# Insights into Wapato Restoration Along the Lower Columbia

## An interview with:

**Curtis Helm**
*Principle Restoration Ecologist, Lower Columbia Estuary Partnership*

**Doug Kreuzer**
*Restoration Ecologist, Lower Columbia Estuary Partnership*

**Jasmine Zimmer-Stucky**
*Communications and Outreach Associate, Lower Columbia Estuary Partnership*

**Eric Anderson**
*Deputy Project Leader, Ridgefield National Wildlife Refuge Complex, U.S. Fish and Wildlife Service*

This year marks the third and final year of construction for a major habitat restoration project at Steigerwald Lake National Wildlife Refuge that has been in the making for nearly a decade. The project aims to "reconnect 965 acres of Columbia River floodplain, reduce flood risk from Gibbons Creek, improve habitat for fish and wildlife, and create new trails for recreation at the Refuge" (Lower Columbia Estuary Partnership, 2021). The work has already shown improvements in floodplain function during heavy rains in late 2021. One element of the project: wapato restoration, aims to enhance the abundance of the once prolific first food plant on the banks of the Columbia. Wapato (Sagittaria latifolia), whose tuber is similar to a potato, was widely consumed and traded by Indigenous people of the Pacific Northwest prior to colonization. Though the extent of wapato has been seriously reduced across its range due to habitat conversion, it remains culturally significant as a former food source for the Indigenous communities of the Lower Columbia River today.

In an interview, Lower Columbia Estuary Partnership and U.S. Fish and Wildlife staff spoke to the importance of wapato restoration, relevance in a changing climate and more.

### How does wapato factor into the overall restoration goals for the refuge and associated ecosystems?

**CURTIS:** Wapato, frankly, just belongs here on this site. It was abundant along the Columbia River. When Lewis and Clark came through, they called the lower Columbia "Wapato Valley;" Sauvie Island was referred to as Wapato Island. There were over 7,000 acres of wapato growing on Sauvie Island alone. Native people had established villages and would come in the wintertime to harvest wapato. It's a plant that's an incredibly valuable part of the ecosystem. I would almost consider it a keystone species as much as salmon are along the Columbia River. The area we're doing our restoration within was once a vast floodplain, historically, before it was diked and dammed off. It was likely common locally, prior to the construction of the levee, and we know that it grows well at Steigerwald if the hydrology is correct, as we have three healthy stands onsite, and we have seen it re-colonizing portions of the alluvial fan in areas where we have performed invasive species control.

**DOUG:** In addition to wapato we're planting other wetland plants, mostly in the form of seeding, and then with [bare root] shrubs and trees, we are covering about 250 acres. By the end of this winter we'll have installed about half a million native trees and shrubs alone, which includes six species of willows, 18 species of shrubs and 11 species of trees. Willows and cottonwoods will be installed as live stakes or pole cuttings. We're trying to cover all of the different zones, from wetlands to riparian to some upland habitats.

**ERIC:** Wapato is a huge swan food resource. I have seen them stomp around in the shallows, trying to identify tubers by foot. They'll flip them up and grab them with their beaks and consume the wapato tuber. So in addition to being a first food and a trade item for Native Americans, it's significant to the swan population in the lower Columbia.

### How does wapato restoration help address issues posed by climate change?

**CURTIS:** Wapato is really valuable in emergent wetlands for fish and wildlife. It takes up a lot of nutrients as it grows, and because it grows aggressively and rapidly colonizes areas, it will slow water down which will help trap sediment and drop it out. It grows in dense, thick stands, which may provide some shading to the surface water, provide

cover, refuge and habitat for salmon, small fish, insects and all sorts of aquatic organisms. Beavers love to eat it, muskrats really favor it.

The emergent wetland plants generally can adapt to sea level rise and changes in hydrology as these subtle changes occur. As high marshes become inundated the low marsh plants can move up, and the high marsh plants can move further upslope if there's a place for them to go to.

