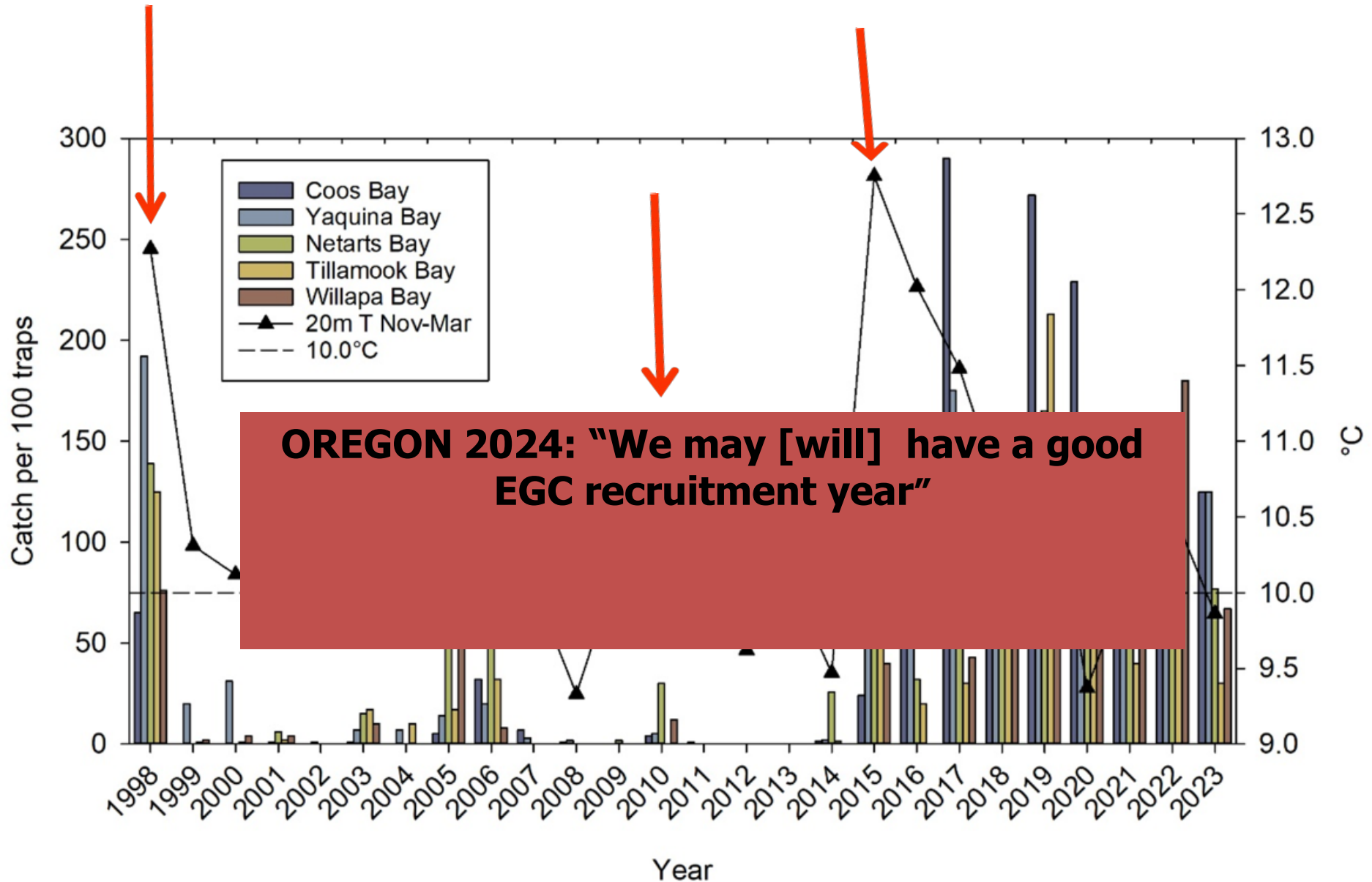
Alaska – Bostwick Inlet (south of Ketchikan), ADFG 15 caught (August)

George Inlet – Carapace Found (August)

ADFG: "Based on carapace detections, they seem to be everywhere people are looking in southern southeast."

