

# Columbia River Basin Interagency Invasive Species Response Plan for Zebra Mussels and Other Dreissenid Species



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## IMPACTS OF DREISSENIID MUSSELS

Have caused billions of dollars of damage to utilities in the Eastern US as they form dense colonies clogging water pipes used by water utilities and power plants

Can attach to a broad range of surfaces, including water diversion structures, trash racks, fish screens and ladders, and boat hulls and engines resulting in costly maintenance

Can filter enormous amounts of algae, disrupting the food chain, impacting native fish stocks and causing extirpation of some species

A major infestation in the Columbia River Basin (CRB) could cause serious problems for salmon and steelhead recovery efforts

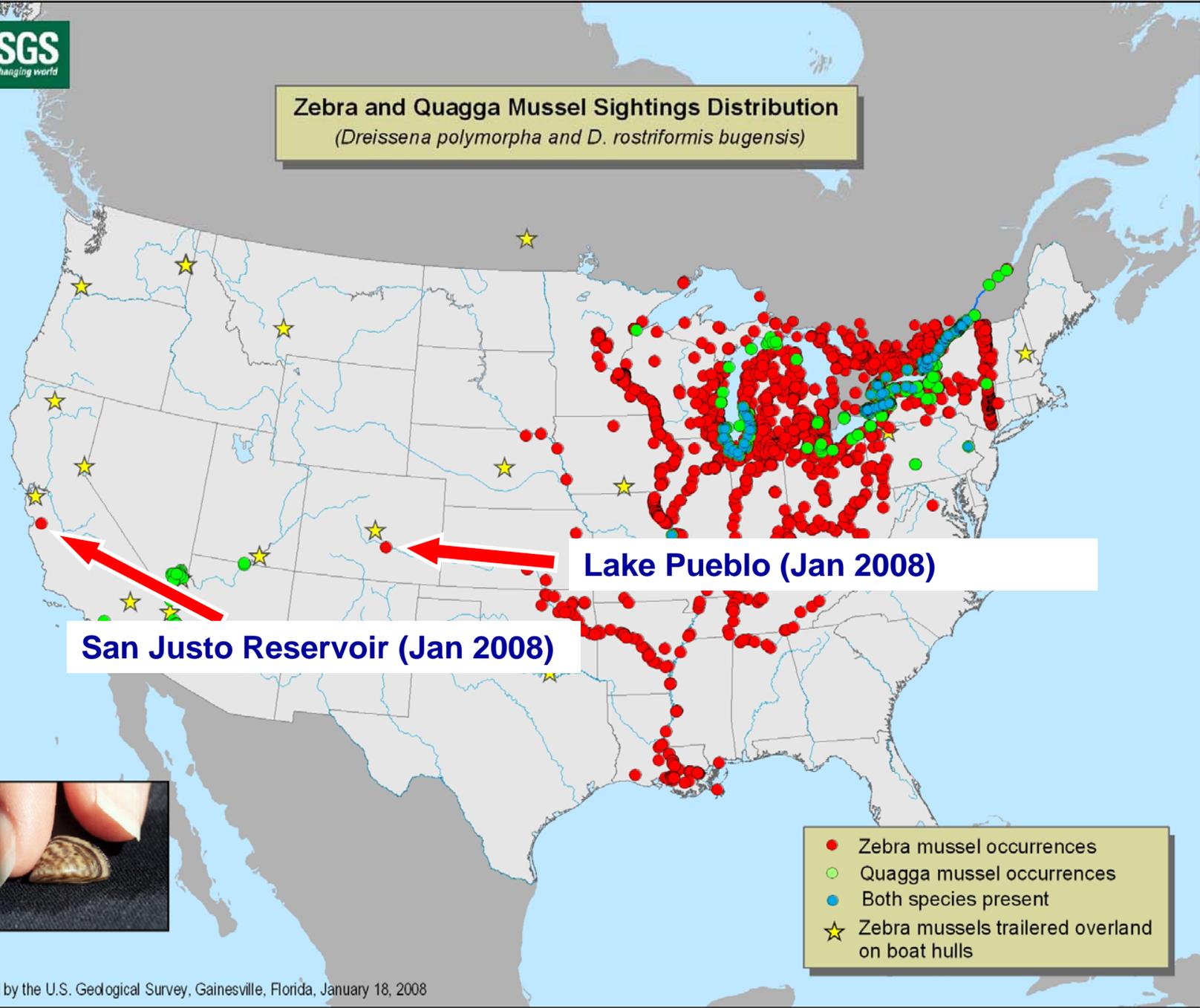


Pipe clogged by one year's growth of zebra mussel



Columbia Basin fish ladders would become fouled with mussels, causing physical damage to salmonids