In addition to wapato, we have added seven additional species of native wetland plants in the form of seed. The more diversity you have, the more niches you can fill, and the more resilient the site will be because you have all these plants that will take advantage of different opportunities as hydrology changes across the site. So we've tried to plant a lot of different things.

**ERIC:** Some of our planting for climate change emphasizes having an intact riparian zone which is going to benefit the water conditions. If we have shaded areas, we've got large woody debris recruitment, which ultimately becomes detritus, which becomes food for insects, which becomes fish food. Having that riparian zone intact in big chunks is going to be important, because if that lake is too warm, it's going to be uninhabitable by fish.

**DOUG:** The site has been opened back up to the river, and we have some pretty good ideas, based on a number of years of observation, design and modeling of where the water levels will be, but we don't really know for sure. We'll find that out in the next few years as it will have a lot to do with water releases from Bonneville dam and the height of the spring freshet on the Columbia River. My general approach is to overlap species so that we do get coverage depending on the hydrology fluctuations and the plants will sort themselves out. Having a wide palette of plant species and overlapping where we think they might do best at various elevations, will build in resiliency.

## Tell me about your experiments planting wapato.

**CURTIS:** We have learned that the tubers have next year's growing tip slightly expanded from their distal end and while digging it is good to handle them gently and not break off this initial growing point. We are planting a number of broken tubers and tubers missing these growing initials this spring to see if they will sprout and grow normally. Similar to how potatoes can be divided and planted.

**DOUG:** Another thing that was more opportunistic was we had some wetland areas where wapato was growing that were going to be modified by the construction work that took place this summer. We were able to get an excavator out and grab buckets of soil with fully leafed out wapato plants. A few of us, including volunteers, picked through and extracted leafed-out wapato plants with rhizomes, and were able to transplant them to some of the newly graded out wetlands. They did surprisingly well. We anticipate those coming back in full force.

**CURTIS:** We also transplanted four, healthy, young wapato plants early in the spring into a baby pool to find out how many tubers the plants would produce. We dug those out at the end of the growing season; I think we got 68 tubers from those four plants. There were no tubers on those plants when we planted them. It was interesting to see how truly prolific they are.

## Have you encountered any challenges that you attribute to climate change and/or extreme weather events?

**CURTIS:** The wapato doesn't suffer much from drought or from heat problems. It grows in a substrate that is fully watered; it has to have a source of water all season long. It is not going to suffer from drought problems the way upland plants are. One of the real problems is with the bare root plants and live stakes; they have to get established in the spring so they can make it through the typical Pacific NW hot dry summer. It's that first growing season that is super critical. If we don't have so-called normal summers, we're gonna have a hard time establishing plants on large restoration sites, which of necessity, are typically planted with bare root or live stake plants. This drought [in 2021] was incredible. It was terribly hot and dry, as we all know. Again, with these extremes, we're also having a crazy rainy fall, that's maybe also due to climate change. Either extreme is not helpful.

*Prune Hill 5th at Steigerwald. Photo Credit: Lower Columbia Estuary Partnership*

**ERIC:** You'd think if you are putting riparian plants in the right place they will very likely over summer fine but all the supplemental watering that was required north of SR 14 in the last two seasons, just to get those things to establish and be able to survive over the summer, it was a valiant effort. Probably, in a typical year, it wouldn't have been required, but it was absolutely this year when we had triple digit weather for back to back days.

## Have you historically irrigated or watered your planting?

**DOUG:** Generally, no. In my experience working on larger restoration projects, I've never watered. Smaller ones, certainly, or working in more urban settings where you have access to water we might do that. But we did do some watering at Steigerwald this past year. We were lucky that we had a collaborating landowner that allowed us to tap into his well, and run garden hoses to a small (1 acre) area. When we're planting 250 acres and there's no irrigation, it's not practical or possible. If we run into another extended drought this coming year we'll try to prioritize some areas if we can get to them, but in most areas it's just not practical.

