

# Colorado Parks & Wildlife Zebra Mussel Update



**STOP AQUATIC  
HITCHHIKERS!™**



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# What Are Invasive Species?

- Non-native plants, animals or pathogens
- No natural predators outside native range
- Harmful effect on natural resources and the human use of resources
- Economic, Cultural and Ecological Impacts
- Aquatic Nuisance Species = ANS



New Zealand Mudsnail



Eurasian Watermilfoil



Zebra Mussel



Rusty Crayfish



# What ANS Are We Concerned About?

ZEBRA MUSSEL



QUAGGA MUSSEL



## Animals

- Zebra Mussels
- Quagga Mussels
- New Zealand Mudsnails
  - Rusty Crayfish
  - Spiny Waterflea
- Fishhook Waterflea
  - Asian Carp



## Plants

- African elodea
- Brazilian egeria
- Eurasian watermilfoil
  - Giant salvinia
- Water hyacinth
  - Hydrilla
  - Parrotfeather
- Yellow floating heart



# ZQM Detection History in Colorado

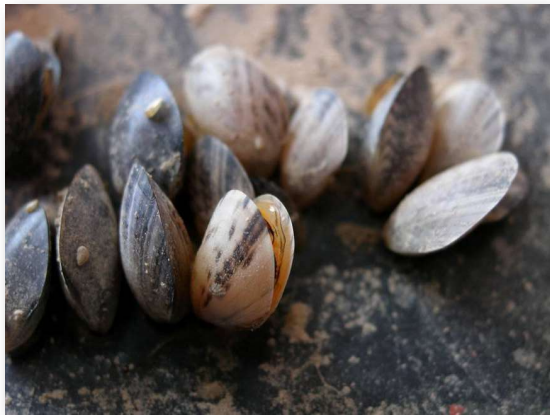
- **2008** - Grand Lake, Granby, Shadow Mountain, Willow Creek, Tarryall and Jumbo Reservoir test positive for single mussel veligers.  
All De-Listed in 2014 following 5 years of negative testing
- **2009, 2011, and 2012** - Blue Mesa Reservoir tested positive for quagga mussel eDNA.  
De-Listed in 2014.
- **2007, 2008, 2009 and 2011** - Pueblo Reservoir tested positive for zebra or quagga mussel veligers.  
De-Listed in 2017 following 5 years of negative testing
- **2017** - Green Mountain Reservoir Tested Positive For quagga mussel veligers.  
De-Listed in 2021 following 3 years of negative testing.
- **2022** - Highline Lake tests positive for adult zebra mussels.
- **2024** - Colorado River tests positive for zebra mussel veligers.





# What are Zebra & Quagga Mussels

- Freshwater bivalve mollusks
- Highly variable color patterns
- Triangular (Z) Rounded (Q)



*Dreissena rostriformis bugensis*

## *Dreissena polymorpha*



- Invasive Characteristics
  - Rapid Reproduction
- Attach with Byssal Threads
  - Filter Feeding



# Ecology

- Tolerant of 33F - 86F
- Can survive very cold waters but can not freeze
- Reproduce in waters 48F-54F
- Light sensitive
- Can live in a wide range of conditions, including oxygen depleted waters

