

**OSWB 2019 Grant Application Form**  
**Grant Cycle 32-9 Application      Due Date: December 14, 2018**

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**Project title:** (Using 6 words or less give your project a descriptive title)  
Willamette River Aquatic Weed Management, Phase 6

**County or Counties project is located in:**  
Benton County, Linn County

**Type of Organization:** A grant applicant must be a **legal entity** identified below and have a FEIN number. A state or federal agency may apply for funding only as a co-applicant with an eligible entity.

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Cooperative Weed Management Area                    | <input type="checkbox"/> Not-For-Profit Organization      |
| <input type="checkbox"/> Watershed Council  | <input type="checkbox"/> Local or tribal government       |
| <input type="checkbox"/> Soil & Water Conservation District                             | <input type="checkbox"/> Institution for Higher Education |
| <input type="checkbox"/> Individual (not eligible for indirect or administrative costs) |   |

**OSWB dollars requested:** \$ 32,990

**Total cost of project:** \$ 69,694

**Name of Applicant or Organization:** Benton County Cooperative Weed Management Area

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## Project Information

**1. Weed Species:** (List all state listed noxious weeds pertaining to this project. Use common name plus genus and species. If your project has more weeds than the allowable space please duplicate this table on a separate sheet and attach to this application)

*Habitat	**Method of treatment	*Weed species	Net/treatment acres	Gross/survey acres	Herbicide(s)	Define the timing of treatment
Wetland	Bio-Control	Purple loosestrife, <i>Lythrum salicaria</i>	1	13	N/A	Late June
Instream (Lake)	Herbicide	Yellow floating heart ( <i>Nymphoides peltata</i> )	0.5	16.5	Imazamox, Triclopyr	June/July and Sept/Oct
Instream (River side-channels)	Herbicide	Uruguayan primrose-willow ( <i>Ludwigia hexapetala</i> )	5	12	Glyphosate, Imazamox	June/July and Sept/Oct
Instream (River side-channels)	Herbicide	Parrot feather ( <i>Myriophyllum aquaticum</i> )	< 1 acre	10.5	Imazamox	June/July and Sept/Oct
Instream	Manual	Uruguayan primrose-willow ( <i>Ludwigia hexapetala</i> )	< 1 acre	5	N/A	May through September
Instream	Manual	Yellow floating heart ( <i>Nymphoides peltata</i> )	< 1 acre	5	N/A	May through September

\*Choose the primary habitat the weed exist – Upland, Riparian, Wetland, Instream, Estuary. It is recognized that some projects have mixed habitat types, chose only one habitat per weed per line. Habitats are described within the Instructions. Use only state listed noxious weeds as described within the Instructions Exhibit B.\*\*see question 5. below for treatment type.

Total estimated project acreage: net: 8.5 gross: 49

(See appendix c with Instructions for understanding calculation of your total project net/gross project acreage.)

### **2. Project location: (directions to the site)**

Horseshoe Lake, Benton County (*Nymphoides peltata* site): From Hwy 20, head north onto NW N. Albany Rd, right onto NW Quarry Rd, left onto NW Cascade Heights Dr, and right onto NW Horseshoe Lake Cir. Parking area is on the right. Landowner permission required to park and walk down to lake.

Collins Bay (*Ludwigia hexapetala* site – 10.5 acre site): Heading east on Hwy 20, take the first right after intersection of Hwy 20 & Independence Hwy, onto private road. Park at bridge and walk along ag field edge towards Willamette River. Call Benton SWCD to get landowner permission before entering private land.

Wapato Cove (*Ludwigia hexapetala* site – 1.5 acre site): On the mainstem Willamette River downstream from Corvallis, 1 mile downstream from Tripp Greenway Island on river right. Accessible by boat, or by vehicle with landowner permission. From Hwy 34,

head north on Riverside Dr. Turn left on Stellmacher Dr. and follow to river. Private road, need permission to enter.

Several small patches of Ludwigia and yellow-floating heart will be hand-pulled on the Willamette River between Corvallis and Albany.

Latitude: (Horseshoe Lake Site: W-123.112806),  
(Collins Bay Site: W-123.173201), (Wapato Cove Site: W-123.1756)  
Longitude: (Horseshoe Lake Site: N 44.660760),  
(Collins Bay Site: N 44.634964), (Wapato Cove Site: N 44.6192) (at least one lat/long reading is mandatory)

**3. Does this project exist within a designated weed control district?**  
(Refer to ORS 569.360)

Yes  No If Yes, provide district name:

**4. Is this part of an established Cooperative Weed Management Area?**   
Yes  No If Yes provide name: Benton County Cooperative Weed Management Area

**\*\*5. Identify your integrated pest management methods:** (all activities must be directly related to the proposed project):

Assessment/Management Plan Development

Biological control

Education and outreach

Herbicide control

Manual control

Mechanical control

Monitoring

Prevention

Restoration

Other – Explain:

Survey – Describe the method of survey planned: Survey Ludwigia and yellow-floating heart populations by boat using GPS. The use of GPS technologies and Fulcrum software will allow us to quickly map aquatic invasive data along the river during surveys and share the data with other practitioners through shared databases including Weed Mapper, Oregon Invasives Hotline, iMapInvasives, and the Willamette Aquatic Invasive Network's (WAIN) shared database.

**6. Have you consulted with ODA staff about this proposal?**  Yes  No

If yes who? Beth Myers-Shenai, Glenn Miller, and Tristen Berg

**7. Is this a landowner reimbursement (cost share) project?**  Yes  No  
Remember to attach a list of landowners with acreage and weed species.

**8. Project summary: In 200 words – give a statement about your overall project.** Provide a summary in 200 words (1000 characters) or less describing what the project

will accomplish and what problems will be addressed. The information you provide will be used for project review, OWEB reporting purposes and will be displayed to the general public.

The Willamette River Aquatic Weed Management Phase 6 (WRAWMP) is the continuation of a project started by Benton County Cooperative Weed Management Area in 2014 with Oregon State Weed Board funding. The focus of the project is the control of Uruguayan primrose-willow (*Ludwigia hexapetala*) and yellow floating heart (*Nymphoides peltata*): two aggressive, invasive aquatic plants that threaten fish and wildlife habitat in freshwater systems. *N. peltata* is an A-listed Oregon State Noxious Weed. The project area spans the reach of the Willamette from Corvallis to Albany, covering approximately 15 river miles and consists of three main components: 1) management of aquatic weed species (A-rated *Nymphoides peltata*, B-rated *Ludwigia hexapetala*, B-rated *Myriophyllum aquaticum* in a limited area of one select site [Collins Bay], restoration of areas following years of *Ludwigia* treatments, and volunteer weed pulls for small patches of *Ludwigia* and yellow floating heart on the mainstem Willamette River), 2) targeted community outreach through a workshop on aquatic invasive plants and distribution of the Water Weeds Guide for Benton County, and 3) monitoring at project sites pre- and post-treatments.

**9. What are you proposing to do? Give an overview of the project (It is important to be concise and keep this to limit of 1,300 words.)** Proposal should include: is this an extension of a previously funded project if so, include details of past treatments such as successes and failures • estimated acreage for treatment • method of control • restoration component • how does this project relates to other projects within the area.

Was this project previously funded by OSWB? Yes No

If yes what year(s) and provide the grant number? 2014 (2014-27-400), 2015 (2015-28-501), 2016 (2016-29-601), 2017 (2017-30-701), and 2018 (2018-31-818).

### **Proposal details:**

The Willamette River Aquatic Weed Management Phase 6 (WRAWMP) is the continuation of an existing project to control key invasive aquatic plants to prevent further spread and re-infestation, restore habitat, monitor treatment efficacy, and perform outreach on the Willamette River. For this project the Benton County CWMA proposes the following activities:

#### 1) Management of aquatic weed species:

One goal of this project component is to increase the quantity and quality of open water habitat in the Willamette River system through control of invasive aquatic weeds. Specifically, we will continue to reduce the ecological impacts of Ludwigia on the river system through control treatments and the reduction of its spread at specific priority sites, as well as promote native plant recovery through restoration plantings.

Another component of this project is to continue surveying Horseshoe Lake, North Albany, for yellow floating heart. Horseshoe Lake was the first reported population of this species in Benton County but had no yellow floating heart in 2018! BC CWMA plans to conduct follow-up treatment if it reoccurs. We will also reduce the ecological impacts of yellow floating heart on the river system. In the summers of 2016 and 2017 we saw the first observed yellow floating heart occurrences along the mainstem of the Willamette River in the Corvallis to Albany reach (at a side channel at Lower Kiger and Tripp Islands). Our volunteer groups hand-pulled the two small populations. Yellow floating heart was not present at these sites in 2018. Each summer we will continue to monitor locations of previous yellow floating heart, as well as continue to survey along the Corvallis to Albany reach of the river for new occurrences. We will continue to hand-pull any new small populations of yellow floating heart and Ludwigia during volunteer paddle and pull events. New occurrences will continue to be GPS'd and included in the Fulcrum database.

We will control parrot feather in a limited area at one select site, Collins Bay. After four years of Ludwigia treatments at this priority site, parrot feather started to try and establish.

a) *Nymphoides peltata*

One component of this project is the continued survey and control of A-rated *N. peltata* at Horseshoe Lake, North Albany (**Appendix A: Map and Photos of Yellow Floating Heart Treatment Area at Horseshoe Lake, Benton County**). This population was treated during the summers of 2014-2017 with OSWB funds. ***This population was not treated in 2018 as there was no yellow floating heart reported at this site in 2018!*** While this is great news, the Homeowners Association on the lake, who agreed to have the detention pond that drains into the lake inspected for *N. peltata* and subsequently treated, did find yellow floating heart in their pond in 2018. They contracted a professional to treat it, and we will keep an eye out at both Horseshoe Lake and the detention pond in the future.

We propose to survey Horseshoe Lake in 2019 for yellow floating heart, and if found, to treat it using aquatic label Imazamox (Clearcast) (1 quart per acre) with 0.5-2% surfactant (Agridex) and an indicator dye. We also propose to communicate with the Homeowners Association to determine whether *N. peltata* is found in the detention pond in 2019, and to determine what treatment their professional contractor used. The focus of this project is to significantly reduce and eventually eradicate *N. peltata* from Horseshoe Lake and prevent its spread to the nearby Willamette River. This population was the first reported occurrence of yellow floating heart in Benton County, making it a prime candidate for rapid removal.

b) *Ludwigia hexapetala*:

Since beginning this project in 2015 We propose to continue control of B-rated *L. hexapetala* at Collins Bay and Wapato Cove on the Willamette River. Collins Bay was recommended for restoration due to the rarity of open marshland on the mainstem of the river. It has been treated during summers 2014-2018 (see **Appendix B: Map of Ludwigia and Yellow Floating Heart Treatment Areas along River; Appendix C: Maps and Pictures of Collins Bay – Before and After Ludwigia Treatments**). Wapato Cove, a 1.5 acre river inlet between Corvallis and Albany (**Appendix D: Wapato Cove Photos**), has been identified during numerous river surveys and by Benton SWCD and the Willamette Aquatic Invasive Network as a priority for control based on its location directly on the river, presence of a significant native species (wapato), and the threat of spread of *L. hexapetala* to downstream locations. For both sites, we will be requesting a reduced amount of OSWB grant funds for treatment, as we will be able to use some Oregon Watershed Enhancement Board Willamette Strategic Implementation Plan (WSIP) grant funds to help pay for treatment at these sites in 2019.

Since beginning this project in 2014, we have seen significant reductions of Ludwigia at Collins Bay. We have increased our survey area for Ludwigia and added a new site

(Wapato Cove) in 2017. Ludwigia has decreased at both sites since starting treatment, with 2018 being no exception (**Table 1**).