**ERIC:** I did a lot of planting at Ridgefield in the 90s and I never had to irrigate. If it's the right plant in the right ecological place, it shouldn't be required, but [the watering this year] was a new experience for me.

### Have you started implementing any assisted migration practices to adapt to changing conditions?

**CURTIS:** For the wetland seeding that we did, all the seed that we had harvested came from wetlands along the Willamette and the nearby Columbia. As much as possible, we've always tried to harvest seed from the same eco-region as our project sites, but assisted plant migration is something that we need to think about in the future.

**DOUG:** We are planting some white alder and Ponderosa Pine which are a little more southern and may tolerate drier conditions. We are also trying some black oaks from California in the mix with the Oregon white oaks. We're certainly thinking about it, but it's not a big part of what we're putting in the ground at Steigerwald at this time.

### How have community members/students responded to the opportunity to engage with this project?

**JASMINE:** Steigerwald is a well loved wildlife refuge, and the Steigerwald Reconnection project created this great opportunity for people to love the refuge in a whole new way. Since the project broke ground, over 1000 people contributed to restoring the wetlands through volunteer planting events or through partnerships with local schools. People love getting their hands dirty, physically connecting to this restoration site; it's creating a lifelong connection to this place.

The Estuary Partnership environmental educators work hand in hand with Doug, Curtis and other staff to make the most out of this project. Our educators go into the local schools and teach students about native and invasive plants. They teach them about watersheds and birds. And then those students, after receiving those in classroom lessons, actually go out to Steigerwald and they look at birds. They plant native plants. They identify invasive species. It's this comprehensive opportunity for the community to both learn more about wildlife and what happens at the wildlife refuge and also be part of its future. I'm looking forward to what these students who had such a big role today are going to think about the refuge in 10, 15, 20 years.

There's a really wonderful stewardship community that's developed around Steigerwald. The Friends of the Columbia Gorge and the Gorge Refuge Stewards have been wonderful partners in promoting opportunities to get the community involved in the restoration project.

The other really great thing that's come out of this wapato planting is when it showed up on the evening news and on the radio in people's homes, we started to get emails from community members asking how they could plant wapito in their own backyards, whether they had a pond or some wetland habitat. So that was really interesting to see people getting so excited about this plant that they wanted to bring it to their own land. It's been really inspiring backyard gardeners throughout the region.

### Anything else to share?

**ERIC:** I've been associated with this refuge for 27 years. This project has needed to happen for a long time. We took a couple of runs at it historically and never completed as far as connecting the partners and the funds. A tip of my hat to the Estuary Partners because they were the spark plug that kept herding the cats for seven years now connecting all of the partners and all the funding sources to make this thing a reality.

**DOUG:** In terms of collaboration on the project, it's been huge. Chris Collins, who has been the lead on the project, really made this whole thing come together. And all of the other partners on the projects have been so important in getting it to this point.

I think it would be really interesting to come back to the site in the next five to 10 years and see the changes on the landscape. We've seen fish coming back in the last six weeks, which has been amazing. We've seen coho in the alluvial fan, which probably haven't been there in 50 years. This is largely a fish funded project, but there's so many other benefits to other wildlife and people associated with this project.

*Bees on Wapato. Photo Credit: Lower Columbia Estuary Partnership*

## Partners:

Bonneville Power Administration

Burlington Northern Santa Fe Railroad

Camas School District

City of Camas

City of Washougal

Columbia Gorge Refuge Stewards

Friends of the Columbia Gorge

Port of Camas-Washougal

US Army Corps of Engineers

US Fish & Wildlife Service

Washington Department of Transportation

Washougal School District

## Funders:

Bonneville Power Administration

Camas-Washougal Community Chest

Washington Department of Ecology

National Fish & Wildlife Foundation

US Fish and Wildlife Service

One Tree Planted / Promise the Pod

Arbor Day Foundation