ZEBRA MUSSEL



QUAGGA MUSSEL

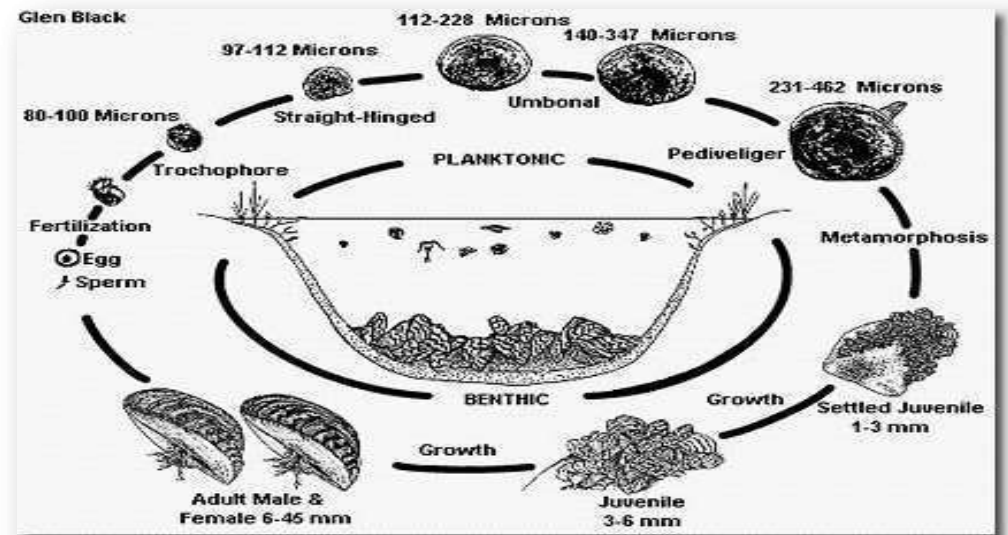
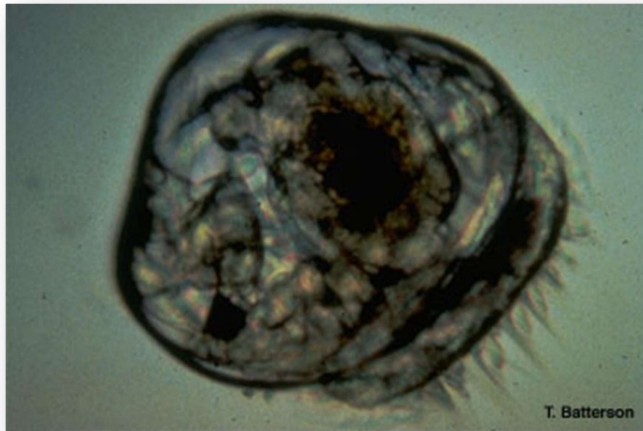


# Life Cycle

- Planktonic Larval Stage (veliger)
- Settler Juvenile Stage
- Sessile as Adults

This is why standing water is such a HUGE concern.

This is what we are feeling boats for - "Bumps on Boats" that don't rub off.







# How did they get to USA?

- Transoceanic vessels from Europe carried larvae in ballast water and/or adults on anchors
- Initial discovery of zebra mussels was in the Great Lakes region near Lake St. Clair in 1988
- Initial discovery of quagga mussels was in the Erie canal and Lake Ontario in 1989





