

BOISE CREEK RESTORATION PLAN



HELPING ECOSYSTEMS, TEACHING COMMUNITIES,
AND CREATING PASSIONATE LAND STEWARDSHIP
BY MICHAEL CASE 2020

PROJECTS FUNDED BY:



THE VISION:

In Enumclaw, Washington, there is a manmade stream that was once used for irrigation drainage from the local farmlands. It is directly connected to Boise Creek, a tributary of the White River in Water Resource Inventory Area (WRIA) 10. This small, but important stream is part of Boise Creek complex due to the presence and upstream migration of salmon species. The area of projected restoration is a quarter mile stretch of land owned by the City of Enumclaw, directly alongside this tributary which is shown in the map below. The riparian zone and up to the Enumclaw Foothills Trail will be the focus of this 5 Phase restoration plan.

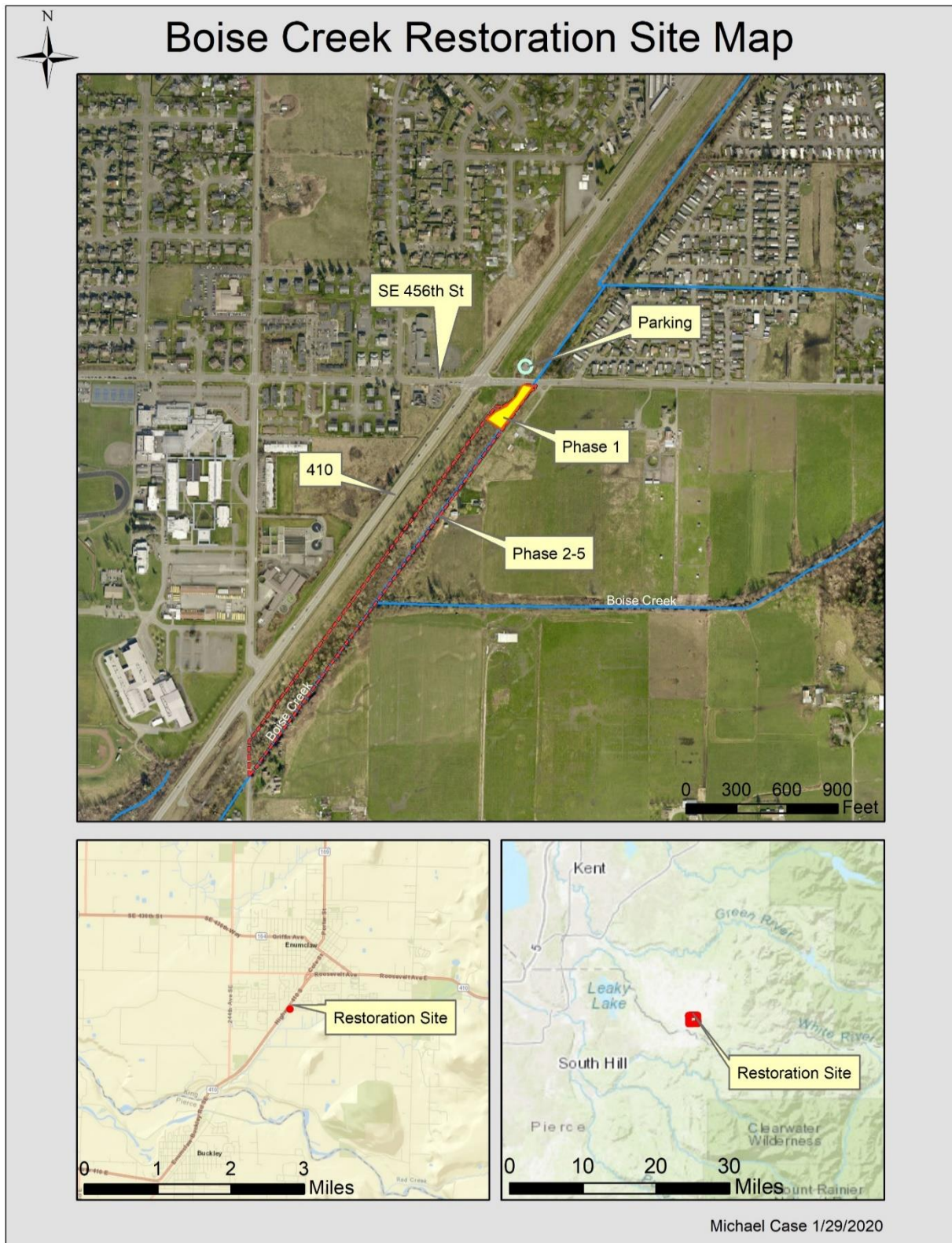
The main goals of this plan are multifaceted but can be put into three categories. The first will be to remove invasive and noxious plant species. This will be followed by installing cultural controls for the invasives by planting native trees and shrubs. Restoring this area with native shrubs and conifers will help shade the stream from solar radiation, which is a well-known detriment to spawning salmon. Re-planting also improves the area by promoting native plant species and helps to beautify the natural area next to a popular walking trail. The physical portion of this plan is a great way to show communities what passion for the environment can accomplish.