# Oregon YOY Green Crab Recruitment

Dr. Sylvia Yamada, Oregon





# WASHINGTON

(Source: WDFW)

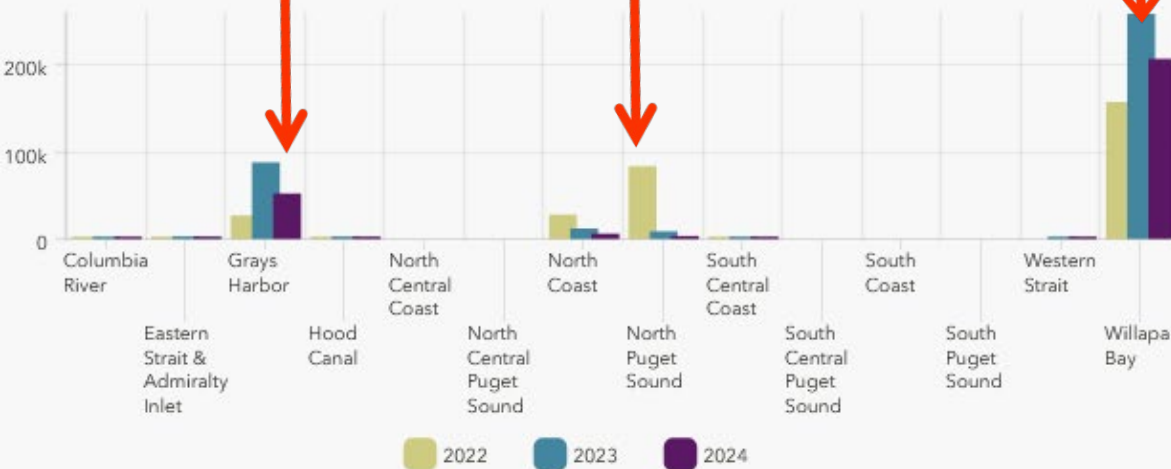
Total EGC Removed to Date

 **905,320**  
Total Removals Since Jan 1, 2022

 **258,588**  
2024 Removals

 **361,449**  
2023 Removals

Total EGC Captures



WA State Parks GIS, Esri, TomTom, Garmin, FAO, NOAA, U.S. Navy Hydrographic Survey, NOAA, U.S. Navy Hydrographic Survey

Data Last Updated on 08/14/24, 3:8 PM

# *Chondria tumulosa* (Hawaii)

Cryptogenic Invasive Red Algae

In 2019 found at the Papahānaumokuākea Marine National Monument.

Mats were found stretching for the length of football fields and smothering the native corals. Not only were colorful corals not in sight; none of the usual grazing fishes, such as parrotfish, were nearby.



<https://sanctuaries.noaa.gov/news/jul20/newly-named-nuisance-alga-chondria-tumulosa.html>



**Thank You!**

**Questions?**

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# Thank You!

## Questions?

PSMFC AIS WEBSITE: [WWW.WESTERNAIS.ORG](http://WWW.WESTERNAIS.ORG)



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# **ZEBRA/QUAGGA MUSSEL (AKA Dreissenids) FACTS**

- ☐ Zebra /Quagga Mussels were introduced into the Great Lakes in the **1980's** via contaminated ballast water from Europe, **2007** were discovered in Lake Mead
- ☐ Uninfested western states are NM, MT, OR, **ID?**, WA, WY, and AK, No. Calif.
- ☐ 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 conveyances using raw water – Navigation buoys, 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)
- ☐ **Impossible to eradicate at this time in large water bodies (e.g. CRB Reservoirs)**



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



**Trash Racks – Hoover Dam  
Circa 2010**



# Salmon Impacts in the Basin: Mussel Fouling Threat



**Travelling Fish Screens Bonneville Dam**



**Fish Ladder, Bonneville Dam**



**Carson National Fish Hatchery**

# Mussel Eradication – Pending

\*\*\*\*\*update\*\*\*\*\*

**2024 Clear Lake, Riding Mountain National Park, Manitoba  
40 adults found**

**August 2024:** Two kilometer barrier is in place ...will they pull the trigger with Potash  
???



(Photo courtesy of Parks Canada. /Winnipeg Sun)

# Mussel Eradication

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Monitoring is Negative so Far in 2024 with ~ two months of monitoring season left

USACE Cost Share (Rapid Response): PSMFC developed the content for the Corps Biological Assessment for the state of Idaho to recoup \$ 1.1 million in the Snake River Eradication, USFWS is reviewing, likely will be approved, Idaho can expect a **USACE** check in March 2025

WDFW also will be receiving funds this year

We continue to seek a Programmatic Biological Opinion for Q/Z eradication (difficult, until then we are in an emergency consultation model)

We do have a white paper out on Programmatic Biological Opinion for mussel control In the CRB ....it could be modeled after fire response ...see <https://www.westernais.org/rapid-response..see:>

*Preparing for CRB Dreissenid Eradication and Control Efforts - A Decadal Journey and Key Next Steps*