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

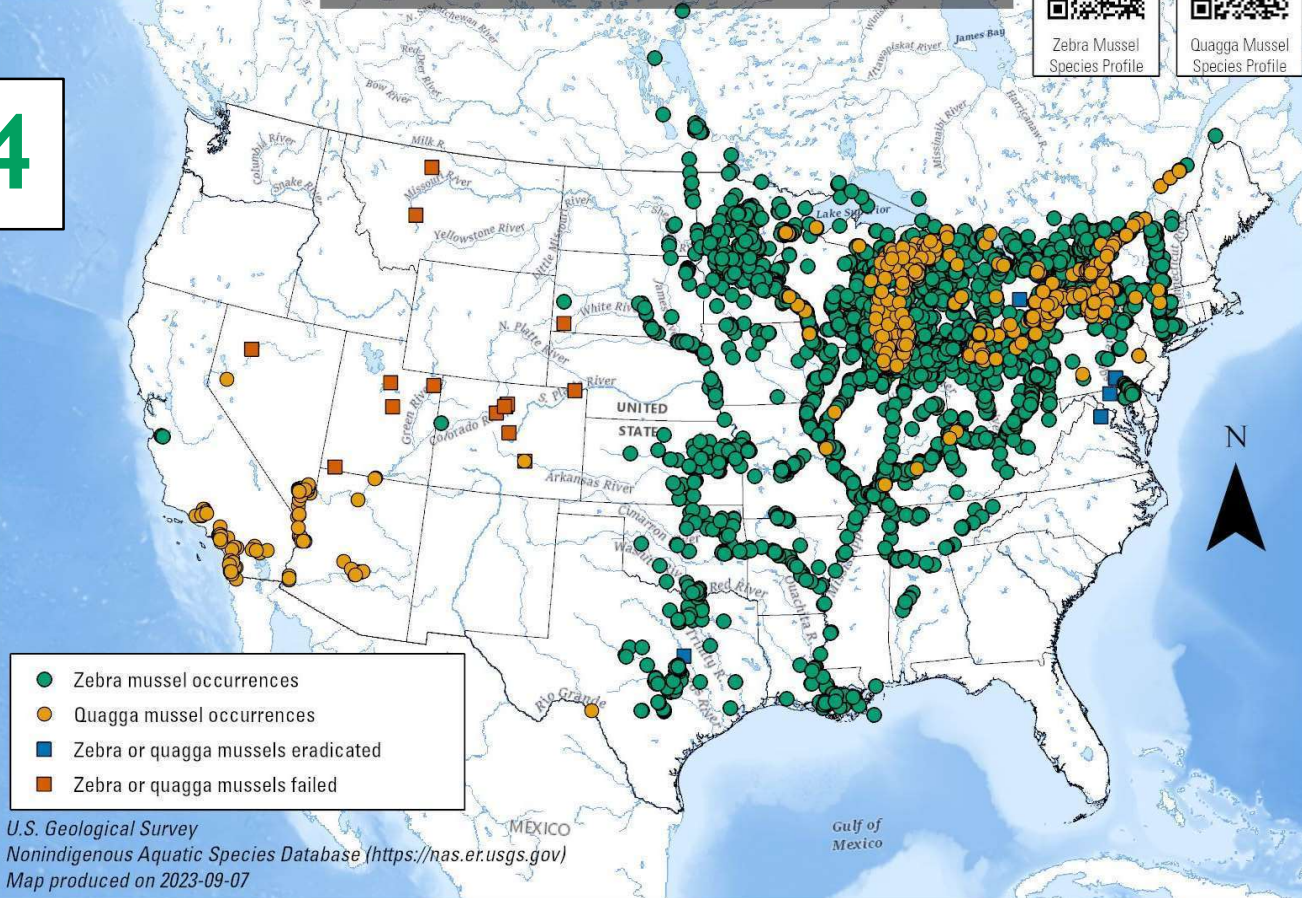


Zebra Mussel  
Species Profile



Quagga Mussel  
Species Profile

2024





# Management

- Eradication is almost impossible.
- Prevention is the best defense!
- Education is the most important task!



# Impacts to Infrastructure

- Impede or stop the flow of water to homes, farms and power plants
- Cost millions of dollars to maintain and/or repair equipment and infrastructure
  - Preventative Control
  - Increased Maintenance
  - Monitoring
  - Unplanned Outages