The second goal is to bring together local communities, cultural leaders, and environmental partners to help educate and promote restoration of the lands around them. This outreach will be an integral part of continuing this restoration project beyond its written scope into the future and develop across socioeconomic boundaries. The project has already started with the help of Bernie McKinney and the Enumclaw Plateau Community Association (EPCA) and funded by the Rose Foundation and the Puget Soundkeeper.

The third goal is not as initially visible as the previous two, that is, creating passionate land stewards. There is no better way to ensure that communities members and their youth will be more environmentally conscious and willing to continue this work than by them helping plant and grow their own trees. This portion will be organizing community events and creating awe and wonder as the locals can watch their own plants grow up, maturing into a beautiful, natural landscape that they can see every day. Future stewards will hopefully have had a taste of the passion that goes into these projects.

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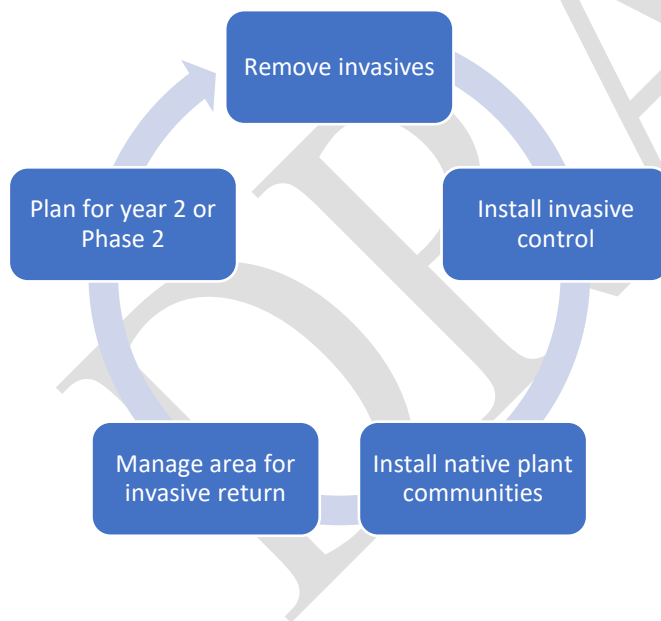
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DESIGN:

This project is broken into 5 parts called Phases as defined in the map below. Each Phase will be its own smaller project that will be worked on in different capacities as the plan moves forward. Phase 1 has already started and has accomplished all the components of the vision within the first year. Each Phase will have approximately 2 seasons of focus until moving on to the next one. This design is to allow time to complete the itemized areas of focus as shown in figures 3 and 4 below.

Each Phase will also have monitoring, and evaluations completed at the end of every year that will lead into the next portions work area. This will include digitizing the installed plants, the area and the invasives. These are records will be used to assess site viability for certain species of interest, soil and water compatibility and shade tolerance. A workbook should be used to record small nuances of each Phase to better understand and have more success on the next



one. The connecting circles represent a continuing process with each Phase and area. This captures the fundamentals of intensive weed management without chemicals. Boise Creek Restoration plan is dedicated to the use of manual, mechanical and cultural controls. An ongoing project of this scope will require lots of time and people to be successful with this type of plan.

