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PACIFIC NORTHWEST 'ONLY PLACE ON CONTINENT' UNAFFECTED BY MUSSEL INVASION; PREVENTIVE STRATEGY URGED

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Representatives of state and federal agencies, utilities, local governments, academic institutions and others gathered Wednesday in Vancouver to enhance the passions, and strategic plans, for heading off an invasion of non-native zebra and/or quagga mussels.

One speaker said that the Pacific Northwest, including Alaska and the Canadian provinces of British Columbia and Alberta, is the "only place on the continent" yet unaffected by mussel invasions that have destroyed natural ecosystems, and robbed economies elsewhere.

Quagga and zebra mussels are the most economically damaging aquatic organisms to invade the United States, according to an introduction to this week's conference, "Preventing an Invasion: Building a Regional Defense against Quagga and Zebra Mussels."

The invaders, native to eastern Europe, have cost an estimated $5 billion in prevention and control efforts since their arrival in the United States in the late 1980s.

Because of the threat posed by these invasive mussels to the Northwest's water control infrastructure and an already stressed environment, there is a need to define and implement a region-wide prevention and response strategy, said the conference organizers. The meeting was sponsored by the Pacific Northwest Economic Region, the Northwest Power and Conservation Council, Portland State University's Center for Lakes and Reservoirs, and the Pacific States Marine Fisheries Commission."

"We just can't afford to fail," said Jim Ruff, the NPCC's manager for issues related to Columbia-Snake river mainstem fish passage and hydro operations. The mussels, known to cling to hard surfaces such as hydro facilities and reproduce exponentially, can clog such valuable implements as irrigation pumps and pipes and fish hatchery water intakes, screens at dams intended to shunt migrating fish toward safer passage routes and hydro generation apparatus.

A "tremendous investment" has been made up and down the hydro system to improve fish survivals within the hydro system, particularly for 13 salmon and steelhead stocks that are listed under the Endangered Species Act, Ruff said.

The experiences of the Great Lakes region in the United States and Canada and along the eastern seaboard are best avoided.

"We had massive changes" to the local environment following the introduction of non-native mussels to the Great Lakes in the mid- to late 1980s, said Ronald Griffiths, one of the first to investigate the zebra mussel infestation in Lake St. Clair (which has shoreline in Detroit, Mich., and the province of Ontario) and Lake Erie in 1988 as a scientist for the Ontario Ministry of Environment.

"They had already been in North America for two years" at the time, Griffiths said, likely brought in as incidental cargo to commercial ships from across the Atlantic. Within a year, "they were

essentially popping up at all the ports in the Great Lakes."

Then, the mollusks "got on trailers and started to get cargoed around" through much of the eastern part of Canada and the United States, he said.

Impacts to the local ecosystem were observed relatively quickly. The "filter feeders" essentially strained suspended matter and food particles from the water, reducing the amount of phytoplankton available for other, native organisms and providing a clear path for sunlight to the bottom of the relatively shallow Lake St. Clair.

"They turn it into nothingness," he said. "By 1990 this entire basin went clear."

"A dozen species were wiped out within five years," Griffiths said. The losses included native mussel species.

A robust walleye population, which spawned in the Thames River in Ontario and roamed the Great Lakes, that had long fueled a popular fish was decimated.

Within a few years biologists "couldn't find a single individual" walleye, and still don't 20 years later, Griffiths said.

"The economic value of that stock has entirely disappeared," he said.

The costs to affected Canadian industrial and municipal water systems range into the millions of dollars annually.

"We're stuck with them, there's nothing we can do," Griffiths said the lack of capability to eradicate the invaders. Efforts now aim at control, and maintenance of infrastructure.

The zebras, and later appearing quaggas, began to nudge westward, with trailered boats suspected as the most likely mode of transport. In 2007 the invasive mussels were discovered in Lake Mead, a Colorado reservoir just east of Las Vegas on the Nevada-Arizona border. They quickly spread to lower Colarado River basin lakes and reservoirs in Arizona and southern California, and then turned up in New Mexico, Colorado, Nevada and Utah.

Lake Havasu, backed up by Parker Dam and located farther south along that state border, has also been afflicted. Pre-zebra mussel, visibility in the reservoir's waters was about 2 feet.

"Now you can see 60 feet," the Bureau of Reclamation's Leonard Willett said. The bureau operates Parker, as well as Hoover Dam, which creates Lake Mead. The filtering of nutrients out of Havasu has allowed the sun to penetrate and stoked the growth of unwanted weeds.

"Weeds were a bigger problem than mussels," Willett said the resulting clogging of dam trash racks and pipes. Mussel- related maintenance costs at Hoover Dam alone have risen to about $1 million annually.

Havasu is the primary water source for 19 million Southern Californians, including residents of Los Angeles. The aquatic weed problem, as well as mussel encrusted pipes and water intake trash racks, are a constant work and budget headache.

About $12 million was spent initially to install special control equipment, according to Ricardo De Leon, Quagga Mussel Control Program manager for the Metropolitan Water District of

Southern California. Operations and maintenance of mussel control activities, has been about $4.5 million annually.

The states of Idaho, Montana, Oregon, Washington and Wyoming and the provinces of Alberta and British Columbia are to this point zebra and quagga mussel free, at least there are no known infestations.

But there is much at risk in a region hugely dependent on hydro power facilities, irrigation and other surface water supply systems, and that employs fish screens and ladders at dams to help improve passage for listed and non-listed species. Exact impacts on the environment are unknown.

Mark Sytsma, head of PSU's Center for Lakes and Reservoirs, noted that invasive mussels have been identified in northern Nevada's Rye Patch Reservoir, which is only about 150 miles distant from the Columbia basin's border. Nearby is the Owyhee River, which flows into Snake River, which ultimately joins the Columbia.

"It's critical that we increase the monitoring" for quagga and/or zebra mussel presence in Northwest waterways, Systma said. More important is the inspection of boats being hauled from state to state and particularly those coming from the Southwest and the Midwest.

A total of 350 contaminated vessels were intercepted during 2012 inspections.

The inspections were "part of the year and part of the time," totaling 8,760 hours, said Stephen Phillips, who manages the PSMFC's Aquatic Nuisance Species Program.

But money for inspections, about $2 million in all in the Northwest states, has been short. Phillips said adequate coverage would require a tripling of the effort.

Conditions for mussel survival would appear to be best in the central and northern Columbia River basin, and in Idaho's upper Snake, where calcium levels in the water are relatively high. But recent research has shown mussels can survive, though perhaps not thrive, in rivers with lower calcium concentrations.

"We know that mussels can grow in very low calcium concentrations," Sytsma said.

The upper Columbia and Snake, "if infested, could continually send veligers downstream" to feed less mussel-friendly waters, Sytsma said. Veligers are larval-stage mussels.