El Dorado, KS, Zebra Mussels 2003





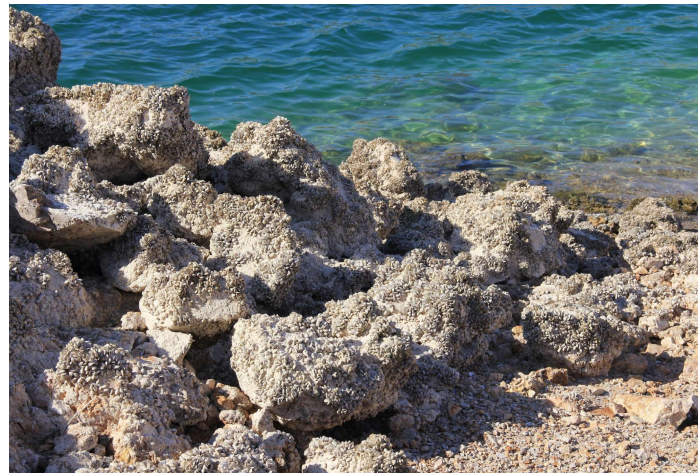
El Dorado, KS, Zebra Mussels 2006





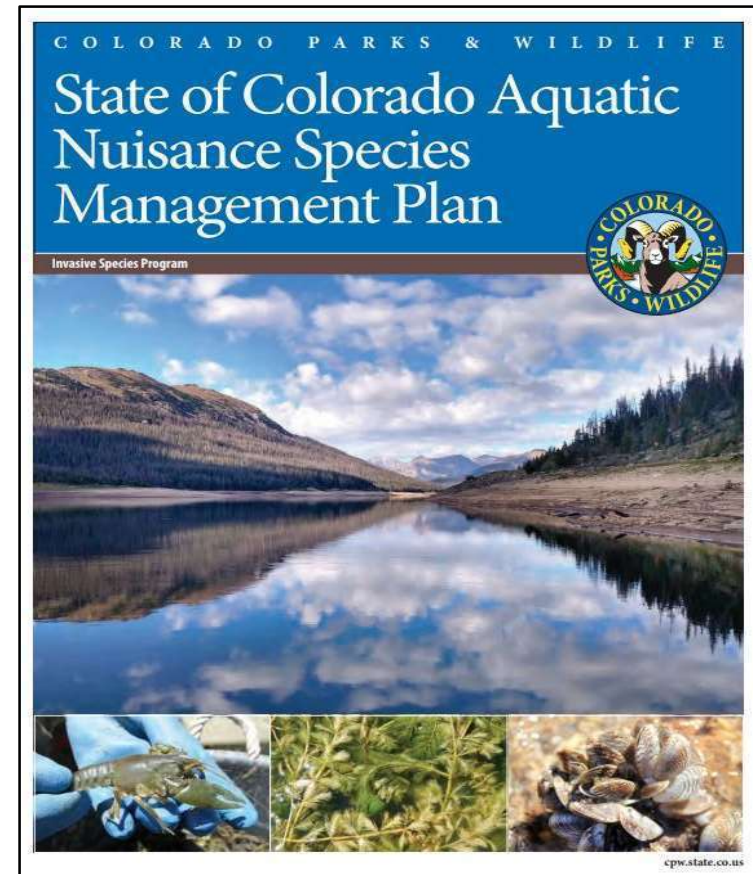
# State ANS Act

- Passed in May 2008
- Formalized State ANS Program
- Illegal to possess, import, export, ship, transport, release, plant, place, or cause an ANS to be released.



# Aquatic Nuisance Species Management Plan

- Started in 2008
- Approved by U.S. Fish & Wildlife Service in 2020.
- Partnership Effort!
- Three main parts
  - Sampling
  - Education
  - WID

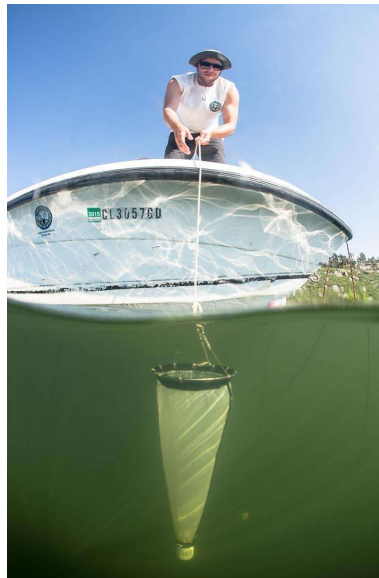




# Early Detection Sampling and Monitoring

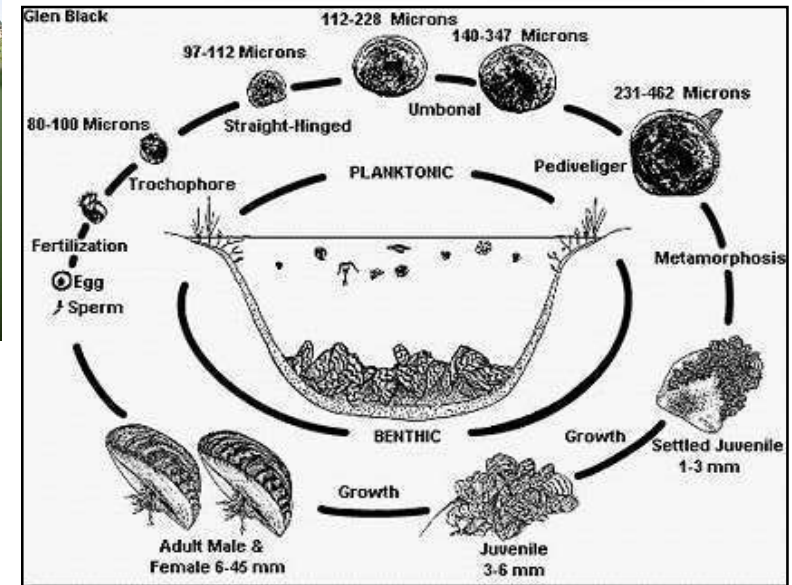
## CPW Technicians

- Plankton tows
- Substrate checks
- Shoreline surveys
- Stream surveys
- Crayfish trapping
- Plant inventories