**Table 1.** Net/treatment acres and gross/survey weed acres of Ludwigia through the WRAWM Project since 2014.

Year	Net/treatment acres	Gross/survey acres
2014	4.25	10.5
2015	11	11
2016	7.5	12
2017	12.75	18
2018	5	12

Treatments at both Collins Bay and Wapato Cove will consist of herbicide application to thick mats of Ludwigia in open water and on the shoreline. Contracted applicators will be familiar with native species and trained in techniques for selective application in aquatic ecosystems. An herbicide mixture of 1.5% Imazamox (Clearcast) with 1-2% surfactant (e.g., Syltac or Agridex), and indicator dye will be used if we can work around landowner needs. Otherwise we will use an herbicide mixture of 3% aquatic label glyphosate, 1-2% surfactant (Agridex), and indicator dye. At Wapato Cove, in dense stands of wapato plants at with sparse Ludwigia, Ludwigia will be manually removed by volunteers or contractors. Treatments will take place in early summer (June/July), when about half of the plants have flowered, but seed capsules have not yet matured. A follow-up treatment will take place about six to eight weeks later (September).

c) *Myriophyllum aquaticum*:

We propose to control parrot feather (*Myriophyllum aquaticum*) in a limited area at one select site, Collins Bay, where parrot feather is starting to establish following years of Ludwigia treatment (**Appendix C: Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments**). For parrot feather control treatments at Collins Bay in 2019, we propose to conduct herbicide application to areas of parrot feather in open water. An herbicide mixture of 1.5% Imazamox (Clearcast) with 1-2% surfactant (e.g., Syltac or Agridex), and indicator dye will be used. Applications would be timed to occur concurrently with Ludwigia control treatment herbicide applications in order to efficiently use labor hours, crew time, and travel to and from the site.

d) Additional restoration plantings at Collins Bay

Five seasons of treatments at Collins Bay have led to a reduction in Ludwigia cover, with some areas having greatly reduced plant cover to no plant cover. We began restoration of native wapato (*Sagittaria latifolia*) at the site in 2016, adding tubers (0.07 acres; **Appendix E: Collins Bay Restoration Areas Map and Photos**). Under separate grant funds we collected wapato tubers again in Fall 2017 and planted them at Collins Bay, along with native aquatic seed (0.33 acres). We are not requesting 2019 ODA OSWB grant funds for restoration. However, under separate grant funds we intend

to collect wapato and plant it at Collins Bay again in 2019. We are hoping to also plant yellow pond lily (*Nuphar polysepala*).

e) Volunteer weed pulls

In 2019, Benton SWCD in partnership with Willamette Riverkeeper will host at least two volunteer weed pulls at locations where volunteers previously pulled Ludwigia and yellow floating heart on the Corvallis to Albany reach, as well as any additional small patches found during the survey. One objective of these volunteer events is to increase community awareness about the connection between river health and aquatic invasives. Another objective is to remove target aquatic invasive species from the river in areas where they are just getting established and are small enough to be hand-pulled, or where integrated weed control techniques need to be used due to native plant sensitivity (Wapato Cove). Ludwigia and yellow floating heart will be manually harvested and secured in heavy duty plastic bags on individual watercrafts. The bags will be sealed and properly disposed of at the end of each event. To determine effectiveness of hand-pulling, volunteer pull sites will continue to be monitored at least once a year following weed pulls. Sites will be monitored using photo points and GPS mapping. Willamette Riverkeeper will provide boats and assist with coordination, safety, and labor.

2) Targeted outreach consisting of one community workshop:

Benton SWCD, in partnership with Willamette Riverkeeper, will host at least one workshop on the Willamette River, targeted for the community and for members of the Willamette Aquatic Invasives Network (WAIN). This workshop will contain information on native and invasive aquatic plant identification, as well as appropriate response and reporting techniques for priority aquatic weed species. During the workshops we will distribute the Water Weed Guide for Benton County, developed during the first phase of this project (Benton County Water Weed Guide BSWCD 2014).

3) Monitoring at project sites pre- and post-treatments:

Water Quality and Vegetation Monitoring: As a continuation of water quality monitoring conducted in partnership with the US Geological Survey in 2018, we propose to collect high frequency water quality data in Collins Bay and Wapato Cove on three separate occasions in summer 2019. The first sampling trip would occur prior to glyphosate treatments in July, again after a second round of herbicide application in September, and again after plant senescence in October. Data will be collected with a Yellow Springs Instrument (YSI) EXO2 sonde, including dissolved oxygen, water temperature, pH, specific conductance, turbidity, and plant pigments (total chlorophyll and phycocyanin). Water quality surveys will be conducted outside of plant sampling and treatments (as both of those activities stir up sediments). From these data, USGS will produce color maps for each water body portraying the water quality parameter results, and when possible, how they differ from previous years data (Collins Bay). A peer reviewed interpretive report will be prepared in collaboration with PSU.



PSU is requesting 2019 ODA OSWB grant funds that include vegetation monitoring at Collins Bay and Wapato Cove. This work critical for understanding the restoration trajectory of a heavily impacted Ludwigia site. By assessing vegetation at Collins Bay, we can continue to develop a restoration plan and determine how native restoration plantings are doing in a more quantitative way than photo monitoring. This assessment will allow us to continue to do adaptive management at that site, which has had heavy investment and a high profile. Vegetation assessments at Wapato Cove will address how integrated pest management is working at a site with high native and invasive species cover.

Results from 2019 monitoring will be shared through meetings and workshops. Assessing the impacts of Ludwigia control on the aquatic plant community and water quality is an important component in the management of the Willamette River system.

Finally, we propose to continue surveying the Willamette River (Corvallis to Albany reach), in partnership with Willamette Riverkeeper, looking for and mapping new occurrences of aquatic invasives and deploying early detection rapid response methods at satellite populations.

## 10. Using a bulleted list: Explain the project goals and objectives.

(See Instructions section for specific guidance on goals and objectives)

- The primary goal of this project is to increase the quantity and quality of open aquatic habitat in the Willamette River system through control of invasive aquatic weeds. Specifically, we will continue to reduce ecological impacts of *Ludwigia* on the river system through the reduction of downstream spread of the species through plant fragmentation. We will also promote native plant recovery through restoration plantings following treatments. Sites targeted for control include Collins Bay, Wapato Cove, the side channel of Lower Kiger (weed pull events), Tripp Island (weed pull events), and satellite populations of *Ludwigia* between Corvallis and Albany. We will reduce populations of *Ludwigia* in the river using integrated techniques at strategic sites. Treatment methods will include hand-pulling and herbicide application using updated techniques and equipment (Inteli-spray system with tractor, boat, and hose & reel).
- Another goal of this project is to ensure eradication of yellow floating heart at Horseshoe Lake, the first observed population in Benton County. After four years of treatment, yellow floating heart was not observed at Horseshoe Lake in 2018, but was observed in the detention pond that drains into the lake. We will continue to monitor this lake and engage with the HOA on their treatment of the detention pond. We will also reduce the ecological impacts of yellow floating heart on the river system. In 2016 and 2017, we saw the first observed yellow floating heart occurrences along the mainstem of the Willamette River in the Corvallis to Albany reach (at a side channel at Lower Kiger and at Tripp Island). Our volunteer groups hand-pulled the small populations and in 2018 we did not observe yellow floating heart at these sites! We will continue to visit these areas to pull any new plants, as well as survey for this species along the river and hand-pull any small populations we observe.
- Another objective of this project is to continue to monitor site changes in response to treatments. Monitoring will consist of strategic photo-points throughout the areas of infestation and GIS mapping of the pre- and post-treatment extent at each site. Photos have been regularly recorded for each photo-monitoring location before and after treatments (see attached photos in **Appendices**). Photo-points were established at Collins Bay in 2014 and have been taken annually through 2018. Restoration photos-points at Collins Bay were established in 2016. Photos were taken at Horseshoe Lake (Benton County) prior to treatments for yellow floating heart, and then again post-treatment. Photo-points have also been established at Wapato Cove.

Additionally, we regularly take photos at hand-pull sites (e.g., Lower Kiger Alcove) during volunteer events to help with monitoring of hand-pull efforts from year to year. We will continue to use photo-point monitoring techniques. These techniques allow us to track change in post-treatment distribution and abundance of Ludwigia and yellow floating heart, native plant distribution, and non-target impacts. We will also conduct water quality monitoring to record pre- and post-treatment differences in dissolved oxygen, water temperature, pH, specific conductance, turbidity, and plant pigments (total chlorophyll and phycocyanin) at two sites (Collins Bay and Wapato Cove).

- Another goal of this project is to reach at least 50 people through education and outreach activities, including presentations, workshops, and volunteer weed pulls. We will provide information on aquatic weed identification and proper early detection and rapid response techniques. Through volunteer weed pulls, Ludwigia and yellow floating heart will be removed from areas where it is just becoming established before it forms significant populations.
- Another objective of this project is to share treatment methodology and results with other land managers and practitioners. The use of Fulcrum software will allow us to quickly map aquatic invasive data along the river during surveys and instantaneously share data with other practitioners through a shared database. All survey data collected for this project will also be entered into Weedmapper and WAIN's shared database to track treatments and map noxious weed populations. Control techniques and efficacy of treatments will continue to be recorded and shared through meetings, presentations, and workshops.
- Another goal of the project is to continue restoration at Collins Bay. After the first several years of Ludwigia treatments, portions of Collins Bay were ready for replanting with native vegetation. Based on native plants found on site, some of the native species best suited for Collins Bay include wapato, softstem bulrush, common spikerush and softstem, broadfruit bur-reed (*Sparganium eurycarpum*), and yellow pond lily (*Nuphar polysepala*). We have begun adding donated native wapato tubers and native aquatic seed to the site (**Appendix E: Collins Bay Restoration Areas Map and Photos**). In 2016 and 2017, we did not have access to broadfruit bur-reed or yellow pond lily stock; however we will be trying to access some of this seed for future planting seasons. No additional wapato was added to the site in 2018 as the generous farmer asked that his wapato field lay fallow for a year. We intend to do additional plantings in 2019. Access to native aquatic riverine wetland plant material is extremely limited.

- Another objective of the project is to continue development of a long-term management plan for priority sites within the Corvallis to Albany reach of the Willamette River, including Collins Bay and Wapato Cove. This plan will include clear goals and objectives for sites and will integrate work already accomplished with future restoration needs. The plan will also include a timeline for achieving restoration goals, and the associated actions needed to accomplish these goals. These sites will also be included as part of a larger plan for invasives management on the Willamette River, which is being developed by WAIN.
- Another objective of the project is strategic control of parrot feather at priority sites where Ludwigia has been treated for several years and where parrot feather is a new invader and is at low enough levels where it can still be managed for the overall health and function of the restoration site. Collins Bay is an example of such a priority site, where we observed parrot feather for the first time establishing in 2017, and treated it in 2018. We want to continue to treat this population before it forms a significant population at this site.

**11. Is the project part of an existing weed management plan?**

Yes No (if yes, provide the plan name, author & date published)

This project fits within the goals and management principles outlined in the Benton County CWMA Five-Year Management Plan. Specifically, “projects [should be] designed using an ecosystem management approach based on an understanding of weed biology, weed ecology, and landscape level processes.” (Benton County CWMA, 2012; pp. 2-4).

The control of Ludwigia is also recommended in the “Willamette Mainstem Vegetative Habitat Survey and Assessment Final Report.” This report was prepared by Carex Working Group based on invasive plant and habitat assessment and survey work completed in 2012 and 2013 on approximately 2,500 acres of riparian habitat on the Willamette River from Corvallis to Albany. This document was reviewed by the WMC steering committee members, staff of Oregon Watershed Enhancement Board, and Meyer Memorial Trust (Carex Working Group, Sept. 2013). The abridged version of this report can be found on the WMC webpage on the Benton SWCD website:

<https://www.bentonswcd.org/assets/Willamette-Mainstem-Assessment-Final-Report-Abridged.pdf>.

**12. Are there additional partners?** Yes No

**Who are the additional partners and what are their roles and responsibilities?**

Additional partners include Benton Soil and Water Conservation District (Benton SWCD), Willamette Riverkeeper (WRK), Oregon Parks and Recreation Department

(OPRD), Portland State University Center for Lakes and Reservoirs (PSU), Oregon Department of Agriculture (ODA), private landowners within the project area including the Horseshoe Lake Neighborhood Association (HLNA), U.S. Geological Survey (USGS), the Willamette Mainstem Cooperative (WMC), and Willamette Aquatic Invasives Network (WAIN).

Beth Myers-Shenai and Glenn Miller, both Integrated Weed Management Specialists with ODA, will continue to provide in-kind support in the form of professional advice, site visits, and consultation on weed control activities. ODA provided photos and GIS shapefiles from aerial surveys for *Ludwigia* in the Willamette River system conducted during summer 2014. Further survey work is planned, as feasible. These data have helped to assess the extent of *Ludwigia* populations in the Willamette River system and are being utilized in the formation of a management plan for this plant (currently being developed by the Willamette Aquatic Invasives Network).

OPRD staff, Scott Youngblood, will continue to participate in outreach activities related to this project. In the past, OPRD has participated in similar projects by providing coordination and safety assistance during volunteer activities on the river. OPRD staff have helped control priority invasives on the Willamette. They will continue to provide these services in 2019 and in-kind funding in the form of staff time and equipment use.

WRK staff will continue to work with Benton SWCD to organize at least three river events, including one aquatic invasive workshop and two volunteer weed pulls, and one survey of the Willamette River in the Corvallis to Albany reach. WRK will provide in-kind funding in the form of equipment use (boats, vans, and trailers). Grant funds are requested in this proposal for WRK staff time and mileage, which will be disbursed under paid contract.

Staff from PSU Center for Lakes and Reservoirs will continue to participate, as they have for our previous workshops and volunteer events, by offering expertise on aquatic invasives, presentations, and sharing outreach materials. Additionally, under the condition that they received 2019 ODA OSWB grant funds, they will monitor vegetation at the two sites we are proposing to treat (Collins Bay and Wapato Cove) and share data with us.

Staff from USGS will work with Benton SWCD to monitor water quality (dissolved oxygen, water temperature, pH, specific conductance, turbidity, and plant pigments [total chlorophyll and phycocyanin]) at Collins Bay and Wapato Cove. USGS will provide in-kind funding in 50% of total cost, plus equipment etc.

Private landowners at Horseshoe Lake and Collins Bay will be partners on this project through site monitoring, regular contact with Benton SWCD, and outreach to neighbors in the area. The Horseshoe Lake Neighborhood Association will continue to monitor and treat yellow floating heart as necessary in a detention pond that drains into the lake. Benton SWCD will continue to provide informational handouts about the project and weeds of concern to interested landowners.