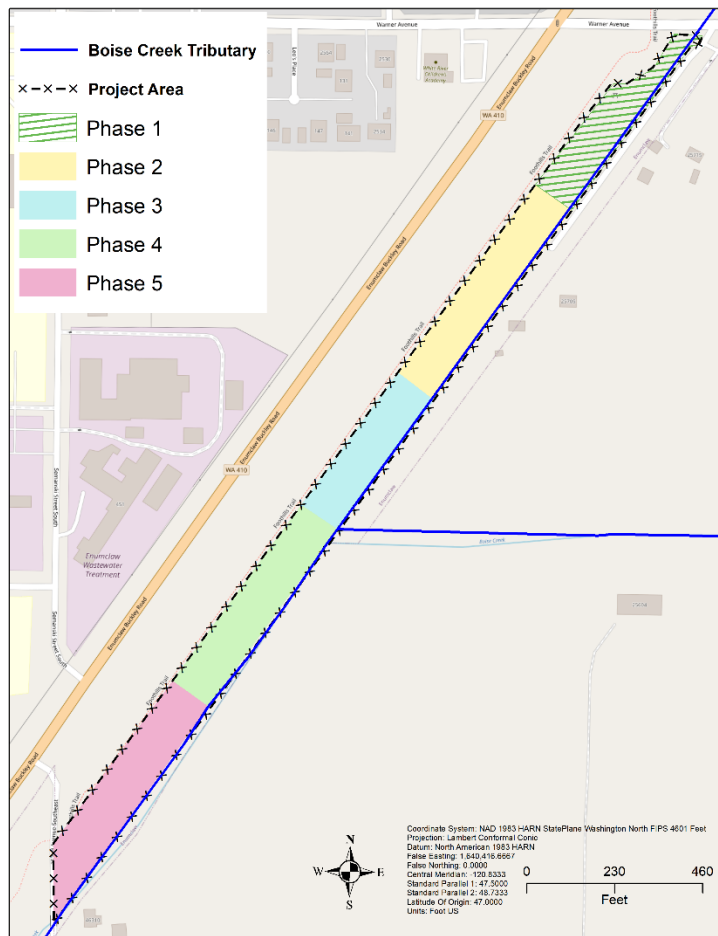
The different Phases not only represent time but also types of landscapes. Each Phases will need a new land analysis and

survey to properly plan the next steps. Each of them has their own hurdles and should utilize interns interested in Map Making and Field Surveying. Phase 2-5 will have their own specific Integrated Pest Management (IPM) plan created by the interns before breaking ground on the next Phases.

OBJECTIVES:

A completed Phase will have the three main goals met, IPM is working as intended, planning for the next phase complete, partnerships have been utilized and the community has been involved. While each Phase will be continually monitored into perpetuity, one can consider it completed when all the prior statements have been met. Unforeseen changes to this plan might change these objectives or timeframes (Covid-19). The interns will then need revisit the

Phase Map



measures of success in accordance with local and state policy at the time.

Community involvement, outreach and education are high on the list of things to accomplish each year. Even with the issue of COVID, there are ways to impact the communities beyond field-based events. A successful year should see a large increase of interested parties. These persons or entities should be recorded and included in an email correspondence when new events are going to occur. This objective will be the hardest to quantify but below are actions that can be done to help.

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ACTIONS:

Below is a list of ideas to help meet the vision of the project.

Community	Outreach	Education
Create Facebook page	Connect with partners and sponsors before an event	Contact schools before an event
Create Google pin to site (completed)	Trainings from the indigenous peoples	Take pictures and document failures and successes
Email / Newsletter	Attend town meetings	Create a children's planting day
Have a small information sign up at the work site	Be present and aware of the community on the trail bordering the site	

FUTURE INTERNS AND STEWARDSHIP:

This plan directly places passionate students and or community members in control of the stewardship of this land into perpetuity. As the project grows, so will the interns, to become the next green warriors to help rebuild broken ecosystems and teach our youth. Keeping the cycle of our young professionals will be the most rewarding aspect of this plan. Its designer and next few project leaders come directly from Green River College in Auburn, WA. This connection has proven successful before with projects on the Green River. Now, this natural resource program can reach further into the communities around the White River and begin a new journey.

Interns moving on to another part of their life should choose a dedicated person or persons to replace them. As more and more interested parties become available, the potential to branch out from Green River and encompass more school and future stewards. This work is without question the best education one can get if they are interested. That is why the stewardship portion of this plan is the backbone for future restoration work.