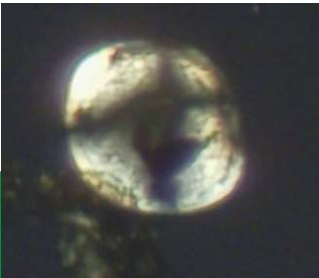


## Frequency

- Risk Dependent
- 1 time per year up to once per month

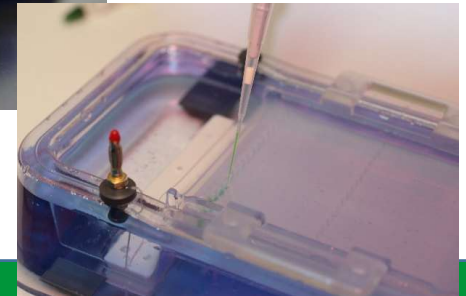


# Plankton Sample Laboratory Analysis



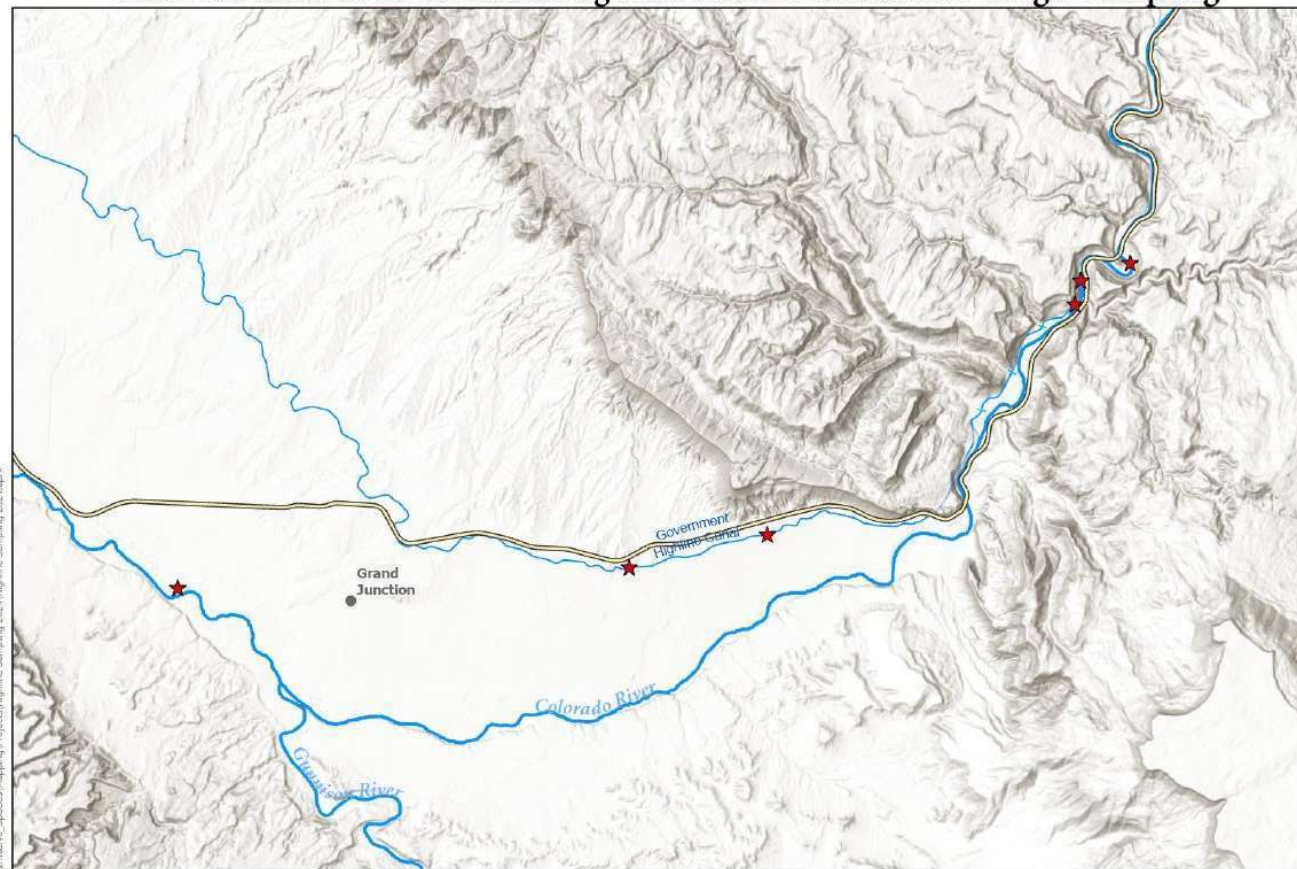
# Polymerase Chain Reaction (PCR)