Both WMC and WAIN focus on management of invasive species on the mainstem of the Willamette River. The WMC is a group of landowners, organizations, volunteers, and other interested parties working towards shared long-term stewardship of Willamette River resources with a focus on the Corvallis to Albany river reach. The Willamette Aquatic Invasive Network, comprised of over 50 participating organizations (local, state, and federal), fosters collaboration to share information, expertise, technologies, aquatic resources, and restore aquatic and riparian habitat in the Willamette River Basin (Cascade Pacific RC&D, WAIN webpage, 2015). WRAWMP (this project) has benefitted from the work and expertise of members of WAIN and the WMC. The BC CWMA will continue to coordinate and work with these groups to share information and lessons learned in the management of *Ludwigia*.

**13. Which elements of the project will OSWB funds be used for? Be specific to activity and specific timing of the activity.**

The Benton County CWMA is requesting OSWB funds for the following elements of this proposed project:

1) Salary and Wages:

Funding for Benton SWCD staff will be used for these tasks: project coordination and management (on-going), administration and oversight of all grant activities (on-going), coordination and facilitation of education and outreach activities (April-October 2019), information sharing and reporting (ongoing), and the beginning development of a long-term management plan for Collins Bay (Dec. 2019 – Feb. 2020).

2) Contracted Services:

Surveying (May-October 2019) and monitoring (May-October 2019) to determine previous treatment effectiveness and post-treatment of yellow floating heart of 0.5 acres of Horseshoe Lake as needed. Treatments, if necessary, will take place in June or July (at first sign of leaf emergence and prior to flower formation), with a second treatment taking place in August or September (as soon as regrowth is observed). Monitoring will take place before and after treatments as needed.

Surveying and monitoring of Collins Bay and Wapato Cove to determine treatment effectiveness and other site changes, continue treatment of *Ludwigia* at both sites, and conducted strategic treatment of parrot feather at Collins Bay. Concurrent with surveying and monitoring, treatment will occur between June-July depending on conditions and consist of application of herbicide. Secondary control treatments will occur between August and September to spray remaining plants. Monitoring will take place before and after treatments as needed.

OSWB funds are requested for education and outreach through the coordination of at least two days of volunteer Ludwigia hand-pull activities on the Willamette from Corvallis to Albany and one aquatic weed workshop for community members. This effort will be led by Benton SWCD and Willamette Riverkeeper. Funds will cover Benton SWCD and Willamette Riverkeeper staff time for coordination of these activities. The first weed pull event will take place in early summer (June), and will be followed-up with a pull later in the season (August). The workshop will be held in late spring or early summer 2019. Much of the Benton SWCD staff time will be in-kind matching services.

Monitoring of project sites will include pre- and post-treatment photo points and aerial imagery mapping (using ODA survey images and Google Earth). Funding is requested for monitoring of water quality parameters, which include pre- and post-treatment measurements of dissolved oxygen, water temperature, pH, specific conductance, turbidity, and plant pigments (total chlorophyll and phycocyanin). This effort will be led by U.S. Geological Survey and ODA funds will cover 50% of the total cost. The other 50% will be matched by USGS.

### 3) Other

OSWB funds will be requested for the reimbursement of the Water Weeds Guide to Aquatic Weeds for Benton County given out to volunteers at the paddle and pull events as well as at the community workshop. Additionally, a garbage dump fee is included for disposal of noxious weeds pulled at the volunteer events.

## **14. How does this project relate to other projects (BLM, USFS or local projects)**

**completed or planned?** Is the project related to work funded in part with another grant from OWEB (i.e. restoration, land acquisition, or technical assistance)? List the OWEB grant number and briefly describe the relationship to this proposal.

The Willamette River Aquatic Weed Management Phase 6 fits within the mission and guiding principles of the Willamette Mainstem Cooperative (WMC), a group of landowners, organizations, and volunteers who work together to improve stewardship of natural resources across all landownerships on the mainstem Willamette, with a focus area of Corvallis to Albany (WMC Programmatic Bylaws, 2015). Ludwigia is listed as a priority species for control in the Willamette River in the WMC Five-Year Action Plan (WMC Five-Year Plan, 2014; pg. 8). Capacity funding for the WMC is funded by Meyer Memorial Trust, through the Willamette River Initiative program, with Benton SWCD providing leadership and fiscal management.

The Ludwigia sites proposed for treatment in this application were identified and mapped during a landscape scale invasive plant assessment of the floodplain along the Willamette River from Corvallis to Albany. The survey was conducted for the Willamette Mainstem Cooperative by Carex Working Group (CWG). In the final report submitted by CWG, Ludwigia was identified as a priority for removal from the Willamette River system and specifically Collins Bay, due to the rarity of open marshland habitat on the

Willamette (Carex Working Group, Sept. 2013). At the time of the CWG survey and report, yellow floating heart was not yet a known issue in the Corvallis to Albany reach of the river.

Benton SWCD has a Five-Year Strategic Plan (2015-2020). One of the goals of the Strategic Plan is to deliver programs that inspire stewardship. To fulfill this goal, Benton SWCD coordinates the WMC, which entails management and implementation of several projects that focus on control of *Ludwigia* and yellow floating heart on the Willamette River. WRAWMP is one such project, funded through the ODA-OSWB. Another WMC project is funded through the Oregon Watershed Enhancement Board (OWEB) Strategic Investment Partnership (SIP) and Bonneville Power Administration (BPA). This four-year project includes the treatment of over four miles of side-channel/slough habitat and over 50 acres of floodplain habitat and gravel ponds heavily infested with *Ludwigia*. This project is located across the river from Wapato Cove, and less than 0.5 miles upstream from Collins Bay (**Appendix B: Map of Ludwigia and Yellow Floating Heart Treatment Areas along River**, see areas “Stewart Slough,” “Asbahr Lake”, and “Lower Kiger Ponds”).

*Ludwigia* is currently being controlled at several other locations on the Willamette River. One of the larger projects is being implemented by City of Eugene, which has been working on *Ludwigia hexapetala* control since 2011 at the Delta Ponds Natural Area. City of Eugene developed the Invasive *Ludwigia hexapetala* Management Plan for the Delta Ponds Natural Area. Delta Ponds Natural Area is a series of gravel extraction ponds recently reconnected to the Willamette River. This five-year plan outlines the systematic treatment of *Ludwigia hexapetala* in the Delta Ponds by integrating manual and herbicide control methods. WRAWMP proposes to apply successfully implemented techniques for *Ludwigia* control, as outlined in the Management Plan by the City of Eugene.

The Delta Ponds Natural Area is located upstream from the WRAWMP project area. The WRAWMP project manager has consulted with several experts working on the Delta Ponds Invasive *Ludwigia* Control Project. Individuals consulted include: Lauri Holts, Resources Coordinator with the City of Eugene; Dr. Brenda Grewell, Delta Ponds project consultant and ecologist with USDA-Agricultural Research Service Exotic & Invasive Weeds Research Unit; Glenn Miller, Integrated Weed Management Specialist with the Oregon Department of Agriculture; Mark Systma, Associate Vice President for Research, Research & Strategic Partnerships at Portland State University; and Matthew Mellenthin, Delta Ponds *Ludwigia* control contractor with Integrated Resource Management (also current control contractor for WRAWMP).

The City of Eugene, in coordination with Willamette Riverkeeper and the River Guardians program, hosted a 2018 outreach aquatic weed workshop for community members at the Delta Ponds Natural Area. The workshop contained information on native and invasive aquatic plant identification, and appropriate responses and reporting techniques for priority aquatic weed species. Benton SWCD helped with the workshop (using Meyer Memorial Trust grant funds provided match in the City of Eugene’s 2018



ODA OSWB grant). Benton SWCD provided copies of the aquatic Weed Guides for Benton County for the event:

<https://www.bentonswcd.org/assets/BSWCDAquaticWeedGuidebkl15.pdf>.

Calapooia Watershed Council, in collaboration with OPRD, began control treatments of *Ludwigia hexapetala* in 2017 from the side-channel system running through Bowers Rock State Park. This work is being funded through an OWEB-FIP grant, Meyer Memorial Trust funding, and potentially ODA OSWB grant funds. This treatment work is being done prior to side-channel reconnection construction, which has been funded through an OWEB-FIP grant as well (**Appendix B: Map of Ludwigia and Yellow Floating Heart Treatment Areas along River**).

OPRD and WRK are collaborating to remove *Ludwigia hexapetala* from 95 acres of aquatic habitat at OPRD's Willamette Mission State Park. Willamette Riverkeeper, OPRD, the USGS, PSU, and Benton SWCD collaborated to conduct baseline monitoring of Ludwigia at the Park to learn more about impacts of Ludwigia and other aquatic invasive species on off channel habitat. These data will provide a basis for understanding complex interactions between aquatic plants, algal communities, water quality conditions, and channel morphology during the post-treatment period. The project will also provide critical data for assessing pre- and post- treatment conditions so effects of Ludwigia treatment on plant cover, water quality, and bed substrate can be assessed. Pre-treatment monitoring work at Willamette Mission is being supported by an OWEB-FIP monitoring grant, and post-treatment monitoring will be covered under a future OWEB proposal. Results from the Willamette Mission State Park monitoring effort will be combined with data collection related to water quality and vegetation sampling at Collins Bay, Scatter Bar Pond, and Wapato Cove to create an even larger dataset including multiple geographic areas. Collins Bay and Wapato Cove vegetation assessments will potentially be funded through PSU's ODA-OSWB 2019 grant funds. The results of this research will result in a peer reviewed published paper to be shared with peers and stakeholders.

The Long Tom Watershed Council is currently working with the OSWB to remove Ludwigia from a number of locations on the Long Tom River and Amazon Creek sub-basin, upstream of the WRAWMP project area. They started work in summer 2015, with follow up treatments in 2016, 2017, and 2018. They also treated a patch of yellow floating heart on the historic confluence of the Long Tom River with the Willamette River, as well as in areas of the Snag Boat Bend Unit of the William L. Finley National Wildlife Refuge.

ODA has been conducting control treatments for yellow floating heart at approximately River Mile 145/146 near OPRD's Sam Daws/Buckskin site, at the southeast end of Benton/Linn counties.

The WRAWMP project manager has consulted with several experts working on yellow floating heart, as well as other floating heart species such as crested floating heart (*Nymphoides cristata*). Individuals consulted include: Glenn Miller, Integrated Weed

Management Specialist with the Oregon Department of Agriculture; Mark Systma, Associate Vice President for Research, Research & Strategic Partnerships at Portland State University; and Dr. Michael Netherland, U.S. Army Engineer Research and Development Center.

The WRAWMP project manager has consulted with several experts working on parrot feather. Individuals consulted include: Glenn Miller (ODA), Andrew Riggs and Sunny Simpkins (Multnomah County Drainage District), Alex Stauch (Mosaic Ecology), and Matthew Mellenthin (Integrated Resource Management).

In summers 2015 and 2016, Willamette Riverkeeper, in partnership with Willamette Aquatic Invasive Network partners, conducted a survey of the Willamette River from north of Eugene to Salem to map high priority aquatic invasive species, including Ludwigia and yellow floating heart, on the river. Portland State University conducted similar surveys on the river around the Portland area in 2015. ODA conducted aerial surveys of the upper Willamette to map Ludwigia in 2014, and plans to continue mapping as feasible. Data sets from these surveys have been entered into various databases and have been shared with appropriate partners, who are using this information to develop plans, set priorities, and apply for funding to strategically manage these species. Benton SWCD is one of the groups who has participated in these surveys, and additional surveys in 2017, and is currently utilizing resulting data. Benton SWCD will also be participating on the subcommittee for the strategic action plan being developed by WAIN (and led by Willamette Riverkeeper and OPRD) to prioritize invasive species treatments along the Willamette River.

**15. How does this project fit into the statewide and/or local weed management objectives? Identify the county weed listing priority if known.**

- Objective One: Leadership and Organization – Strategy One: Provide consistent statewide and local leadership and organization.

The Benton County CWMA provides local leadership and organization to groups, agencies, and landowners related to invasive plant issues around the county. The Benton County CWMA Management Plan outlines management principles for CWMA activities that align with this project such as: “projects are designed using an ecosystem-based management approach based on an understanding of weed biology, weed ecology, and landscape level processes.” (Benton County CWMA 2012).

The BC CWMA is coordinated by Benton Soil and Water Conservation District. Benton SWCD’s current Executive Director has over 30 years of experience managing aquatic invasive species programs and is committed to dedicating the resources necessary to address long-term management needs of this program (WRAWMP) in Benton County (within budget restraints). This will increase the likelihood of long-term success.

- Objective Two: Cooperative Partnerships – Strategy Two: Develop and expand partnerships.

The Benton County CWMA is made up of a broad partnership of agencies, organizations, and landowners. Benton SWCD provides fiscal oversight and coordination of the Benton County CWMA. Benton SWCD has a strong history of developing partnerships and collaborating with other agencies, organizations, and landowners to complete projects and develop programs for the stewardship of natural resources. Another partnership that will be involved in the planning and implementation of this project is the Willamette Mainstem Cooperative, which is supported by a group of stakeholders representing local agencies and landowners, and is facilitated by Benton SWCD.