SITE ACCESS:

Consideration of site access will need to be addressed going into phase 2-5. Partnering with the City or contracting help with materials movement might be necessary as to the limitation to vehicle access to the sites Phase 2-5. Moving large quantities of plants, tools and equipment over the landscape in wet times could pose other problems and should be addressed prior to entering the site. Extreme care should be taken around the many swales in the area. This area of the plan will need to be evaluated on a situational basis with the least impact to the area.

CURRENT PROGRESS (PHASE 1):

Earlier this year the area had been the focus of some invasive removal and mulch spreading in preparation for native plant installation that recently planted 450+ shrubs, trees and willow stakes. Maintaining the health of the new plants requires this management plan to address some of the overgrowing invasive issues. This phase is dedicated to installing native trees and shrubs after removing invasive plant species. It is currently managed by interns from Green River College and assisted by Community Volunteers with Plant donations / acquisitions help from EPCA (Thank you Bernie McKinney).

The project has successfully completed over 130 Hours of groundwork, including help from 9 Interns and 1 Community Volunteer. In total, 276 Shrubs, 82 trees, and 94 stakes (Shrubs 63, Trees 31) were installed on site in spring 2020. All associated data, including plant health, location, proximity to the stream and amount of mulch used at base of the tree, is available on request. This information will be collected by the interns for use in reports and updates.

PHASE 1 - INTEGRATED PEST MANAGEMENT (IPM):

Due to an incredibly warm and wet spring growing season, the installed plants look amazing and are showing to be prosperous. Unfortunately, the established invasives and some natives have grown beyond anticipated and are threatening to choke out the new, smaller plants. Some areas have 6-foot tall Reed canary grass patches, large mats of sticky bed straw, or the usual crowding from invasives such as Himalayan blackberry paired with groundcover such as

Creeping buttercup and Herb robert. Figure 2 is the base reference plan map for this project and will be the focus of the next two sections.

The northern side of the site has a small, manmade water drainage ditch that has the first sightings of morning glory and a huge mat of sticky bed straw inhibiting new growth. The eastern area is alongside the stream is mainly blackberry and common velvet grass patches. There is also the first single sighting of English holly depicted by the red dot in Figure 2. The area under the small orange dots is the center area of the sight that is covered in thick mulch and is the location of most of the planted tree species.

The western side, where the Foothills Trail is next to, is a seasonally wet swale and contains most of the grasses and cow parsnip with the well enough causing the blackberry to grow over top. Occasional blackberry, Creeping buttercup, and Herb robert. The large orange circles represent the areas at the base of residual alder or cottonwood trees where the mulch did not get spread well enough allowing the blackberry to grow over top.



Chinese Proverb

The best time to plant a tree was 20 years ago.

