National Fish and Wildlife Foundation
Final Programmatic Report

Project Name and Number: Crowding Aquatic Plant Reduction Project #2006-0098-023

Recipient Organization/Agency: Benton Conservation District

Date Submitted:

1) Summary of Accomplishments

This project compared the effectiveness of two mechanical methods for reducing the density of invading water stargrass on selected traditional fall chinook spawning grounds in the lower Yakima River, in eastern Washington. Cutting and pulling techniques were compared on effectiveness, treatment longevity, fish use of opened habitat, and practicality for possible larger-scale implementation in the future. Both treatments were equally effective at reducing water stargrass densities up to a year after treatment. Local landowners, students, other agencies and the regional public community were educated about the water stargrass and salmon recovery efforts in the lower Yakima River.

2) Project Activities & Results

Activities

- Water stargrass was harvested by hand using two different treatment techniques: cutting and pulling. Treatment areas were divided into 50' x 50' plots. Treatment plots were located in three distinct areas: two in side channel areas and one in a mainstem area.
- Plant samples were collected at harvest and periodically after harvest to monitor water stargrass density at treatment and control sites.
- Treatment and control sites were surveyed for fall chinook redds and carcasses as a method of determining fish use of the habitat areas.
- Outreach included door-to-door visits near project areas, interviews with long-time residents, classroom presentations, presentations to professional and civic groups, website exposure, Washington State Conservation Commission field tour stop, and front page coverage in regional newspaper with daily circulation over 42,000.

Results

- Hand-cutting and hand-pulling techniques were equally effective at reducing water stargrass plant density through the end of the project and monitoring period. Contrary to predictions, hand-pulling was significantly faster with virtually identical results.
- One side channel treatment area was recolonized by a different aquatic plant: curly leaf pondweed, which is not native to the area. The other side channel treatment area experienced limited regrowth of water stargrass only, but did not recover to pre-treatment plant density. It was expected that both side channel sites would have reacted similarly.
- The mainstem treatment site remained open and clear one year later with no significant regrowth of water stargrass or other aquatic vegetation. It was expected

that some regrowth would occur during the summer growing season after harvest, but the treatment area at the main stem site was still visibly clear one year later.

- The number of treatment areas was limited due to unexpected labor costs and lack of response from local contractors for this unique type of instream work.

3) Lessons Learned

The most efficient conservation practice was pulling, which was not predicted. Project staff had predicted that pulling would give the most long-lasting treatment, but it was not expected to be the faster, most efficient use of labor also. Cutting proved difficult and cumbersome, even on the small scale of this project. It seems unlikely that a large-scale mechanized cutting system would be effective. The spawning grounds are located in fairly shallow, yet fast-moving water with large cobble substrate. The uneven bottom of cobble does not lend itself to large cutting bars. The very shallow, fast-moving water would prohibit use of more conventional large-scale aquatic mowers designed for use in lakes or ponds. Perhaps the next experimental technique to test would involve pulling a weighted chain upstream, to break the stems near the substrate. Mechanizing this process would be difficult, as the water depth is not generally sufficient for motorboats.

Other conservation efforts to control nuisance aquatic plant species should anticipate that when one plant species is removed, it is a distinct possibility that another, even less desirable plant could invade the newly opened areas. Within two treatment areas of this project, it has not yet been determined if the change in plant species is desirable or not, but the change in species composition was not predicted.

An important, yet pleasant, lesson learned was how much support the public would offer. Project staff expected favorable, mild interest, but were almost overwhelmed with the amount of direct participation landowners wanted to contribute. When asked for permission to cross private property, landowners responded with offers to volunteer labor, use of equipment and fuel. These generous offers were put to work, which helped offset unanticipated high contracting costs. Long-time residents also offered historical information about salmon spawning habitats, information that contributed to treatment site selection. Although it may not be wise to count on landowner donations of equipment and services, interviews with area residents can provide valuable background information. Other conservation groups in almost any region could benefit from informal interviews of members of the public who live or work in the project areas, even if these people are not trained biologists.