For this project, Benton County CWMA and Benton SWCD will work with Willamette Riverkeeper, and other partners, to implement workshops, volunteer events, and survey work. Benton SWCD also plans to work closely with Portland State University Center for Lakes and Reservoirs, the Willamette Aquatic Invasive Network, Calapooia Watershed Council, the City of Eugene, and other interested groups to ensure that it is meeting Ludwigia and yellow floating heart control objectives while minimizing impacts to local fish and wildlife species.

- Objective Three: Planning and Prioritizing – Strategy Three: Develop and maintain noxious weed lists and plans.

The Benton County CWMA has developed and maintains an invasive plant list for Benton County. This list is regularly reviewed and updated by the Benton County CWMA. *Ludwigia hexapetala* is a B-rated weed on the Oregon state noxious weed list and a B-rated weed on the Benton County invasive plant list, and is targeted for outreach and data collection, both of which would be fulfilled through this project. *Nymphoides peltata* is an A-rated noxious weed by the state of Oregon and A-rated in Benton County. It is targeted for ODA response and immediate removal. *Myriophyllum aquaticum* is a B-rated weed on the Oregon state noxious weed list and a B-rated weed on the Benton County invasive plant list. It is targeted for containment and removal from priority areas only.

The species and sites proposed for treatment in this application have been carefully considered and chosen based on survey data and recommendations from several specialists and land managers who operate on the mainstem Willamette River.

- Objective Four: Education and Awareness – Strategy Four: Provide education and awareness

For this project Benton SWCD, in partnership with Willamette Riverkeeper, will provide education and outreach to land managers, restoration practitioners, landowners, and the general public through a series of aquatic weed workshops, volunteer weed pulls, and project site tours on the Willamette River. For these events, we will discuss the benefits of identifying, reporting, and removing invasive plant populations before they spread. One of the objectives for these outreach events is to educate targeted

audiences on the identification of aquatic invasive plants, the impact on wildlife, humans, and native plant communities, and methods for timely response relative to species of concern.

Benton SWCD will develop outreach materials and distribute them to workshop participants and landowners with the project area. This includes distribution of the water weed guide for Benton County:

<https://www.bentonswcd.org/assets/BSWCDAquaticWeedGuidebkl15.pdf>. We are also in the process of updating the aquatic weed guide (using Meyer Memorial trust grant funds) to include additional EDRR noxious aquatic weeds (e.g., delta arrowhead [*Sagittaria platyphylla*], flowering rush [*Butomus umbellatus*]) and native look-alikes to the noxious aquatic weeds (e.g., watershield [*Brasenia schreberi*], American waterweed [*Elodea canadensis*], Richardson's pondweed [*Potamogeton richardsonii*]). We may have the next version of the Benton County aquatic weed guide ready to share for 2019 outreach and education events.

An objective of these events is to increase public and land manager awareness of aquatic invasives and provide tools to members of the community and restoration practitioners to make informed decisions for management of aquatic weeds.

- Objective Five: Integrated Weed Management (IWM) – Strategy Five: Continue to support and advocate the principles of IWM.

The Benton County CWMA is dedicated to using tested and integrated approaches in weed management. This project is supportive of integrated weed management principles in the use of manual and chemical control of Ludwigia and yellow floating heart on the mainstem and at each project site. For each site, all appropriate methods for treatment will be thoroughly analyzed and considered based on resources available and existing conditions.

- Objective Six: Early Detection and Control of New Invaders – Strategy Six: Implement early detection and control.

This project includes early detection and control of new invaders as a key element: we successfully controlled the first observed *Nymphoides peltata* in Benton County (at Horseshoe Lake), as well as the first observed yellow floating heart occurrences along the mainstem of the Willamette River in the Corvallis to Albany reach (e.g., Lower Kiger side channel, Tripp Island). Continual monitoring to ensure eradication is proposed in this grant application.

We propose to control early detected new small populations of Ludwigia along the mainstem of the Willamette before they become established, as well as control of established populations of Ludwigia at priority areas (i.e., Collins Bay, Wapato Cove) where it may still be effective in significantly reducing, and eventually removing, the plants from these priority areas. Both Collins Bay and Wapato Cove contain a diversity

of native aquatic plant species, as well as unique backwater habitat areas important for native fish and wildlife species.

We would also treat a limited area of parrot feather (*Myriophyllum aquaticum*) at one site, Collins Bay. Parrot feather was first observed at this priority site in 2017 following years of Ludwigia treatment (**Appendix C: Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments**). We began pulling two patches of parrot feather at Collins Bay in September 2017 and disposed of materials offsite (using non-ODA grant funds); however, the patches were determined to be too large for hand-pulling and will need to be chemically treated again in 2019.

- Objective Seven: Noxious Weed Information System and Data Collection – Strategy Seven: Upgrade Noxious Weed Information System.

Through the survey and mapping of project sites using GPS technologies and Fulcrum software, we can contribute to existing state weed information systems such as Oregon Weed Mapper, Oregon Invasives Hotline, iMap Invasives, and WAIN's shared database. These databases allow the sharing of noxious weed populations and enables the tracking of treatments.

Data collected during the course of this project can be made available for reference by other land management agencies, to inform the development of other projects, or management plans, such as the Strategic Plan the Willamette Aquatic Invasives Network is currently developing.

- Objective Eight: Monitoring and Evaluation – Strategy Eight: Monitor noxious weed projects to evaluate effectiveness

Regular monitoring will be integrated into this project to determine short and long-term effectiveness of control activities. Photo-points have been and will continue to be strategically placed at each site to collect information before and after each treatment occurs. Populations will be mapped and updated throughout the duration of the project and in subsequent years as funding allows.

## **16. How will restoration be a part of your project? If restoration is not a component of this project please explain.**

An objective of this project is habitat restoration work at Collins Bay. Collins Bay is recommended for restoration due to the rarity of open marshland on the mainstem of the river, which is vital habitat for birds, fish, pond turtles, river otters, and many other species (Carex Working Group Sept. 2013).

Five seasons of treatment at Collins Bay have led to a reduction in Ludwigia cover, with some areas having greatly reduced plant cover to no plant cover (**Appendix C: Maps and Pictures of Collins Bay – Before and After Ludwigia Treatments**). After surveying the site and considering native plants growing in similar habitats, as well as

access to local native aquatic plant materials, we have selected the following species for replanting: wapato, softstem bulrush, common spikerush, soft rush, spike bent grass, American slough grass, slender rush, and slough sedge. In 2016 and 2017, we did not have access to broadfruit bur-reed or yellow pond lily stock; however, we will be trying to access some of this seed for the 2019 planting season. Access to native aquatic riverine wetland plant material is extremely limited.

In Fall 2016, we collected native wapato (*Sagittaria latifolia*) tubers and added approximately 500 of them to Collins Bay (0.7 acre; **Appendix E: Collins Bay Restoration Areas Map and Photos**). However, because of the early October 2016 rains and subsequent flooding of the river, we were only able to add tubers to already flooded areas. While we added tubers to an area with limited to no plant cover, there was low success, likely because the tubers could only be added at the water level and not individual pushed into the soil. Tubers may have also be predated on by fish, beavers, or nutria using the area, or flushed out of the side channel during winter storms.

For our ODA OSWB 2017 grant application, we did not request grant funds for restoration. However, under separate grant funds (Meyer Memorial Trust) we collected wapato tubers again in fall 2017 and planted them at Collins Bay along with native aquatic seed (0.33 acre; **Appendix F: Pictures of Aquatic Weed Outreach and Education Events, Weed Pulls, and Monitoring; Appendix E: Collins Bay Restoration Areas Map and Photos**).

Marvin Gilmour, a local farmer and wetland restoration practitioner, generously donated his labor and staff's labor and time to help with harvesting and collection of wapato tubers using traditional agricultural methods. Benton SWCD volunteers also helped with wapato collection. Donated native plant materials included: tubers/bulbs (wapato) and native seed (e.g., wapato, common spikerush [*Eleocharis palustris*], soft rush [*Juncus effuses*], spike bent grass [*Agrostis exarata*], American slough grass [*Beckmannia syzigache*], slender rush [*Juncus tenuis*], and slough sedge [*Carex obnupta*]).

Benton SWCD has begun coordinating with scientists from PSU's Center for Lakes and Reservoirs about potential appropriate native aquatic plants and seeds to be used at Collins Bay. PSU's vegetation sampling conducted in 2019 through ODA OSWB funds will help inform a longer-term habitat enhancement plan at this site.

Areas where native plant material have been added will be monitored using photo points and GPS mapping, as well as presence-absence surveys of plant species. We are not requesting 2019 ODA OSWB grant funds for restoration. However, under separate grant funds (Meyer Memorial Trust) we plan to collect wapato tubers again in fall of 2019 and plant them at additional areas of Collins Bay, along with native aquatic seed, as these plant materials are available. We are also beginning to explore other options for potential sources of native aquatic plant materials.

Other areas treated during this project will be assessed for restoration potential as treatments continue.

**17. Does this project protect a high priority species or habitat? Please give a brief description of the species or habitat/land use designation for this project.**

- 1) Anchor Habitat for Anadromous Fish: Collins Bay and Wapato Cove are within the areas identified in OWEB's Willamette River Habitat Protection and Restoration Program 2010-2015 Habitat Technical Team Proposal as part of the priority anchor habitats for anadromous fish along the Willamette River mainstem (OWEB 2010). Collins Bay and Wapato Cove are also within ODFW's designated essential salmon habitat (ODFW 2011).
- 2) Open Water Marsh Habitat: Collins Bay was also listed as a special habitat by Carex Working Group during the 2012-2013 invasive plant and habitat assessment, stating that open water marsh habitat was rarely encountered during survey work and that the site is worth noting for preservation/restoration work. They also recommended the use of integrated methods to remove Ludwigia along the Willamette mainstem to reclaim infested habitats and prevent further spread (Carex Working Group Sept. 2013).
- 3) Western Pond Turtles: Western pond turtles are considered a sensitive species by the state of Oregon and are one of the strategy species listed in the Oregon Conservation Strategy (ODFW 2016). While there are no official surveys on record, property owners Stanley and Louise Snyder spoke of the pond turtles and large fish once found in Collins Bay. They have witnessed more wildlife species (turtles, wood ducks) using the inlet since treatment on Ludwigia began. Prior to treatments, they did not observe any pond turtles or large fish in the inlet since Ludwigia had become so pervasive. Other landowners from properties nearby have corroborated the Snyder's account of the progression of Ludwigia and subsequent changes to the river.

Western pond turtles require open water habitat with native emergent vegetation to feed, bask, reproduce, and hide from predators. Infestations of aquatic weeds, such as Ludwigia, result in thick vegetation mats that limit movement of aquatic and semi-aquatic species, such as turtles, amphibians, fish, waterfowl, and mammals, severely limiting their ability to navigate, feed, and reproduce. In addition, these dense mats of vegetation die off at the end of the growing season and the process of decay can drastically reduce dissolved oxygen in water. These areas of low dissolved oxygen may create a barrier for movement of aquatic organisms through a waterway, or cause fatality of aquatic organisms that can become trapped in areas without sufficient dissolved oxygen. Furthermore, thick mats of vegetation formed by Ludwigia capture sediment, potentially altering floodplain capacity and side-channel characteristics of waterways such as Collins Bay.

- 4) Wapato (*Sagittaria latifolia*), also known as broadleaf arrowhead, is considered a significant native plant for its cultural value. This plant was once widely harvested by Native Americans in the Willamette Valley, such as the Kalapuyan people. It has an edible, potato-like tuber valued for its high nutritional value. Many species of ducks, mammals, and other wildlife also feed on the leaves and tubers of these plants, and all parts are considered edible. All sites proposed for treatment in this project contain wapato. The Willamette Aquatic Invasive Network considers wapato to be an indicator of high quality habitats and are recording habitats containing wapato during surveys.



**18. Salmon/Steelhead Populations Targeted and Expected Benefits to Salmon/Steelhead**

The information provided will be used by OWEB to better meet federal and state reporting requirements. Completion of this section is required but will not be used to evaluate this application for funding.

- This project is NOT specifically designed to benefit salmon or steelhead.
  - If you check this box do not answer supplemental question 18(A)

Targeted Salmon/Steelhead Populations: Select one or more of the salmon ESUs (Evolutionary Significant Unit) or steelhead DPSs (Distinct Population Segment) that the project will address/benefit. Additional information on the designation and location of the salmon/steelhead populations can be found at <http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Maps/Index.cfm>

<b>Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)</b>		<b>Coho Salmon (<i>O. kisutch</i>)</b>	
<input type="checkbox"/>	Deschutes River summer/fall-run ESU	<input type="checkbox"/>	Lower Columbia River ESU
<input type="checkbox"/>	Lower Columbia River ESU	<input type="checkbox"/>	Oregon Coast ESU
<input type="checkbox"/>	Mid-Columbia River spring-run ESU	<input type="checkbox"/>	Southern Oregon/Northern California ESU
<input type="checkbox"/>	Oregon Coast ESU		
<input type="checkbox"/>	Snake River Fall-run ESU	<b>Steelhead (<i>O. mykiss</i>)</b>	
<input type="checkbox"/>	Snake River Spring/Summer-run ESU	<input type="checkbox"/>	Klamath Mountains Province DPS
<input type="checkbox"/>	Southern Oregon and Northern California Coastal ESU	<input type="checkbox"/>	Lower Columbia River DPS
<input type="checkbox"/>	Upper Klamath-Trinity Rivers ESU	<input type="checkbox"/>	Middle Columbia River DPS
<input checked="" type="checkbox"/>	Upper Willamette River ESU	<input type="checkbox"/>	Oregon Coast DPS
		<input type="checkbox"/>	Snake River Basin DPS
<b>Chum Salmon (<i>O. keta</i>)</b>		<input type="checkbox"/>	Washington Coast DPS (SW Washington)
<input type="checkbox"/>	Columbia River ESU	<input checked="" type="checkbox"/>	Upper Willamette River DPS
<input type="checkbox"/>	Pacific Coast ESU	<input type="checkbox"/>	Steelhead/Trout unidentified DPS

**18(A). Expected Benefits: Write a brief description of the goals and purpose of the project and how it is expected to benefit salmon/steelhead habitat.**

One goal of this project is to remove aquatic invasive plants from side-channels, ponds, and sloughs within the Willamette River system. Aquatic weeds such as Ludwigia act as sediment traps and can fill in open water habitat and side-channel systems over time. These plants reduce the amount of available dissolved oxygen in the water with the rapid growth and decay of large biomasses. Removal of these weeds will improve water quality and reduce habitat degradation caused by these plants, thus improving habitat for fish and other wildlife (Sears et al. 2006).