- DNA Extraction
  - Suspect samples → Purified DNA
- Amplification
  - Create millions of copies of template DNA
- Conventional PCR Gel
  - Results by identifying correctly sized bands on agarose gel
- qPCR (quantitative or real-time)
  - Uses fluorescent signals to measure DNA
  - Results seen in real-time





# Colorado River & Government Highline Canal Zebra Mussel Veliger Sampling



★ Veliger Locations (7)

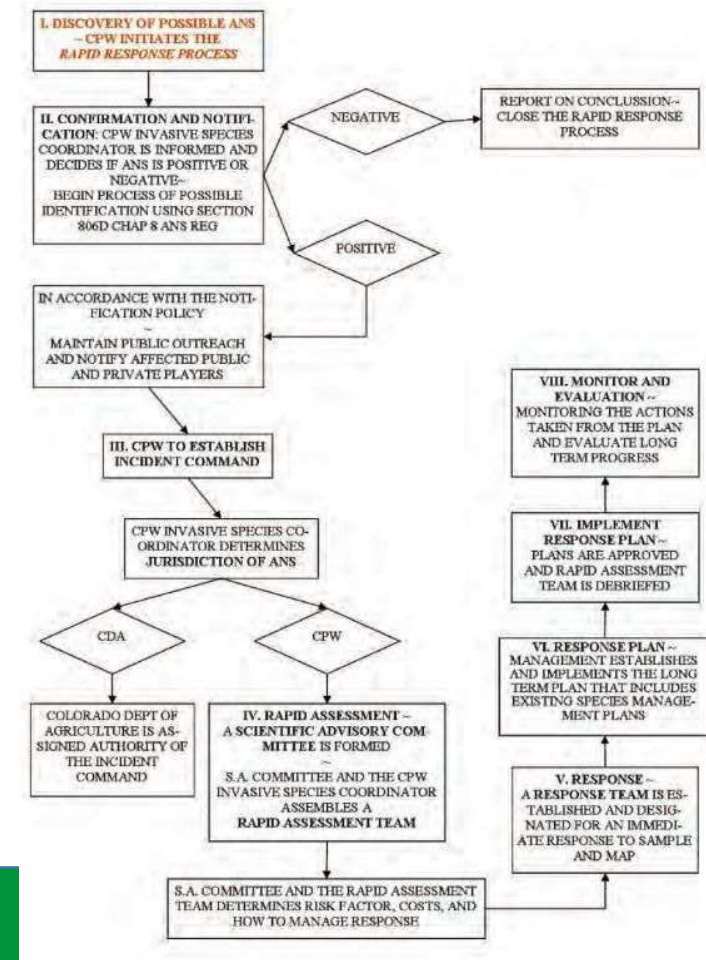


Map Produced by:  
Colorado Parks and Wildlife Invasive Species Program 8/8/2024

