Community Technical Group Vegetation Strategy and SWIF Action Plan Comments

Appendix 1.3b

DRAFT: 5/20/16
Updated: 1/23/17

OVERVIEW (Appendix 1.3b CTG Comments.docx)

The following tables compile comments provided by CTG members on the Vegetation Management Strategy Draft and the SWIF Action Plan Draft. Comments were provided via email and at CTG meetings. Also included is the County's response and action items related to the comments. Note: This document does not include grammatical suggestions, but those items have been updated/incorporated into the associated document where appropriate.

VEGETATION MANAGEMENT STRATEGY DRAFT

Section	Comment	Pierce County Response
Full document	Suggest referring to the US Army Corps of Engineers as "USACE" rather than "the Corps" for consistency with other documents.	The use of the term "USACE" (United States Army Corps of Engineers) is used to recognize the Division of the Army Command that fulfills numerous mandates of the federal government, including the management of waters of the United States and shared use with local jurisdictions. Under the discretion given by Congress the USACE also manages the PL84-99 Levee Safety Program Corps to repair and/or rehabilitate any qualified flood control project (Levees). The term "Corps" refers to the Army Corps of Engineers, being a Division of the Army. Use of Corps is intended to recognize the personnel that make up the Army Corps of Engineers. When referring to the program, standards, or directives, reference should be made to USACE.
Full document	The levee system should incorporate a 200-foot riparian corridor on both sides of the river.	The SWIF is focused on the eligibility requirements of the USACE under the PL84-99 program. The program sets standards for levee maintenance that includes constructed appurtenances that extends beyond the levee structures such as a culvert or drainage facility. USACE standards also require inspection of the levee at a minimum of 15 feet upland from the levee structure. Currently, there are no requirements requiring the retention of vegetation upland from the levee structure. Pierce County has chosen to incorporate levee vegetation enhancement as a component of our SWIF to fulfill the goals and objectives of our SWIF Vegetation Management Strategy. Additionally, Pierce County recognizes the benefit of maintaining vegetation along our levees to provide a riparian corridor that is vegetated, providing numerous benefits to fish habitat, outlined in the SWIF Chapter 4. Pierce County will as feasible provide for retention of trees on County owned land under the control of Surface Water Management adjacent to the levee. Additionally, SWM will enhance the adjacent county owned land by planting trees for long term benefit. Efforts to coordinate the enhancement of the riparian corridor on privately held lands should be pursued by local conservation groups or agencies focused on working with private landowners.
Full document	Is there a clear definition of mature trees?	The term "Mature Tree" is used to recognize the larger trees that exist along our levees; whether the tree is deciduous (commonly cottonwood, alder, or big leaf maple), or coniferous (commonly hemlock, cedar, douglas fir). The intent is to retain these larger trees to the furthest extent practically feasible. The SWIF Vegetation Management Strategy promotes the retention of trees greater than 6 inches in diameter, and saplings to provide for longer term successional growth and replacement of the trees that may grow back or may have to be removed once deemed to be a hazard tree.
Overview	Reference to maintaining eligibility in the PL 84-99 program should be removed, since vegetation is no longer a component of the eligibility criteria.	Although vegetation is no longer a direct review criteria under the USACE Continuing Eligibility Inspection checklist; vegetation does affect eligibility requirements for levee inspection and levee structural integrity requirements. Pierce County has provided a Leve Vegetation Management Strategy that provides for levee inspection, and provides protocols for addressing hazard trees that may impact levee structural integrity standards that are a requirement for eligibility under the PL 84-99 Program.
Overview	Monitoring of the vegetation strategy should include both the success of plantings and their impact on levee performance.	The SWIF Action Plan (Chapter 8) provides for a series of actions that will be undertaken to implement the SWIF over time. A key component of the SWIF is the Vegetation Management Strategy that recognizes the importance of maintaining vegetation along the levee system. In keeping with the agreement between the Puyallup Tribe of Indians and Pierce County, vegetation plantings will be provided to enhance the levee face following repairs. Additionally, Pierce County will develop a program that will enhance silt benches formed upon the levee face and in along the levee in association with levee repair plantings. The program is dependent upon monitoring the success of the plantings. Monitoring will note how high flows have affected levee growth, as well as performance of vegetation on providing for erosion control and structural integrity along the levee face.