**19. At the end of the project, how will it be determined whether the goals and objectives listed in question 10 have been met? What elements will be monitored/evaluated and by whom, how often and for how long?**

Monitoring and evaluation of this project is currently being led by Benton SWCD, and will continue for as long as needed, provided funding is available. To determine success for this project, photo-points, which have already been established, will continue to be used for monitoring purposes. Data on the extent of native and invasive plants present at each site will be recorded and mapped. Each plot will be monitored to evaluate the

response of plant communities to each treatment method. Monitoring will take place before and after each treatment, and annually after that to assess the extent of Ludwigia and yellow floating heart at each water-body (and parrot feather at Collins Bay). Success will be determined by comparing post-treatment distribution and abundance of Ludwigia, yellow floating heart (and parrot feather at Collins Bay), and native plants to pre-treatment abundance and distribution.

Success of Ludwigia infested sites will be determined by a reduction in Ludwigia populations to a level that sites can be managed through river volunteer events (e.g., weed pull events) at a budget and level manageable by local partners. This project includes the sixth year of treatment for Ludwigia at Collins Bay. Collins Bay is expected to require several more years of treatment to adequately reduce plant densities to levels where the habitat can stabilize. The first year was the most intensive for control work at the site. With the reduction in plant densities, treatments now require less labor and time, which means yearly maintenance should continue to decrease in cost.

The project includes the third year of treatment at Wapato Cove. We will be able to assess whether the combination of herbicide application (in dense and medium patch areas of Ludwigia) and manual removal of Ludwigia (in dense areas with wapato with sparse Ludwigia) is effective control treatment at this highly publically visible site with an abundant amount of native aquatic vegetation. We will continue to re-evaluate and adapt our methods to most effectively conduct Ludwigia control treatments at this site.

This project includes funding for potential treatment of Horseshoe Lake (Benton County). Horseshoe Lake was treated for yellow floating heart for four years. In the fourth year (2017) a new treatment method was used (Imazamox) and fortunately no yellow floating heart was found in Horseshoe Lake in 2018! Yellow floating heart was, however, found in the detention pond that flows into Horseshoe Lake. Continued funding for rapid response treatment is needed in the case of a small population re-establishing at Horseshoe Lake in 2019. We will continue to coordinate with other restoration practitioners about other potential options for control treatments as well as spread our success story with partners.

## **20. What is the long term plan for this project? Who will maintain the project after the grant and for how long?**

Priority sites that are being treated within the Corvallis to Albany reach, including Collins Bay and Wapato Cove, will be included as part of a strategic action plan being developed by WAIN. This plan will include clear goals and objectives for sites and will integrate work already accomplished with future restoration needs. The plan will also include a timeline for achieving restoration goals, and the associated actions needed to accomplish these goals.

Continued community education and outreach about Ludwigia and yellow floating heart, and other aquatic invasives, is key to long-term management and protection of priority

habitats in the Corvallis to Albany reach. Significant progress has been made with public awareness about Ludwigia and yellow floating heart as a result of the river workshops and paddle and pull events through this project. Benton SWCD, with Willamette Riverkeeper, will continue the successful river volunteer program to remove new small populations of Ludwigia and yellow floating heart along the Corvallis to Albany reach for as long as funding can be obtained. Once the WAIN strategic action plan is developed, WAIN may be able to apply for additional grants, such as the National Fish and Wildlife Pulling Together Initiative grant, to help leverage funds for river volunteer weed pull events along priority sections of the Willamette River.

Benton SWCD will continue to maintain these projects for as long as funding can be obtained. Many funding and maintenance options will be (or have been) considered, including discussions with landowners on contributions they are willing and able to make. As indicated earlier, current Benton SWCD leadership is committed to the long-term success of this project. To the extent budgets allow, the organization is dedicated to continuing its role in providing expertise and oversight of an aquatic invasive plant management program in Benton County.

**21. What type of work will be done on this project? If applicable, select all the activities that are part of your project (check all that apply)**

- Pesticide or herbicide application
- Aircraft Aerial application of chemicals
- Transporting individuals on the water
- Grantee’s staff or volunteers work with children related to this project

**Insurance Types and Coverage Amounts required for all restoration, assessment or monitoring projects receiving funds from OWEB.**

<b>Insurance Type</b>	<b>Minimum Amount</b>
General liability	\$1,000,000 per occurrence, \$2,000,000 aggregate
Auto liability (maybe included as an endorsement on a commercial general liability policy)	\$1,000,000 combined single limit

**Specialized Insurance Requirements: Insurance Types and Coverage Amounts required for grantees and/or contractors depending on the project type and who is doing the work.** \*Insurance coverage that may be purchased as a stand-alone policy or included as an endorsement on a commercial general liability policy.

**Additional insurance will be required if you are doing any of the below activities. (If grantee is doing work, grantee needs insurance, if a contractor is being hired contractor will need to carry below insurance)**

<b>Insurance Type</b>	<b>Minimum Amount</b>	<b>When Required</b>
*Pesticide or herbicide applicator coverage	\$250,000 per occurrence, \$500,000 aggregate	All projects that involve applying pesticide and/or herbicides.
*Abuse or Molestation Coverage	\$100,000 per occurrence and \$300,000 aggregate	All projects when grantee employees or volunteers for the grantee are working with children.
*Transporting volunteers on water	Should be explicitly called out as covered under the commercial general liability policy.	When the grantee transports stakeholders on the water as a part of the grant.
Aircraft Aerial Application Liability	\$1,000,000 combined single limit.	All projects that include aerial application of pesticides or herbicides.

## RACIAL AND ETHNIC IMPACT STATEMENT

This form is used for informational purposes only and must be included with the grant application.

Chapter 600 of the 2013 Oregon Laws require applicants to include with each grant application a racial and ethnic impact statement. The statement provides information as to the disproportionate or unique impact the proposed policies or programs may have on minority persons in the State of Oregon if the grant is awarded to a corporation or other legal entity other than natural persons. "Minority persons" are defined in SB 463 (2013 Regular Session) as women, persons with disabilities (as defined in ORS 174.107), African-Americans, Hispanics, Asians or Pacific Islanders, American Indians and Alaskan Natives.

1.  The proposed grant project policies or programs could have a disproportionate or unique positive impact on the following minority persons:

Indicate all that apply:

<input type="checkbox"/> Women	<input type="checkbox"/> Asians or Pacific Islanders
<input type="checkbox"/> Persons with Disabilities	<input type="checkbox"/> Alaskan Natives
<input type="checkbox"/> African-Americans	<input type="checkbox"/> American Indians
<input type="checkbox"/> Hispanics	

2.  The proposed grant project policies or programs could have a disproportionate or unique negative impact on the following minority persons:

Indicate all that apply:

<input type="checkbox"/> Women	<input type="checkbox"/> Asians or Pacific Islanders
<input type="checkbox"/> Persons with Disabilities	<input type="checkbox"/> Alaskan Natives
<input type="checkbox"/> African-Americans	<input type="checkbox"/> American Indians
<input type="checkbox"/> Hispanics	

3.  The proposed grant project policies or programs will have no disproportionate or unique impact on minority persons.

If you checked numbers 1 or 2 above, on a separate sheet of paper, provide the rationale for the existence of policies or programs having a disproportionate or unique impact on minority persons in this state. Further provide evidence of consultation with representative(s) of the affected minority persons.

I HEREBY CERTIFY on this 11<sup>th</sup> day of Dec, 2018, the information contained on this form and any attachment is complete and accurate to the best of my knowledge.

Signature Holly Crosson

Printed Name: Holly Crosson

Title Executive Director

## Project Partners

**List agencies/organizations from which funding is anticipated for the proposed project.**

**The Oregon State Weed Board requires 25% match for projects. If you have questions with this requirement please contact**

**Tristen Berg, ODA Grant Program Coordinator at 503-986-4622.**

Show all anticipated funding sources, and indicate the dollar value for cash and in-kind contributions. For all funding please state within the “use of contribution” column exactly what the cash/in-kind will be used for- include a separate line for **volunteers, labor, or materials**. This helps the OSWB gain a better understanding of the roles and responsibilities the partners will have with the project. Check the appropriate box to denote if the funding status is secured or pending. In the Amount/Value Column, provide a total dollar amount or value for each funding source. Match should be directly related to the noxious weed project. **Other OWEB funding is not eligible for match toward OSWB grants.**

**NOTE: If your project is selected for funding your organization will be asked to provide signatures for 25% match as a component of agreement procedures.**

Funding Source (Name the Partner)	Use of Contribution	Cash	In-kind	Secured (x)	Pending (x)	Amount/Value
<i>Sample Agency</i>	<i>GIS mapping, and ATV use</i>		<i>\$2,500</i>	<i>X</i>		<i>\$2,500</i>
OSWB	Planning and project coordination for aquatic invasives control, restoration planting, survey, and monitoring (WQ and effectiveness), and targeted outreach	\$32,990	N/A	<input type="checkbox"/>	<input checked="" type="checkbox"/>	\$32,990
Oregon Dept. of Agriculture	Project consultation, aerial and boat survey and data interpretation	N/A	\$2,425	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$2,425
Meyer Memorial Trust Willamette Mainstem Cooperative Capacity Grant 16060748	Benton SWCD Project Coordination and mileage	\$5840	\$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$5840
Benton Soil and Water Conservation District	Project staff assistance	\$	\$1680	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$1680
Willamette Riverkeeper	Staff assistance with restoration work parties, surveys, community outreach, and ecological monitoring and equipment	\$	\$1,050	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$1,050
Oregon Parks and Recreation Department	Staff assistance with outreach activities	\$	\$1,200	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$1,200

US Geological Survey (USGS)	Water-quality monitoring in Collins Bay and Wapato Cove	\$	\$10,000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	\$10,000
Marvin Gilmour	Plant materials for restoration planting, and labor for seed harvest/processing	\$	\$3016	<input type="checkbox"/>	<input type="checkbox"/>	\$3016
Benton SWCD volunteers	Native seed and bulb collection and planting	\$	\$787	<input type="checkbox"/>	<input type="checkbox"/>	\$787
OWEB-SIP funds (non-matchable)	Ludwigia treatments at Collins Bay	\$	\$3295	<input type="checkbox"/>	<input type="checkbox"/>	\$3295
OWEB-SIP funds (non-matchable)	Ludwigia treatments a Wapato Cove	\$	\$5050	<input type="checkbox"/>	<input type="checkbox"/>	\$5050
River Weed Pull Volunteers	Pulling Ludwigia and Yellow floating heart along Corvallis to Albany reach of river	\$	\$2361	<input type="checkbox"/>	<input type="checkbox"/>	\$2361
		\$	\$	<input type="checkbox"/>	<input type="checkbox"/>	\$
<b>Total Estimated Funds (add all amounts in the far-right Column):</b>	(The total should equal the total cost of the project on page 1 of the application)					*\$69,694
Have any conditions been placed on matching funds that may affect completion? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes , Explain:						

## NOTICE of Grant Award Conditions

**Initial each category below and submit along with your completed proposal.**



If this proposal is funded, you will be required to:

- Sign a Grant Agreement containing the terms and conditions for the project implementation, release of funds, and documentation of completion.
- Payments will be made only for work started after the effective date of the grant agreement, unless special conditions have been placed by ODA/OWEB.



Before ODA/OWEB releases the Grant Agreement, you will be required to:

- Resolve any and all outstanding issues from your previous grants with ODA/OWEB.



Upon signing the Grant Agreement, you will be required to:

- Certify in the Grant Agreement that prior to starting work on private land, you have or will obtain cooperative agreements with the private landowner(s). Exhibit D of the ODA/OWEB Grant Agreement may also require you to submit copies of those agreements to ODA/OWEB prior to the release of funds.
- Agree that monitoring information resulting from projects are public domain.
- Determine what permits and licenses are required.



Before ODA/OWEB releases any payments, you will be required to:

- Document that 25% match funding has been secured.
- Submit an OWEB Metrics Form.
- Submit copies of all applicable permits and licenses from local, state, or federal agencies or governing bodies, or certify that permits and licenses are not needed.