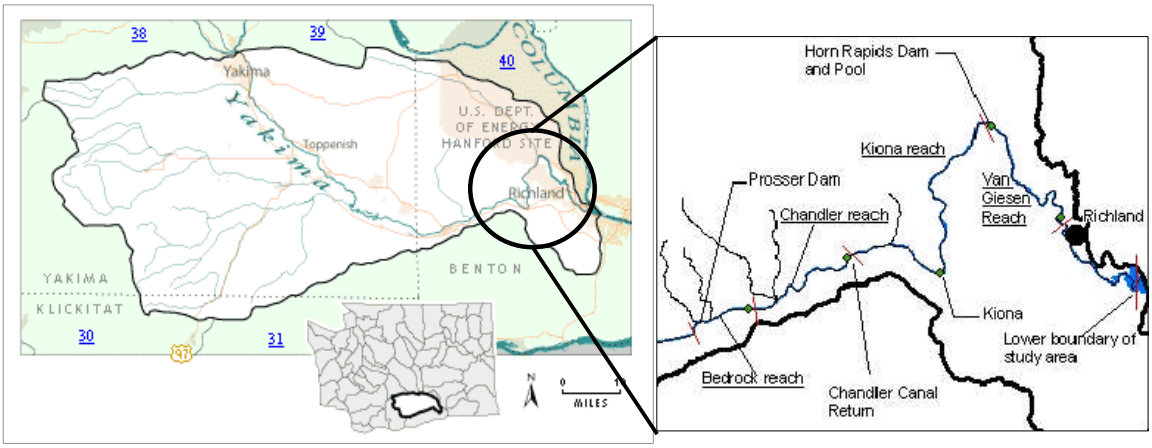
4) Dissemination

Public access points along the lower Yakima River are limited, so securing landowner permission to cross private property was critical for efficient project operations. As part of securing river access, staff conducted door-to-door visits. Talking with landowners revealed that they were frustrated by the plants, but incorrectly presumed that the plants were milfoil. Staff

concerns about disposing of the harvested plants were resolved by landowners, which saved significant time, as well as transportation and disposal costs. Eager landowners enthusiastically offered to accept the plant waste, including a hay farmer and an orchardist who offered to compost it for on-farm use and experiment with it as mulch in the orchard.

In addition to personal contacts with local landowners, project information was disseminated through more formal channels. Two local conservation districts featured project updates in newsletters. Project presentations were given to the Benton County Commissioners, Aquatic Plant Management Conference, the local Water Resource Inventory Area, Tapteal Greenway, Audubon Society and Richland Rod & Gun Club. Front page color photos highlighting the project appeared in the Tricity Herald (daily circulation over 42,000) and the Prosser-Record Bulletin, a local weekly publication. This project was also highlighted on the Washington Conservation Commission website. The board members of the Washington Conservation Commission also visited the project site as part of a regional field tour.

5) Project Documents



These maps indicate the project area in Water Resource Inventory Area (WRIA) 37, from Horn Rapids Dam upstream to Kiona in Benton County.

High density of water stargrass in the lower Yakima River covered traditional fall chinook salmon spawning habitat, changed the depth-flow ratio of the river, favored non-native warm-water fish species and negatively impacted recreation.

Water stargrass was harvested by hand, collected and loaded into anchored watercraft for disposal above the high-water line.

Lower Yakima River treatment site: water stargrass has been hand-pulled on the left side of the photo. Right side of the photo shows water stargrass at undisturbed density. Water is slightly turbid from harvest activity. September 2007.

Pile of freshly harvested water stargrass measured almost 3 feet tall and 17 feet long from one treatment site. The pile was left to dry, without turning or aeration, and shrunk to a height of 18 inches within four months.

Photo marked with red dashed line to highlight mainstem treatment area with flat surface water, showing where water stargrass was removed.

The area of flat water in the center of the photo is treatment areas where water stargrass was removed. Surrounding rough water surface is caused by water stargrass at the surface. Photo taken one year after treatment applied, showing that water stargrass did not recover from treatment during the intervening summer growing season. September 2008.

Water stargrass filling river, clogging pumps, suffocating aquatic life

ANDREW SIROCCHI
HERALD STAFF WRITER

BENTON CITY — Marc Miller pulls clumps of grass out of the shallow waters of the Yakima River like loose strands of long hair.

He twirls a hoe around another knot of weeds, pulls loose and dumps his catch unceremoniously into a canoe.

As recently as 2000, the water stargrass Miller was removing was a rarity in the Yakima River. Since then, the aquatic weed has spread like wild strawberries, developing shallow roots in the river bed and sending runners upstream.

"Water stargrass is a native plant that for some reason has gotten completely out of control," said Rachel Little, a fish biologist with the Benton Conservation District. "It's very unusual, seeing one plant species dominate like this."