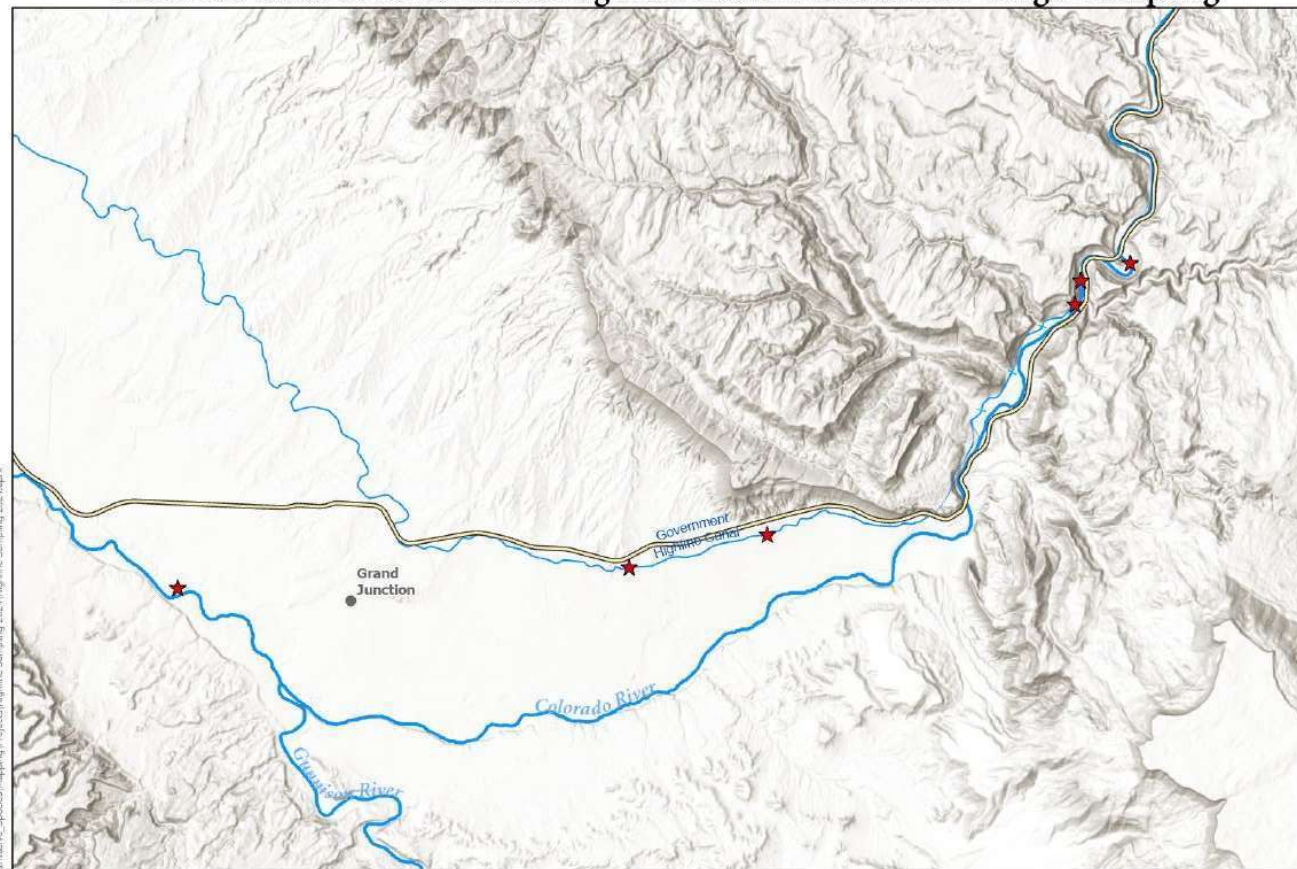


# CPW Invasive Species Rapid Response Strategy

- Outlined in State of Colorado Aquatic Nuisance Species Management Plan
  - Establish Incident Command (CPW)
  - Establish Response Team
  - Determine the Extent of the Population
  - Develop & Implement Long Term Plan



# Colorado River & Government Highline Canal Zebra Mussel Veliger Sampling



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## Colorado River & Government Highline Canal Zebra Mussel Veliger Sampling