**Zebra and Quagga Mussel Sightings Distribution**  
(*Dreissena polymorpha* and *D. rostriformis bugensis*)



**San Justo Reservoir (Jan 2008)**

**Lake Pueblo (Jan 2008)**



- Zebra mussel occurrences
- Quagga mussel occurrences
- Both species present
- ★ Zebra mussels trailed overland on boat hulls

# THE ADVANCE CONTINUES

**It is feared that zebra mussels will eventually be introduced into the Columbia River Basin.**

**#1 strategy is prevention and the #1 prevention strategy is mandatory boat inspections**

**Currently only and California and Washington have effective interception capability, OR/MT/ID are in early stages of strengthening regulations and seeking additional state funding for prevention efforts**

***Although prevention efforts continue, natural resource agencies also must prepare for a region-wide interagency coordinated response to an invasion.***

# COLUMBIA RIVER BASIN RAPID RESPONSE PLAN

- For the past year, the US Fish and Wildlife Service and Pacific States Marine Fisheries Commission under the auspices of the 100th Meridian Initiative, have been leading the effort to develop a “Columbia River Basin Interagency Invasive Species Response Plan for Zebra Mussels and Other Dreissenid Species” (*Plan*).
- The purpose of the *Plan* is to coordinate a rapid, effective, and efficient interagency response in order to delineate, contain, and when feasible, eradicate zebra, quagga, and other dreissenid mussel populations if they are introduced in CRB waters.
- The *Plan* recognizes that a dreissenid invasion is an environmental emergency and any hope of containment necessitates fast action (note: eradication usually unlikely)
- The provisions of this *Plan* are intended to enhance interagency coordination beginning with the discovery of an infestation by implementing containment and initial control efforts.



# PLAN ELEMENTS

- Make initial agency notifications upon discovery of mussels
- Activate appropriate Incident Command System organizational elements for interagency response
- Verify reported introduction
- Define extent of colonization
- Establish external communications system
- Obtain and organize resources
- Prevent further spread via quarantine and pathway management
- Initiate available/relevant control actions
- Institute long-term monitoring



## RESPONSE ROLES AND ORGANIZATION

- The *Plan* uses the National Incident Management System (NIMS), and its Incident Command System (ICS) organizational management structure
- Included in NIMS is an executive committee or Multiagency Coordinating Group (MAC) that guides the response
- The MAC will be composed of an executive group that will include the five CRB states, the USFWS, NOAA, and the Columbia River Inter-Tribal Fish Commission.
- Key decisions that the MAC may face include approval of eradication strategies, restrictions of vessel movement and funding for response operations.
- Additional agencies are then added to the MAC group depending on the infestation location and severity.



# **RAPID RESPONSE EXERCISE OCTOBER 23-24, 2007**

A table-top exercise was held in October 2007 to test the Plan.

Twenty state, federal and tribal agencies from throughout the region attended.

The exercise goal was to enhance the ability of the entities within the CRB to coordinate and solve interagency issues that may arise in the event a real situation erupts.

Another goal was to evaluate the proposed organizational structure.

Outcomes included confirmation that the overall NIMS approach (including MAC structure) can work, and a recommendation to build MAC/Support Group relationships via subsequent exercises.

The lessons learned at the exercise, including delegation of authority, resource logistics and legal authorities are currently being incorporated into the next draft of the rapid response plan.

# NEXT STEPS

Based on direction and input given at the October Rapid Response Exercise, the following tasks have been identified as priorities:

- Incorporate edits and comments into the *Plan*
- Identify primary notification coordinator
- Develop associated strategic planning document designed to enhance *Plan* implementation
- Distribute summary of lessons learned from exercise
- Obtain written delegations of authority for identified agency representatives
- Compile region-wide inventory of rapid response logistical resources by agency.
- Secure written agreement by MAC agencies (and others) to follow *Plan*.
- Next draft Early February