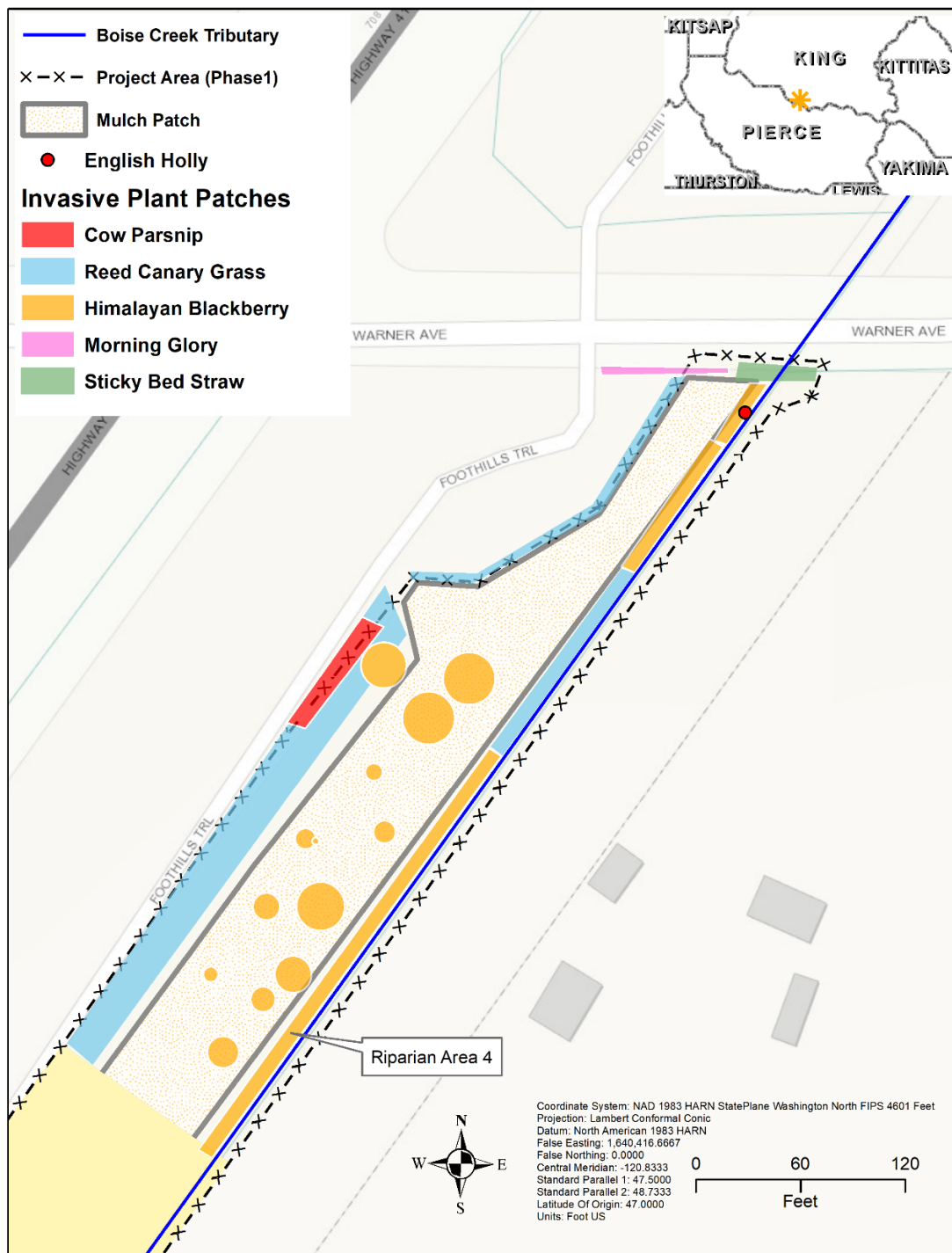
The second best is today.

Stewardship

Only our own dirty hands and long cast shadows make changes out here.

M. Case

Boise Creek Species of Interest Map



Author: Michael Case 2020

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All invasive and noxious weed management practices below are explained in further detail and found on the Noxious Weed Control Board site for Washington at <https://www.nwcb.wa.gov>

This project is dedicated to manual, mechanical and cultural controls of noxious weeds.

1. **PRIORITY** The pink polygon in Figure 2 is Morning Glory. It is identified and is starting to establish in the drainage ditch and should be the first species to try to eradicate.
 - **Note:** This plant is extremely hard to remove once established. Its in a water drainage that prevents herbicide use. This will need to be intensely managed.
 - **Control:** Manual pulling, debris should be thrown into a black plastic bag and put in a garbage can.
 - **Estimated Labor:** 1 person, 1 hour
 - **Timing:** **ASAP**
 - **Tools:** gloves, garbage bag, trowel
2. Release and re-mulch installed plants in or near the large mulch patch as denoted by small orange spots polygon. Every plant that is not a stake has flagging for identification.
 - **Note:** This is to ensure proper growth through the season and allow for better protection in the future. This will need to be managed once or twice a growing season.
 - **Mulch:** 6-inch high and 1-2 foot thick mulch rings should be installed if needed.
 - **Control:** Release by manual pulling overcrowding plants, debris should be thrown into pile to let dry out and die on top of a tarp or black plastic.
 - **Estimated Labor:** 6 people, 12 hours
 - **Timing:** **ASAP**
 - **Tools:** gloves, garbage bag, trowel, shovel, sheers, hedge trimmers, shovel, pick mattock, pitchfork, wheelbarrow.
3. Remove native nuisance plants, Cow Parsnip, from the walking path area in the red polygon.