Upon completing the project, you will be required to:

- Submit a Project Completion Report as required in the Grant Agreement, including maps, and photos. OGMS Online Project Completion Reporting can be completed at <http://apps.wrd.state.or.us/apps/oweb/fiscal/default.aspx>.
- Submit your Oregon Watershed Restoration Inventory report(s) electronically at <http://apps.wrd.state.or.us/apps/oweb/owrio/default.aspx>. New weed site data will be pulled from OWRI to meet Weedmapper requirements.



**CERTIFICATION:**

I certify that this application is a true and accurate representation of the proposed project and that I am authorized to sign as the Applicant or Co-Applicant. By the following signature, the Applicant certifies that they are aware of the requirements (*see Application Instructions*) of an OSWB/OWEB grant and are prepared to implement the project if awarded. **I have read and initialed the NOTICE of Grant Award Conditions**

Applicant  
Signature:

Holly Crosson

Date: 12/11/18

Print Name:

Holly Crosson

Title: Executive Director

Co-Applicant  
Signature:

\_\_\_\_\_

Date: \_\_\_\_\_

Print Name:

\_\_\_\_\_

Agency: \_\_\_\_\_

**All appendices are housed within the application instructions section and can be downloaded at:**

**<http://www.oregon.gov/ODA/programs/Weeds/Pages/GrantProgram.aspx>**

**Mandatory attachments:**

- **Oregon State Weed Board Project Budget.**
- **Project Partner Form.**
- **Racial and Ethnic Statement.**
- **Maps highlighting specific area of project activities.**
- **Photos (please use the same photo points you will use on interim progress reporting and project completion reports).**
- **For landowner reimbursement projects – landowner list with acreages listed by weed species.**

## Oregon State Weed Board Project Budget

**IMPORTANT: Read the application instructions and guidance entitled "Budget Categories: Definitions and Policy"**

*Add additional lines, if necessary.*

Totals automatically round to the nearest dollar

A	B	C	D	E	F	G	
	Unit Number	Unit Cost	OWEB Funds	Cash Match	In-Kind Match	OWEB-WSIP Funds (Non- matchable)	Total Costs
Itemize projected costs under each of the following categories:	(e.g., # of hours)	(e.g., hourly rate)					(add columns D, E, F)
<b>Salaries, Wages, and Benefits.</b> List position titles, include only costs of employees charged to this grant.							
Benton SWCD - Project Manager	370	32	6,000	5,840			11,840
Benton SWCD - Executive Director	40	42			1,680		1,680
<b>SUBTOTAL (1)</b>			6,000	5,840	1,680		13,520
<b>Contracted Services.</b> Labor, supplies, and materials to be provided by <i>non-staff</i> for project implementation.							
Collins Bay - Ludwigia control (herbicide) with Intelli-spray and tractor and backpack, early summer and early fall treatment (IRM)	2 days (6-7 crew)		2,000			3,295	5,295
Collins Bay - Parrot feather control (herbicide) with Intelli-spray and tractor and backpack, early summer and early fall treatment (IRM)	2 days (2-4 crew)		2,000				2,000
Wapato Cove - Ludwigia control (herbicide) with Intelli-spray and tractor and backpack, early summer and early fall treatment (IRM); manual control in dense areas of wapato with sparse Ludwigia	2 days (2-4 crew) (herbicide); 2-4 days (2-4 crew) (manual)		2,000			5,050	7,050
Horseshoe Lake, Benton County - Aquatic veg control (herbicide) with backpack, early summer and fall treatment (IRM)	2 half days (2 crew)		637				637
Water quality monitoring at Collins Bay and Wapato Cove (US Geological Survey)			10,000		10,000		20,000
Restoration work parties, surveys, community outreach, and ecological monitoring (Willamette Riverkeeper contract)	140	45	6,300				6,300
Restoration work parties (paddle and weed pull volunteers; minimum of 6 volunteers x 8 hours x 2 events)	96 hours	24.59			2,361		2,361
Mileage reimbursement (Willamette Riverkeeper, Portland)	522	0.545	284				284
Canoes, paddling equip., dry bags, trailer & other equip. (Willamette Riverkeeper)	30	35			1,050		1,050
Native plant materials for restoration planting; wapato, bur-reed, common rush (local farmer, Marvin Gilmour)	3 lbs seed; 1,000 bulbs	various			2,696		2,696
Processing seed and harvesting bulbs (Marvin Gilmour)	8 hrs	40			320		320
Collecting seeds and bulds (volunteers)	24 hrs	24.59			590		590
Restoration planting, seeds and bulbs (volunteers)	8 hrs	24.59			197		197
Assistance with outreach activities (Oregon State Parks Dept., Scott Youngblood)	3 days	\$400			1,200		1,200
Project consultation, river survey (aerial and boat) and data interpretation (ODA, Glenn Miller)	3 days	\$475			1,425		1,425
Project consultation, river survey (aerial and boat) and data interpretation (ODA, Beth Myers-Shenai)	2 days	\$500			1,000		1,000
<b>SUBTOTAL (2)</b>			23,221	0	20,839	8,345	52,405

<b>Travel.</b> Mileage, per diem, lodging, etc. Must use current State of Oregon rates.							
Mileage for project (BSWCD staff)	410	0.545	223				223
							0
<b>SUBTOTAL (3)</b>			223	0	0	0	223
<b>Materials/Supplies.</b> Materials and Supplies are defined as consumable items, purchased by the grantee, that are normally used up during the course of the project.							
							0
<b>SUBTOTAL (4)</b>			0	0	0	0	0
<b>Equipment/Software.</b> List portable equipment costing <b>\$1,000</b> or more per unit.							
							0
							0
<b>SUBTOTAL (5)</b>			0	0	0	0	0
<b>Other.</b> This category refers to items that do not fit in the other budget categories, grantee owned equipment, including fees and project-specific printing.							
Reimbursement for Aquatic Weed Guides for Benton County given out at events	100	4.56	456				456
Disposal of bagged hand pulled aquatic weeds	3 visits	30	90				90
<b>SUBTOTAL (6)</b>			546	0	0	0	546
<b>[Add subtotals above] MODIFIED TOTAL DIRECT COSTS (7)</b>			29,991	5,840	22,519	8,345	66,694
<b>INDIRECT COSTS</b> Select one of the methods below. Fill in the requested rate. Compute by multiplying MTDC (6) line by this rate.							
No reimbursement for Indirect Costs	<input type="checkbox"/>		0				0
10% <i>de minimis</i>	<input checked="" type="checkbox"/>	10%	2999				2999
	<input type="checkbox"/>		0				0
<b>SUBTOTAL (7)</b>			2999	0	0	0	2999
<b>GRANT BUDGET TOTAL (8)</b>							
<b>[Add Modified Total Direct Costs (6), Grant Admin Subtotal (7)]</b>			32,990	5,840	22,519	8,345	69,694

## References

- Benton County Cooperative Weed Management Area. 2012. Benton County Cooperative Weed Management Area (CWMA) Strategic Action Plan. Pp. 2-4. <http://www.bentonswcd.org/assets/bentoncwmastrategicactionplan-2012-02-29.pdf>
- Benton Soil and Water Conservation District. 2014. Water Weeds: Guide to Aquatic Weeds in Benton County. Benton County Cooperative Weed Management Area. <http://www.bentonswcd.org/assets/BSWCDcompleteAquaticWeedGuide.pdf>
- Benton Soil and Water Conservation District. 2015. Five Year Strategic Plan 2015-2020. <http://www.bentonswcd.org/assets/BSWCD2015StrategicPlan.pdf>
- Brainerd, R. & Carex Working Group. 2013. Willamette mainstem vegetative habitat survey and assessment, final report. Corvallis, Oregon. <http://www.bentonswcd.org/assets/Willamette-Mainstem-Assessment-Final-Report-Abridged.pdf>
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- Grewell B.J., M. D. Netherland, and M. J. Skaer Thomason. 2016. Establishing Research and Management Priorities for Invasive Water Primroses (*Ludwigia* spp.). U.S. Army Corps of Engineers, Engineer Research and Development Center, Aquatic Plant Control Research Program. February. <https://www.bentonswcd.org/assets/Grewell-et-al-2016-Ludwigia-Tech-Report-USACE-ERCD-EL-TR-16-2-2.pdf>
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- Oregon Department of Fish and Wildlife (ODFW). 2016. Oregon Conservation Strategy. <http://www.oregonconservationstrategy.org/>
- Oregon Watershed Enhancement Board (OWEB). 2010. Willamette River Habitat Protection and Restoration Program. 2010-2015. A Proposal of the Habitat Technical Team. May 28, 2010. <https://www.nwcouncil.org/media/6865874/200901200.pdf>
- Sears, A., Meisler J., Verdone L., & Sonoma Mosquito and Vector Control District. 2006. Invasive *Ludwigia* management plan for the Laguna de Santa Rosa Sonoma County, California. Laguna de Santa Rosa, Sonoma County, CA.

<http://www.lagunadesantarosa.org/pdfs/Ludwigia%20Control%20Project%20Final%20Report.pdf>

Willamette Mainstem Cooperative. 2014. Willamette Mainstem Cooperative Action Plan 2015-2020. Updated March 2017.

<https://www.bentonswcd.org/assets/WMCActionPlan2015-5yr-LONG-Mar2017-1.pdf>

Willamette Mainstem Cooperative. 2015. Willamette Mainstem Cooperative Programmatic Bylaws.

[https://www.bentonswcd.org/assets/WMC\\_Bylaws\\_signed\\_2015\\_Nov\\_18.pdf](https://www.bentonswcd.org/assets/WMC_Bylaws_signed_2015_Nov_18.pdf)

Appendix A: Map and Photos of Yellow Floating Heart Treatment Area at Horseshoe Lake, Benton County

### Yellow Floating Heart at Horseshoe Lake, Benton County



Map 1: Location of yellow floating heart (*Nymphaodes peltata*) at Horseshoe Lake, Benton County.

**Appendix A (continued): Map and Photos of Yellow Floating Heart Treatment Area at Horseshoe Lake, Benton County**

Photo Monitoring at Horseshoe Lake: Yellow Floating Heart (*Nymphoides peltata*)



Yellow floating heart at Horseshoe Lake - June 2014



Before 4<sup>th</sup> year of treatment (new method) – July 14, 2017



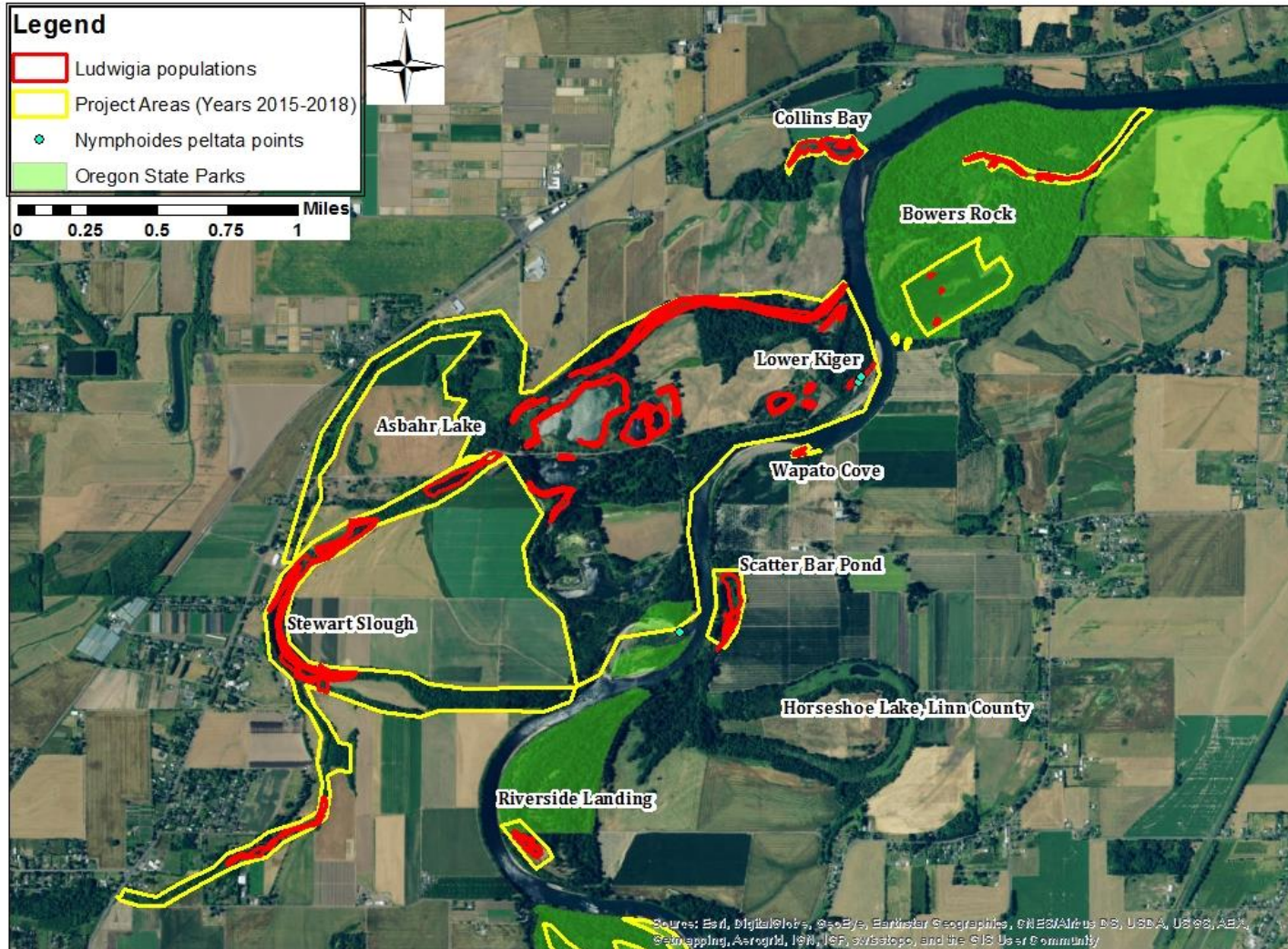
After first round of treatment (Clearcast) in 4<sup>th</sup> year of treatment: waterfern in place of yellow floating heart – September 6, 2017