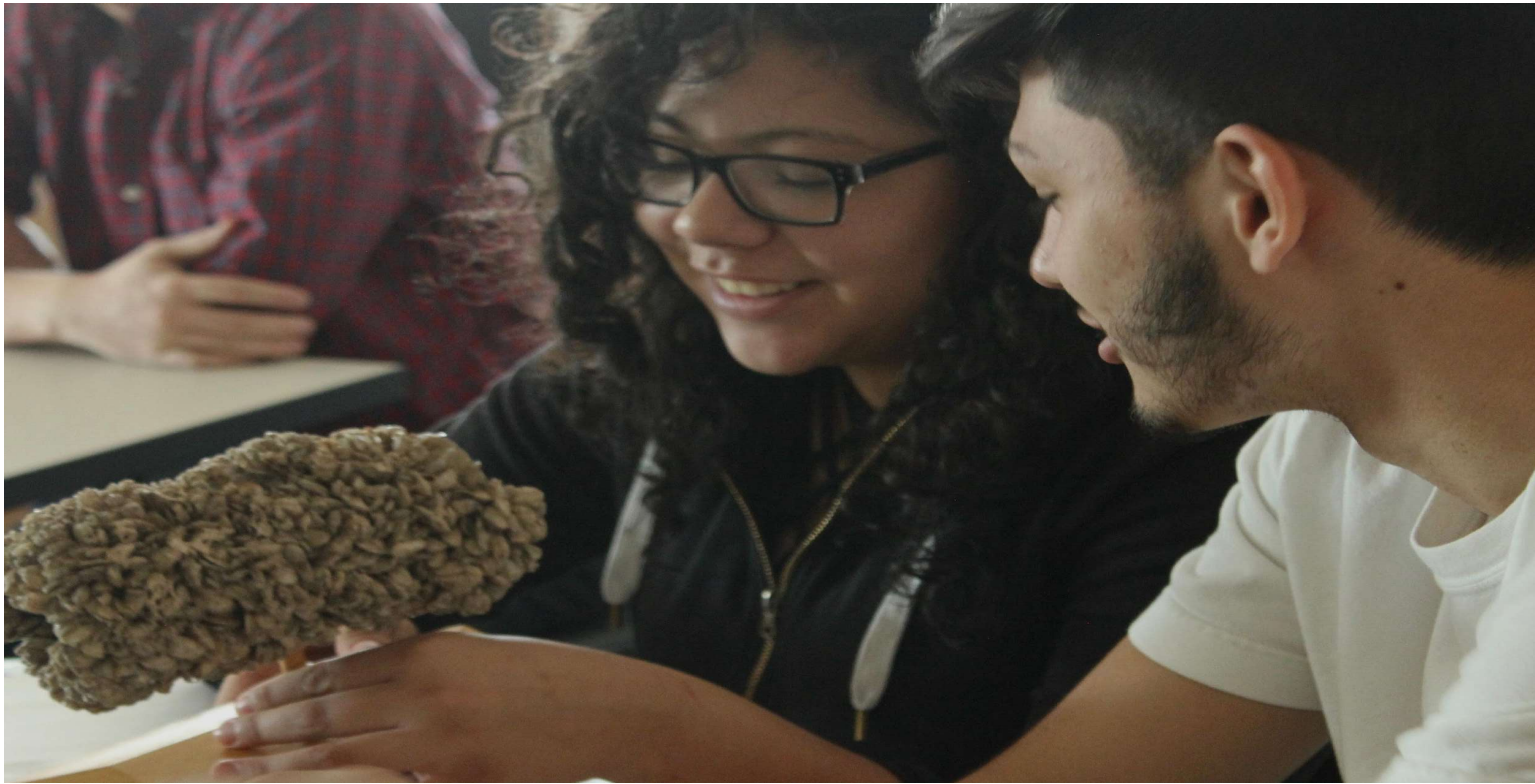
## Ongoing Efforts

### Continued Weekly Sampling on Colorado River Near De Beque

- Collaboration w/ USBOR, USFWS, USGS, GVVUA
- Over 270 Sampling Events To Date



# Priority #1 - Education!



# Education Efforts



## Signage

- 24 Signs Produced & Many Posted @ River Access Points.

## Outreach to Outfitters

- 164 Direct Calls

## Public Awareness Campaign

- Targeted ad campaign w/ Wildlife Forever





# Education Efforts

## Education & Voluntary Inspections

- 07/19 - 08/18
  - Inspectors On 5 Busiest Ramps Downstream of Detection
  - 3,063 Contacts To Date
  - Information Gathered Will Be Used To Inform Future Containment Efforts.
    - What kind of watercraft are using the Colorado River?
    - Where are they coming from? Where are they going?
    - What risk does this represent?



# Watercraft Inspection and Decontamination (W.I.D)







# HB21-1226 - More Robust Check Stations Aquatic Nuisance Species Act



- Passed in 2021
- Allowed a Pilot Roadside Check Station Program in 2022/2023 boating seasons along major Ports of Entry (POE) into Colorado
- Prohibits persons transporting a conveyance from failing or refusing to stop at these check stations during the hours of operation.- \$100 Fine



# Roadside Watercraft Inspection & Decontamination Pilot Program - Next Steps

- Port of Entry has agreed to allow CPW to implement an almost full-time program at the Loma & Trinidad Ports of Entry in 2024.
  - March - October; 5 Days Per Week
  - 35 Interceptions @ Loma Port of Entry, 2 @ Trinidad
- CPW is collaborating with the Army Corps of Engineers on an extensive west-wide boater movement study.
  - The information ascertained from this study will be utilized to better inform the placement of resources at other POEs / Border Areas.



# Any Questions?



*Thank you!*