- **Note:** This plants sap can burn the skin and should be removed due to the high human traffic (kids) that frequent the foothill trail. Sap and juices from the stock and stem can cause contact dermatitis and burning on sensitive individuals.
 - **Control:** Careful manual pulling, debris should be thrown into a trash bag and removed from the site and placed into a trash receptacle.
 - **Estimated Labor:** 3 people, 4 hours
 - **Tools:** Gloves, garbage bag, trowel, shovel sheers, hedge trimmers, shovel, pick mattock, pitchfork, wheelbarrow.
 - **Additional PPE:** Face shields, long sleeve shirts and pants with gloves are required for those assigned to this task.
 - **Timing:** If flowering, remove umbels and place into bag before removing roots and stalks to reduce reseeding potential.
4. Reduce crowding and shading from plants in the riparian area next to the stream as identified on the map as green, blue, and orange polygons.
- **Note:** The first 2 orange and blue streamside polygon areas are planted with hundreds of small, unflagged, willow stakes and is also, an unstable stream bank. Care should be taken when removing blackberry. Willow stakes are planted on stream edge to shade out grasses and blackberry but need a few seasons to become established.
 - **Control:** Blackberry can be manually removed completely on the bank but on the slope, plant stalks should only be cut to the soil to avoid excavation of the heart and increasing potential erosion and sediment deposition into the stream. Debris should be thrown into pile to let dry out and die on top of a tarp or black plastic. Grass can be cut down to the soil each season until willow grows established to shade out or the cut area can be heavily mulched. Sticky bed straw patches need to be cut out to release riparian plants.
 - **Estimated Labor:** 6 person, 5 days
 - **Tools:** gloves, trowel, shovel, sheers, hedge trimmers, shovel, pick mattock.
 - **Timing:** Blackberry should be removed during flowering stage when all its

resources are utilized to flower and makes the plant the weakest.

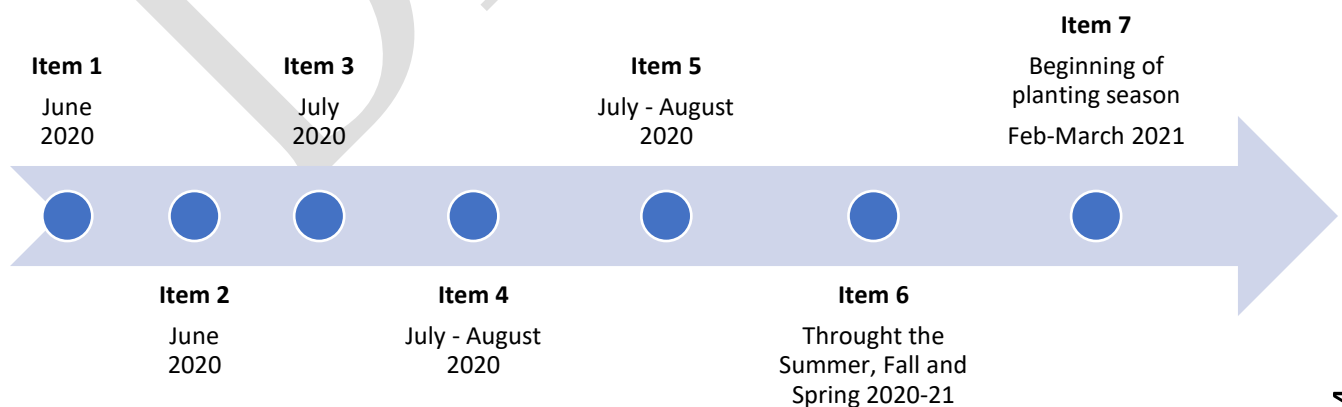
5. Remove blackberry rings from the base of existing trees designated by the orange circles on the map.
 - **Note:** These areas should be cut back and removed as much as possible. Mulch should be spread onto the base of the trees.
 - **Control:** Manual removal. Debris should be thrown into pile to let dry out and die on top of a tarp or black plastic.
 - **Estimated Labor:** 6 person, 2 days
 - **Tools:** gloves, trowel, shovel, sheers, hedge trimmers, shovel, pick mattock.
 - **Timing:** Blackberry should be removed during flowering stage, when all its resources are utilized to flower and makes the plant the weakest.