No yellow floating heart was seen at Horseshoe Lake (Benton County) in 2018 – October 5, 2018

Appendix B: Map of Ludwigia and Yellow Floating Heart Treatment Areas along River

### Ludwigia and Yellow Floating Heart Sites along Willamette River

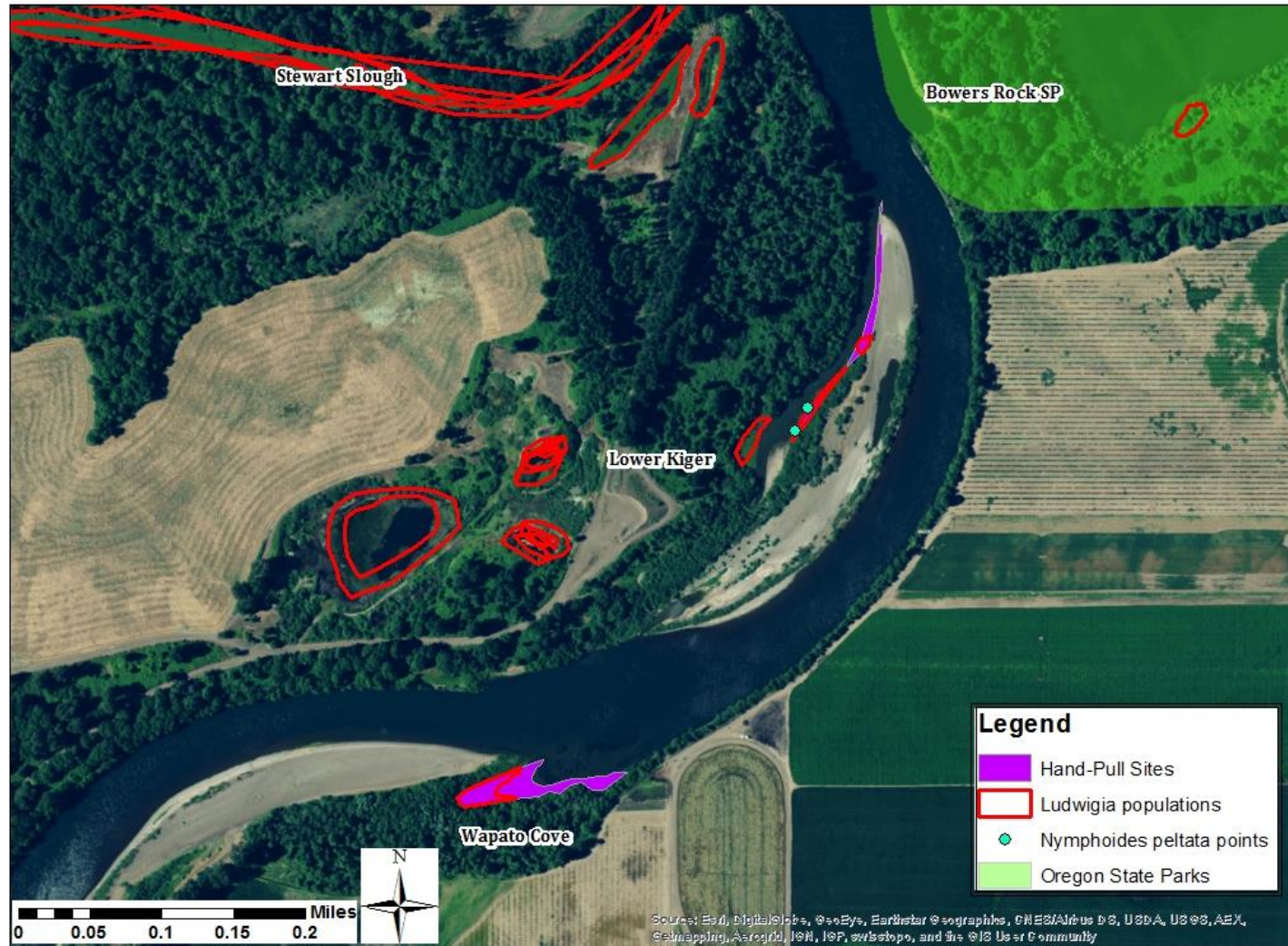


**Map 2:** Location of invasive water primrose species (*Ludwigia* spp.) and yellow floating heart (*Nymphoides peltata*) on the Willamette River between Corvallis and Albany.



Appendix B (continued): Map of Ludwigia and Yellow Floating Heart Treatment Areas along River

### Hand-Pulling Sites for Ludwigia and Yellow Floating Heart



Appendix C: Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments

Collins Bay Photo Points



Appendix C (continued): Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments



Photo Point 1— July 7, 2014, before Ludwigia treatment



Photo Point 1— June 27, 2016, before third year of Ludwigia treatment



Photo Point 1— July 7, 2017, before 4th year of treatment



Photo Point 1— Oct 4, 2017, after 4th year of treatment



Photo Point 1— Oct 23, 2018, after 5th year of treatment

**Appendix C (continued): Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments**



Photo Point 2— July 7, 2014, before treatment



Photo Point 2— June 27, 2016, before 3rd year of treatment



Photo Point 2— July 7, 2017, before 4th year of treatment



Photo Point 2— Oct 4, 2017, after 4th year of treatment



Photo Point 2— Oct 23, 2018, after 5th year of treatment

**Appendix C (continued): Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments**



Photo Point 3— July 7, 2014, before treatment



Photo Point 3— June 27, 2016, before 3rd year of treatment



Photo Point 3— July 7, 2017, before 4th year of treatment



Photo Point 3— Oct. 4, 2017, after 4th year of treatment



Photo Point 3— Oct 23, 2018, after 5th year of treatment

Appendix C (continued): Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments



Photo Point 4— July 7, 2014, before treatment



Photo Point 4— July 25, 2016, before 3<sup>rd</sup>  
year of treatment



Photo Point 4— July 7, 2017, before 4<sup>th</sup> year



Photo Point 4— Sept. 21, 2017, after 4th year  
of treatment



Photo Point 4— Oct 23, 2018, after 5th year of treatment

**Appendix C (continued): Maps and Pictures of Collins Bay: Before and After Ludwigia Treatments**



Photo Point 4 area — parrot feather sneaking into areas treated for Ludwigia. Part of these parrot feather patches area can be seen in previous photo 4 photos. September 21, 2017.

## Appendix D: Wapato Cove Photos



Wapato Cove - Highly visible site along river with easy public access from river. Ludwigia is dominant in the south side of the site and has mixed in (at different densities) with native wapato in other areas of the site. August 12, 2016.



Wapato senesces after 2<sup>nd</sup> manual control of Ludwigia. October 23, 2018.



North end of site with high densities of native wapato and sparse Ludwigia. Manual removal of Ludwigia by volunteer groups and/or contractors in this area. August 22, 2017



South end of site with densest areas of Ludwigia. Chemical control treatments by contractor (hose and backpack spraying). September 12, 2017 during first contractor treatment.

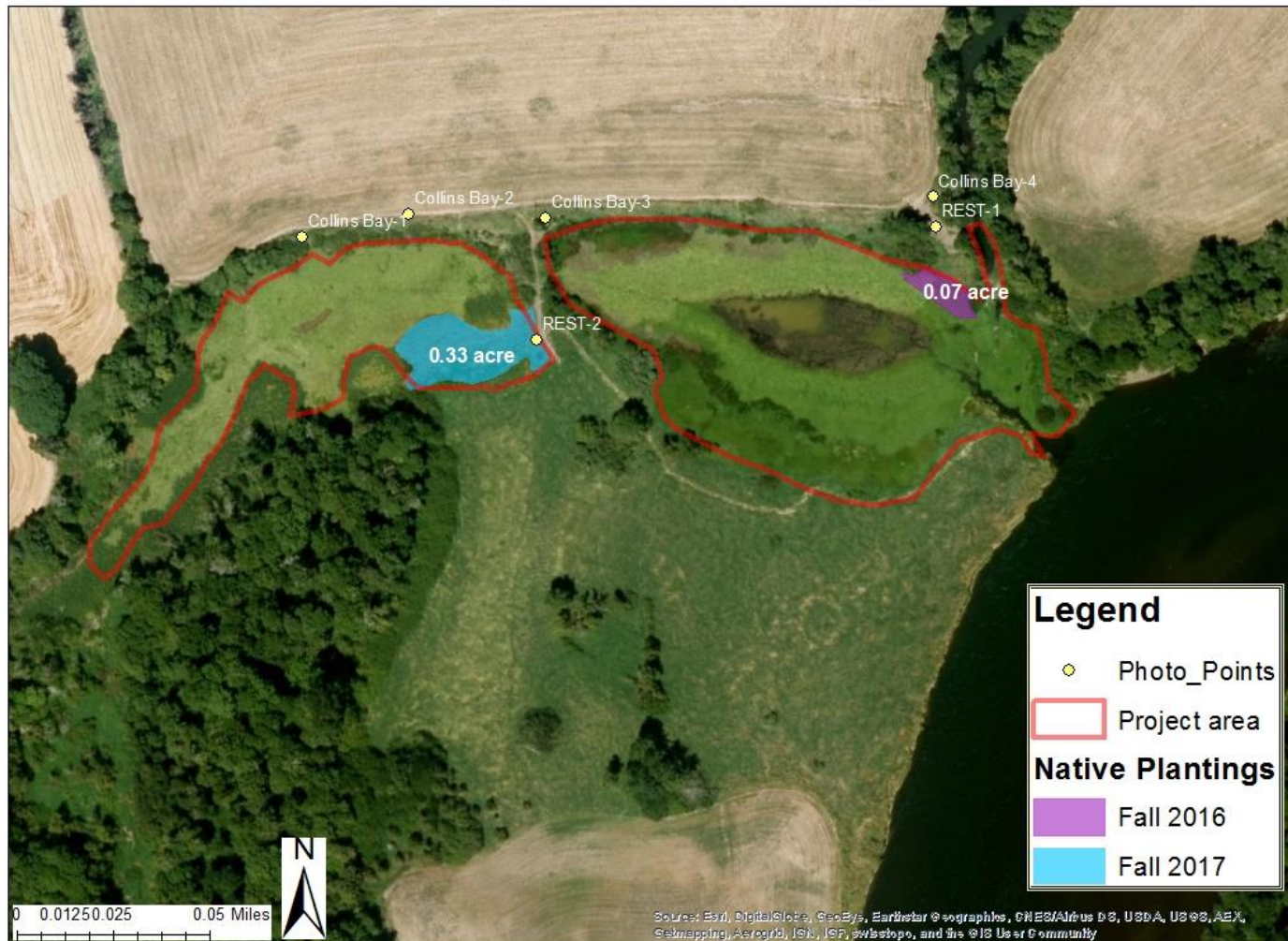


South end of site with densest areas of Ludwigia. Manual control only in 2018. October 23, 2018.



Appendix E: Collins Bay Restoration Areas Map and Photos

### Collins Bay Restoration Planting Areas



Map 3: Restoration planting areas at Collins Bay.

## Appendix E (continued): Collins Bay Restoration Areas Map and Photos



Photo Point REST-1 (July 25, 2016): Before 2016 control treatments for *Ludwigia* and before dropping of wapato tubers in this area after river inundation in Fall 2016.



Photo Point REST-1 (July 7, 2017): Only a few wapato sprouting (not visible) because we weren't able to plant tubers and could only drop them in area in 2016 because of high water levels in October 2016.



Photo Point REST-1 (October 23, 2018): No restoration plantings occurred this year.

Appendix E (continued): Collins Bay Restoration Areas Map and Photos



Photo Point REST-2 (October 4, 2017): Native aquatic plant materials (wapato tubers and native aquatic seed) added in Fall 2017 to Ludwigia treated area.



Photo Point REST-2 (October 23, 2018): No restoration plantings done this year.

Appendix F: Pictures of Aquatic Weed Outreach and Education Events, Weed Pulls, and Monitoring

# Love Your River

Together we can help the Willamette and its habitats!

Get to know aquatic plants  
Take home a weed guide  
Paddle and pull with us



River Weed Pull Event: Willamette Riverkeeper's Richard Dickenson talking about aquatic invasive weeds during the Paddle and Pull – July 25, 2018



## Aquatic Plant Workshop

Tues. June 19, 10:00AM-3:30PM  
Learn to ID and survey for native and invasive plants at Eugene's Delta Ponds.