# CALCIUM AS A LIMITING FACTOR

## Frontiers in Ecology and the Environment

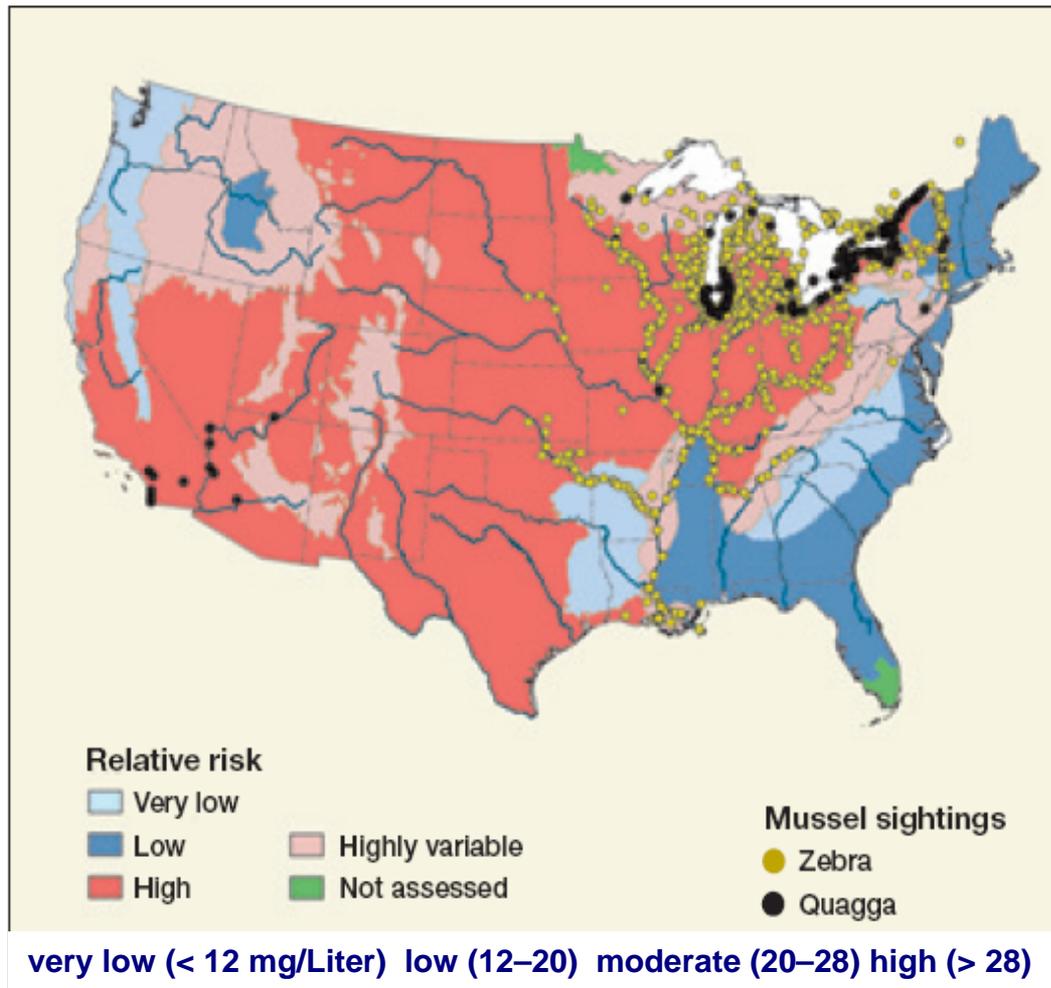
### A calcium-based invasion risk assessment for zebra and quagga mussels (*Dreissena* spp)

Thomas R Whittier, Paul L Ringold, Alan T Herlihy, and Suzanne M Pierson

*Front Ecol Environ* 2008; 6, doi:10.1890/070073

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**Figure 2.** *Dreissena* invasion risk classes for ecoregions of the contiguous US based on calcium concentrations in streams and rivers. Depending on watershed characteristics, some portions of the highly variable ecoregions will be at high risk, while others will be at very low risk. Dots indicate zebra mussel and quagga mussel observations through October 2007.

The apparent contradictions between our map and some zebra mussel sites (primarily on large rivers) emphasize that a useful risk model for any specific water body will need to include additional information about the watershed, as well as on *Dreissena* autecology. In the case of the portion of the Arkansas River within the very low-risk areas, one must know that most of the upstream river drains high-calcium areas, and high-calcium concentrations in the lower mainstem of the river reflect that water source rather than local conditions. The other key requirement for *Dreissena* in river systems is the presence of an invaded upstream lake or reservoir to maintain a supply of larvae (Horvath *et al.* 1996; Allen and Ramcharan 2001). The Arkansas River system has invaded reservoirs, as well as a series of locks and dams on the mainstem. On the other hand, the lower Missouri River is not dammed and currently does not support mussels (Allen and

(WebTable 2). At the mouth of the Tennessee River, the Ramcharan 2001), despite more than adequate calcium

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