Pre-Work for Next Year

6. Removal of riparian invasive plants in preparation for next year's plantings as denoted by the callout section of the streamside blackberry unit called "Riparian Area 4".
 - **Note:** These are densely populated areas of mature blackberry and will need a combination of control. This area will be the focus for next year's willow stake plantings.
 - **Control:** Blackberry can be mechanically and manually removed completely on the bank but on the slope, plant stalks should only be cut to the soil to avoid excavation of the heart and increasing potential erosion and sediment deposition into the stream. Debris should be thrown into pile to let dry out and die on top of a tarp or black plastic. Grass can be cut down to the soil each season until willow grows established to shade out or the cut area can be heavily mulched.
 - **Estimated Labor:** 6 person, 5 days
 - **Tools:** gloves, sheers, hedge trimmers, shovel, pick mattock, weed eaters, chain saws, flail mower, electric hedge trimmers.
 - **Timing:** Blackberry should be removed/cut during flowering stage, when all its resources are utilized to flower and makes the plant the weakest.

7. Control of the Reed canary grass area in the blue polygon next to the Foothills Trail.
- **Note:** This area is a wetland area swale. It has a good amount of natural regenerating native species like Red Osier Dogwood, Red Alder and Cottonwood and is on the margin of the large mulch pile. It will be the focus for next year's willow stake plantings to help control the grasses and reduce the invasive mix of Himalayan blackberry, Herb robert and Creeping buttercup that are attempting to establish on the margin of mulch.
 - **Control:** Margin invasives should be removed manually. The wetland type area is more sensitive and its will be culturally controlled by over planting willow stakes. Grasses can be mechanically and manually cut back before planting next year. Debris should be thrown into pile to let dry out and die on top of a tarp or black plastic. Grass can be cut down to the soil each season until willow grows established to shade out or the cut area can be heavily mulched.
 - **Estimated Labor:** 4 person, 7 days
 - **Tools:** gloves, sheers, hedge trimmers, shovel, pick mattock, weed eaters, electric hedge trimmers.
 - **Timing:** Blackberry should be removed/cut during flowering stage, when all its resources are utilized to flower and makes the plant the weakest. Grasses should be cut back before planting stakes.

IPM TIMELINE:



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MEASURES OF SUCCESS AND MONITORING:

Each year, the invasives plan should be revisited, adjusted and measurements recorded 3 times. These events should take place at the beginning of planting season, middle of summer and early fall. This will be the backbone plan for invasive, problem and nuisance plants for the next 4 phases in this multi-year project. Every phase will have some type of modification to this assessment going forward into planning next year's season. Monitoring of this site will be under the guidance of the Boise Creek Restoration Interns. Measurement of success will ultimately be the establishment of a willow dominant riparian area adjacent to the stream, conifer and shrub communities growing well in the large mulch pile and invasives reduced to small, manageable patches.

Monitoring on the area of interest polygons will relay information about success over time. These digitized areas, at present time of this management plans creation, are considered 98-100% covered with invasives or massive out competition from the newly installed plants. Each of these areas should be assessed at each part of the season and assigned a priority to continue control for the remaining time of the project. Besides the Morning glory that needs to be eradicated early and monitored as much as possible, these other areas are to be visually and digitally assessed with a percent cover estimation of the area polygons.

The digital plant information and location recording survey will be utilized to help monitor the health of the tree and shrub communities. Withing the survey is a built-in measurement of the plant health and can help determine percentage of survivability in the installed plant communities (save the stakes). This can be revisited in the fall each year to record any change in the initial percentage of growth as captured in the spring/summer 2020 survey. The stake plantings should not be used in the calculation of success because of its different type of planting that traditionally has a much lower survival rates as cuttings/stakes.

Adjustments should be made each year to species selection, planting location, planting procedures, mulching, soil amending and other operational items by revisiting survivability rates, location, and other data. As noted in 2020 planting season, even areas with the first phase have changed dramatically since planting due to a plethora of variables. Unique findings should be recorded in journal form and passed on through each intern and each year for insight into better procedures into the future phases.