Portland State University

## Water Weed Pulls

Paddle with us & pull weeds along the way.

### Eugene Delta Ponds

Sat. June 30, 9:00AM-12:00PM  
Sat. July 28, 9:00AM-12:00PM

*Eugene registration contact:*  
Kelsey.C.Irvine@ci.eugene.or.us  
541-682-4845

Corvallis to Albany river reach  
Wed. July 25, 9:30AM-3:30PM or  
Aug/Sept (Date TBD) 9:30AM-3:30PM

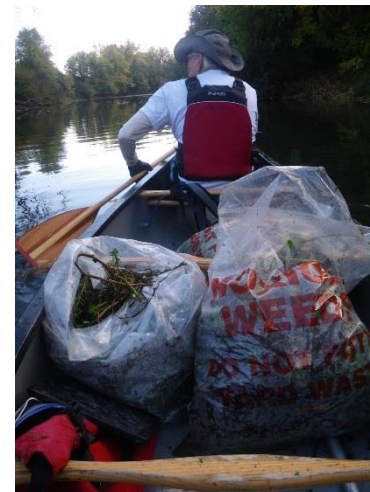
*Corvallis/Albany registration:*  
[www.bentonswcd.org/programs/willamette-main-stem/love-river-events/](http://www.bentonswcd.org/programs/willamette-main-stem/love-river-events/)



Willamette Aquatic Invasive Network



Oregon Department of Agriculture



River Weed Pull Event: Loading the canoe up with invasive species during the Paddle and Pull- October 9, 2018

Appendix F (continued): Pictures of Aquatic Weed Outreach and Education Events, Weed Pulls, and Monitoring



River-based Workshop: Willamette Riverkeeper's Michelle Emmons and Benton SWCD's Melissa Lemein giving an overview of invasive species at Eugene's Aquatic Plant Workshop – June 19, 2018



River-based Workshop: Americorp learning about invasive species at Eugene's Aquatic Plant Workshop – June 19, 2018



River-based Workshop: Pulling Ludwigia during Eugene's Aquatic Plant Workshop – June 19, 2018



River-based Workshop: Eugene's Aquatic Plant Workshop – June 19, 2018

**Appendix F (continued): Pictures of Aquatic Weed Outreach and Education Events, Weed Pulls, and Monitoring**



Lower Kiger Island (LKI) Plot 1: Hand pulling of small patches by volunteers . July 16, 2016.



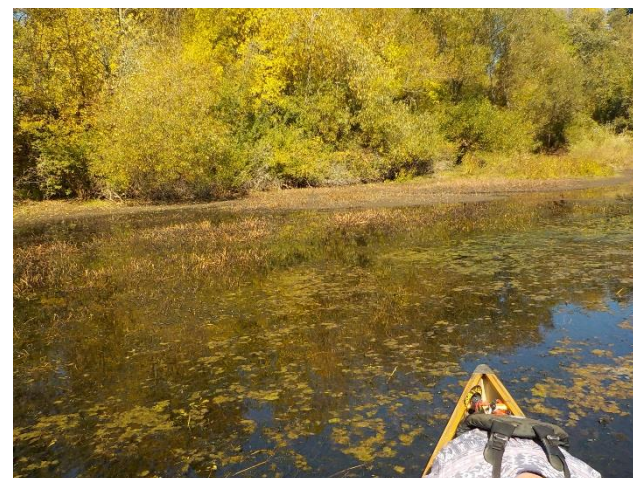
LKI Plot 1: Hand pulling of small patches by volunteers. Patches have greatly decreased in size after several years of hand pulling. July 8, 2017.



LKI Plot 2: Before 1<sup>st</sup> year of herbicide treatment (using OWEB-WSIP funds). July 13, 2016.

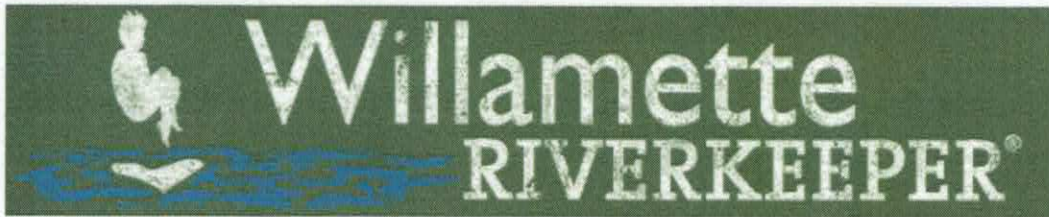


LKI Plot 2: Before 2<sup>nd</sup> year of herbicide treatment (using OWEB-WSIP funds). July 8, 2017.



LKI Plot 2: After 3<sup>rd</sup> year of herbicide treatment (using OWEB-WSIP funds). October 15, 2018.

**Appendix G: Letters of Support**



December 4, 2018

Oregon State Weed Board  
635 Capital St. NE  
Salem, Oregon 97301-2532

Dear Oregon State Weed Board Grant Review Team Members,

We are pleased to continue our partnership the Benton Cooperative Weed Management Area (CWMA) and Benton Soil and Water Conservation District (SWCD) for their work to control invasive species at priority sites on the Willamette River and to conduct outreach with the public on this issue. The strong focus on weed management in the Corvallis to Albany Reach of the Willamette River has been very effective in controlling existing weed infestation and preventing new infestations of EDRR species. This project will continue to treat target priority noxious weeds, restore biologically diverse habitat, and allow for much needed community outreach about the importance of protecting and enhancing off channel habitats in the Willamette Valley.

Willamette Riverkeeper is a non-profit organization dedicated to protecting and restoring the Willamette River. As partners in this project, Willamette Riverkeeper staff will work closely with Benton CWMA and SWCD staff to engage community members in hands-on stewardship and educational activities.

In partnership, we will co-facilitate one aquatic weed training for professionals and members of the public. We will also plan and lead two on the water community "paddle and pull" / EDRR survey events. These work party events will focus on hand pulling target invasive plants and providing community outreach and hands on education. We will also spend one river day conducting an EDRR survey in the Corvallis to Albany Reach. The survey will focus on searching for new infestations of yellow floating heart. All of these activities will occur within the Corvallis to Albany Reach on the mainstem Willamette River.

Thank you for your careful consideration and support of this grant proposal.

Sincerely,

Marci Krass

Restoration Program Manager



**Environmental Science and Management**

Mark D. Sytsma, PhD  
Professor Emeritus

Mail Code ESM                      503-725-3833 office  
Post Office Box 751                503-307-6131 mobile  
Portland, OR 97207-0751         sytsmam@pdx.edu

Oregon State Weed Board  
635 Capital St. NE  
Salem, Oregon 97301-2532

13 November 2018

Subject: Support for the BC CWMA OSWB application entitled "*Willamette River Aquatic Weed Management Phase 6*"

Dear Oregon State Weed Board Grant Review Team Members,

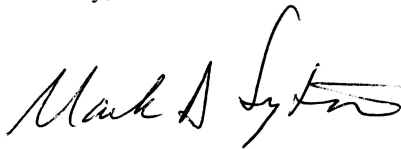
I am writing to express Portland State University's (PSU) support for the Benton County Cooperative Weed Management Area's (BC CWMA) grant proposal for aquatic weed management. Partnerships between private and public landowners, local and state agencies, and non-profit conservation organizations have formed in recent years to address critical habitat needs along the Corvallis to Albany reach of the Willamette. The Willamette Mainstem Cooperative (WMC) is one such partnership and has conducted a landscape scale weed assessment of the floodplain between Corvallis and Albany. One outcome of the assessment process is that *Ludwigia hexapetala* has been identified as a priority species for control in the Willamette River. The BC CWMA proposes to conduct follow-up treatments of Ludwigia in Collins Bay and Wapato Cove. Several Ludwigia sites have been the focus of volunteer hand-pulling in previous years and will continue to be monitored and targeted for hand-pulling during this project phase.

In 2017, a unique opportunity came about to partner with US Geological Survey (USGS), PSU, Oregon Parks and Recreation Department (OPRD), and Willamette Riverkeeper on a regional monitoring effort to learn more about the impacts of Ludwigia and other aquatic invasive species. Monitoring in 2017 included two sites in the WMC project area (Collins Bay and Scatter Bar Pond monitoring was conducted under ODA OSWB grant funds and USGS Cooperative Water Program funds). PSU is applying for 2019 ODA OSWB grant funds to monitor vegetation at the two sites the BC CWMA is proposing continued monitoring in their 2019 ODA OSWB grant proposal (Collins Bay and Wapato Cove).

Continued treatment at these two sites will contribute significantly to improving ecological function of the Willamette River, and protecting unique and high quality habitats.

Thank you for your consideration of this proposal.

Sincerely,



Mark D. Sytsma



***The Ridge at Cascade Heights HOA  
c/o 1905 NW Eagles Nest Circle  
Albany, OR 97321 (541) 791-7989***

Oregon State Weed Board  
Oregon Department of Agriculture  
635 Capital St. NE  
Salem, Oregon 97301-2532

November 7, 2019

Subject: Support for the BC CWMA OSWB application: "*Willamette River Aquatic Weed Management Phase 6*"

Dear Oregon State Weed Board Grant Review Members,

On behalf of the Ridge at Cascade Heights Homeowners Association (HOA), I would like to express our strong support for the Benton County Cooperative Weed Management Area's (BC CWMA) grant proposal for "Willamette River Aquatic Weed Management Project Phase 6" in the Corvallis to Albany Reach of the Willamette River.

The BC CWMA, currently coordinated by the Benton Soil and Water Conservation District (SWCD), has been working with the HOA on control treatments of yellow floating heart (*Nymphaeodes peltata*), an Oregon Department of Agriculture (ODA) A-listed noxious weed, at Horseshoe Lake. The lake is partially owned by the HOA.

In 2017, Benton SWCD coordinated with ODA as well as other partners and research scientists to try a new control treatment method of yellow floating heart at the lake. This endeavor was successful, and in 2018 we did not have yellow floating heart present at Horseshoe Lake. In 2019, BC CWMA proposes to monitor the lake for yellow floating heart and treat it in the case of its return, which we support.

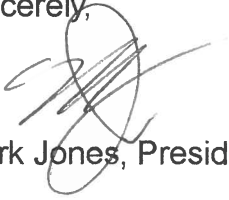
The HOA is actively engaged in monitoring of the lake and in learning more about yellow floating heart, its effects, and possible treatment methods. Concurrent with Benton SWCD's treatment regimen for yellow floating heart at the lake, the HOA will continue to have the detention pond that drains into the lake inspected for yellow floating heart and treated by a contracted professional if any plants are found. Yellow floating heart was found in the detention pond and treated in 2018.

***Board of Directors: Mark Jones, President <> Judy Steel, Treasurer <> Kathy Meddaugh, Secretary  
Marsha Nierenberg, Director <> Karen Carnahan, Director***

The continued control of yellow floating heart at Horseshoe Lake will contribute significantly to improving ecological function of the lake and protect this unique open water habitat along the Willamette River.

Thank you for your consideration of this proposal.

Sincerely,

A handwritten signature in black ink, appearing to be 'Mark Jones', written over a circular scribble.

Mark Jones, President

***Board of Directors: Mark Jones, President <> Judy Steel, Treasurer <> Kathy Meddaugh, Secretary  
Marsha Nierenberg, Director <> Karen Carnahan, Director***

Oregon State Weed Board  
635 Capital St. NE  
Salem, Oregon 97301-2532

November 26, 2018

**Subject:** Support for the BC CWMA OSWB application entitled “*Willamette River Aquatic Weed Management Phase 6*”

Dear Oregon State Weed Board Grant Review Team Members,

I am writing to express the Oregon Parks & Recreation Department’s (OPRD) support for the Benton County Cooperative Weed Management Area’s (BC CWMA) grant proposal for aquatic weed management. Partnerships between private and public landowners, local and state agencies, and non-profit conservation organizations have formed in recent years to address critical habitat needs along the Corvallis to Albany Reach of the Willamette. The Willamette Mainstem Cooperative (WMC) is one such partnership and has conducted a landscape scale weed assessment of the floodplain between Corvallis and Albany. One outcome of the assessment process is that *Ludwigia hexapetala* has been identified as a priority species for control in the Willamette River. The BC CWMA proposes to conduct follow-up treatments of *Ludwigia* in Collins Bay, and to add an additional site locally known as Wapato Cove. Several *Ludwigia* sites have been the focus of volunteer hand-pulling in previous years, and will continue to be monitored and targeted for hand-pulling during this project phase.

The control of target invasive plants will contribute significantly to improving ecological function of the Willamette River, and protecting unique and high quality habitats. In order to support the next phase of these efforts, OPRD staff will assist in volunteer and outreach activities on the river including weed pulls and aquatic weed workshops. OPRD will contribute \$1,400.00 in staff time for control, monitoring, and outreach activities related to this project.

The control of aquatic invasive plants will contribute significantly to the overall goal of improving ecological function of the Willamette River habitats.

Thank you for your consideration of this proposal.

Sincerely,



Sarah Steele  
Willamette Valley District Manager  
Oregon Parks and Recreation Department  
8801 Buena Vista Road NW, Albany, OR 97321  
[sarah.steele@oregon.gov](mailto:sarah.steele@oregon.gov)