But that's what stargrass has done. From spring to fall, it covers salmon spawning grounds and fishing holes along 43 miles of river, from Prosser to the mouth of the Columbia River. It clumps around irrigation pumps, creating problems for orchardists, and at night, begins to extract from the water oxygen needed by fish and aquatic animals.

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Scanned image of Tricity Herald newspaper, October 7, 2007. Complete article text on next page.

Yakima River has bad grass

By ANDREW SIROCCHI HERALD STAFF WRITER

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If stargrass were a nonnative species, there might be more help removing it from the Yakima River. But, Little said, the weed always has been in the river, and attacking it with predators or chemicals likely would create new problems in other stems of the Yakima or Columbia rivers.

Carp that already are in the river appear to feed on stargrass, but they've had little effect.

"We see a lot in the river, but they don't seem to be putting a dent in it," Little said.

That leaves volunteers working with their arms, hoes or whatever else they can find to remove stargrass naturally.

The Washington Department of Fish and Wildlife has monitored the stargrass progression since 2001. Paul Hoffarth, a district biologist in Pasco, said the explosion directly correlates to the ensuing decline in the fall chinook that used to spawn in the lower stem of the Yakima River.

Fall chinook reached peak numbers in 2002, when about 13,000 returned to the river. Hoffarth said 70 percent of those spawned below Prosser, and in 2002, the department counted 286 pockets of salmon eggs in the Benton City area alone.

By 2006, only 2,300 fall chinook made the trip back to the lower Yakima River, and only 10 egg pockets were found near Benton City.

"We believe the water stargrass is one of the major players in the Yakima River decline," Hoffarth said. "It could be other things, but this is the one thing we can point to and say, 'Yes, we no longer have these spawning grounds.' "

Another clue that stargrass is responsible is the health of the Hanford Reach run of fall chinook. Hoffarth said salmon that make both runs used to face similar challenges and should be reacting similarly. While the Hanford Reach fish are doing well, the Yakima run is dwindling.

The one major difference is water stargrass.

Identifying a problem and fixing it, though, are two different things.

"The problem is that every time you try to fix something, you break something else," Hoffarth said. "In this case, you have a native grass. It's thriving under the current conditions. You can't treat an entire river system.

"In a river system," he said, "you're basically hoping for a series of environmental changes -- a huge flood or a scouring event to knock it back."

Barring an event that could devastate people as well as the river, the Benton Conservation District has called on volunteers to do the work by hand.

The district has established three work sites where volunteers have focused their efforts.

The areas were chosen based on their potential as spawning grounds, with the hope that if the weeds are removed, salmon will stop there.

The first site was set up downstream of the main Benton City bridge. A second was set up at Songbird Island, in the middle of the channel, and a third established off the main channel, to be used as a juvenile rearing ground.

Little said there are few answers to why the stargrass has spread so rapidly, but she did receive a $21,000 grant from the National Fish and Wildlife Foundation to help identify the problem and find the best way to keep the grass from covering spawning grounds.

One theory for the rapid increase, she said, is that the river water has been kept cleaner in the past six years or so. Efforts to keep river banks from sloughing and causing turbidity have been a success.

That means sunlight has reached deeper into the riverbed and spawned more stargrass than ever before. The strands will reach six to seven feet deep into the river, and stargrass isn't picky about what it attaches itself to.

"As a fish biologist, I'm concerned," she said. "Salmon need gravel to spawn on and (stargrass) is covering up their gravel."

Little has looked to see if biologists in other river systems have found better solutions, but what she's discovered isn't promising. In the Potomac River, Little said stargrass was becoming an issue before a flood scrubbed it from the riverbed and flushed most of it away.

In ponds, lakes or other closed systems, grass carp and chemicals can be introduced to control it.

In the lower Yakima, which remains a highly regulated system that won't easily allow for introduction of new species to attack the problem, a solution won't be easy.

Miller, a resource technician with the Franklin Conservation District who has joined the hand-removal effort, said stargrass is often confused with another problematic aquatic weed.

"It's not milfoil," he said . "People think the Yakima River is full of milfoil, and we can get rid of it. But it's not, so let's get that straightened out."

Milfoil is a non-native, invasive plant, Miller said. Stargrass, while invasive, is native, which limits what biologists can do.

Little, though, has continued to write grant applications to address the problem. She is optimistic that threatened species of salmon, which have been blamed for costly regulations that affect landowners, may end up providing money to solve the problem.

"Our success," she said, "will be based on whether the fish come back."