PURCHASING AND BUDGET:

As this project started, it was designed and developed initially by a graduation senior from Green River College for their capstone project. With that, the school supplied the project tools and some supplies for the first portions of Phase 1. Now that the capstone part is complete, the tools and supplies must be procured by our partners. It is advised to start with a small had tool cache to help with volunteer events. There are also partnerships with the City of Enumclaw that can potentially help with more mechanical tools from power trimmers to flail mowers.

This section needs a little more conversation, review, and input before the Second draft

How do we finance the paid interns going forward? Lets make a plan for this

WORK SAFETY:

Each intern was reminded every day that if they felt uncomfortable in any respect to COVID-19 governance to speak with the Crew Leaders to discuss potential solutions. The development of this work safety plan will need to adjust over time as COVID-19 rules relax or increase. It is also important that the interns or crew leader be trained in basic first aid and know the local emergency numbers and locations.

- Work site safety included a 6-ft physical distance rule.
- No more than 5 people at the site at one time.
- Site broken up into 30-50ft sections for work areas.
- A First Aid kit was always on site.

- Workers were asked to bring their own Personal Protective Equipment. (i.e Masks, boots, gloves).
- Safety talks each morning described potential risks, hazards, and safe procedures.

All paid interns worked on their own accord. Due to the state of governance because of the COVID-19, there were many additional precautions made to maintain social distancing and health guidelines. All tools were supplied on site as well as water, sunscreen, snacks, and breaks. There was one community volunteer that helped plant on multiple days. He was also the recipient of all safety talks and site information.

SPONSORS AND COMMUNITY PARTNERS:

EPCA

The Enumclaw Plateau Community Association is the voice of community members from SE King County that partner with King County Government on solutions for urban sprawl, recreational planning, open space preservation and sustainable resource management.

Puget Sound Keepers

The Puget Sound Keepers is a 501 (c)3 nonprofit organization focused on having positive impact on water quality throughout the Puget Sound region. Through monitoring, policy making and environmental regulation enforcement, they educate and partner with the public, both locally and regionally to find solutions for clean waterways.

Rose Foundation

The Rose Foundation is a non-profit, environmental project focused, grant funding organization. They encourage youth leadership in a grassroots effort to fight the environmental and climate challenges of today.

City of Enumclaw

The City of Enumclaw is the governing jurisdiction, providing services and leadership for the community. They invest resources towards maintaining and enhancing the quality of life for the community members and visitors. Through recreational opportunities within city parks,

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trails, and designated open space, they provide use and programs to bring the community outside.

Sustainability Ambassadors

They are a non-profit organization that works to increase sustainability education throughout King County. With the goal to empower students, teachers, and community leaders to drive sustainable community actions.

Boise Creek Trail Association ???

Puyallup Tribe of Indians

The Puyallup Tribe of Indians consist of a population of Salish speaking indigenous people living within the area between the foothills of the Cascades along the rivers and streams, reaching to the shores of the Puget Sound. The Puyallup Tribe of Indians have a focus on protecting and strengthening their sovereign rights and preserving the cultural practices and history of their people within the Pacific NW. This includes following best practices in managing for natural resources and the environment.

Muckleshoot Tribe

The Muckleshoot Tribe is a federally recognized tribe of descendants from the Duwamish and Upper Puyallup River Valley. The Muckleshoot Tribe continues to contribute to the local community and economy, providing resources to organizations across Washington. Through resource management efforts, within forests and rivers, they educate on the importance of saving salmonid species and other renewable resources for the future. Their contribution to a better quality of life benefits both their community citizens and the surrounding neighboring populations.

Green River College – Natural Resources

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Green River College is a public college in Auburn, Washington. It has a student body of approximately 10,000. Although it began awarding Bachelor's degrees in 2014, it awards primarily Associate degrees.

REFERENCES AND RESOURCES:

Bioretention Plant List

https://www.psp.wa.gov/downloads/LID/draft_2012/AppendixFiles_Jan2012.pdf

King County IPM <https://www.kingcounty.gov/services/environment/animals-and-plants/noxious-weeds/weed-control-practices/ipm.aspx>

Washington Noxious Weed Control Board <https://www.nwcb.wa.gov/>

Washington Native Plant Society <https://www.wnps.org/plant-lists>

U.S. National Vegetation Classification <https://www.dnr.wa.gov/NHP-USNVC>

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