Section	Comment	Pierce County Response
Objectives	Habitat should be considered equally as part of flood risk reduction and a risk analysis to habitat needs to be conducted.	The Vegetation Strategy lists two main Objectives in regards to habitat: 1.) performing the work to minimize the risk to habitat, 2. Perform veg. management in a manner that avoids or minimizes impacts upon fish. Short term impacts from this work are offset by the replanting of vegetation, incorporating LWD back into the system, and following appropriate BMPs to reduce impacts from this work activity such as erosion control, turbidity control, and minimizing the amount of clearing to the minimum necessary. **Action: Include a number of "Action Items" to be included with the SWIF Plan and Vegetation Management Strategy for implementation. Develop Vegetation Strategy SOP to standardize the practice as an Action Plan item.**
Levee Vegetation Management Strategy – Deliverables Riparian Vegetation Communities Mapping	Where can I review the current vegetation communities mapping?	**Action: The vegetation communities mapping is discussed in Chapter 4 of the SWIF Plan.. The levee vegetation community maps will also be attached as an appendix to the draft SWIF as Appendix 4.1 – "PL84-99 Levee Vegetation communities Map Portfolio".** **Additionally, these maps will be found on the SWIF webpage: http://www.co.pierce.wa.us/index.aspx?nid=4351**
General Guidelines	Multi-use of levees, such as trails, should not negatively affect the priority of maintaining habitat for species protection.	SWM works closely with our County and City's Parks Department to coordinate the use of our levees for public recreation where appropriate. Removal of vegetation will be coordinated with a MOU reflecting the vegetation strategy. **Action: Add language: "When there is mutual use on the levees, trails must fit into agreed upon levee maintenance guidelines, rather than pose additional guidelines on levee and vegetation maintenance." Develop MOU for trail use/vegetation removal as an Action Plan item.**
General Vegetation Management Strategies Vegetation Management Zones	Trees on the backside of the levee provide valuable shade for temperature moderation. King County included a 150-foot buffer zone in their "Vegetation Management Zone."	Evaluation of the 200 ft. riparian corridor along the levees illustrates that there is approximately 1,140 acres of land associated with the PL84-99 levees. 20% of this is owned by Pierce County, totaling 234 acres. The 80% remaining upland property is privately held and ability to limit removal of this vegetation will be subject to agreement with these upland property owners. **Action: The Vegetation Management Plan Strategy will provide for plantings on the upland side of the levee to offset the removal of hazard trees and trees lost to levee repair work.**
General Vegetation Management Strategies Vegetation Removal	Include more details about vegetation removal, particularly smaller vegetation. There needs to be a way that small woody vegetation gains importance based upon the surrounding context. Smaller vegetation may not be important where lots of mature vegetation exists, but it may be very important where it represents recolonization of a section of riparian area where woody vegetation is currently lacking.	The SWIF Vegetation Management Strategy places emphasis on retaining saplings that may be available to provide a successional growth of the vegetation communities. The strategy recognizes that best results have been achieved where the levee face has been properly prepped to accommodate plantings as well as volunteers from natural propagation. Vegetation will be thinned or mowed to provide for levee inspections, retaining clusters of vegetation with openings for visual and physical access. . As older vegetation dies back it will be important to accommodate newer growth. To do so effectively will require oversight by a biologist to recognize these site conditions and identify which new growth to accommodate in a protective growth cluster, as older vegetation is displaced. Additionally, our planting program will look for opportunities to supplement the levee face when tied to a levee repair, removal of hazard trees, or removal of invasive species. **Action: Develop a protocol for SWM biologist and maintenance crews to follow in identifying opportunities to provide for successional growth of smaller vegetation, clustered to accommodate levee site inspections.**
General Vegetation Management Strategies Vegetation Removal	First bullet reads (see **bold**), "Levee vegetation understory will be thinned to provide visibility and physical access for inspections, **retaining clusters of native shrubs and saplings approximately 10-15 feet in diameter**, for recruitment of future understory native vegetation and overstory trees. **The cleared area around the native shrubs will be approximately 10-20 feet between clusters**, depending on site conditions and character of vegetation. (See Illustration X.x)". This differs from text and figure on page 14. Please revise to correct dimensions, preferably towards greater native cluster size dimension, and lessor of the cleared area around clusters (i.e., Illustration X.x, page 14).	The intent of the dimensions was to provide guidance on how to dimension the inspection windows and clusters of native vegetation to remain. The minimum distance between the clusters thought to be needed to provide for inspection is 8 feet. In some cases this will be expanded out up to 25 feet depending on existing conditions; where vegetation has been limited to primarily grass. In heavily vegetated areas, the vegetation will be thinned to provide for an 8 ft. inspection window, while retaining a minimum 8ft cluster of vegetation. In situations where existing vegetation across the levee is best accommodated in smaller clusters the clusters of vegetation may be reduced down to a minimum of 8 feet. The cluster of vegetation retained may be extended out a distance of up to 25 feet in when the levee structure is rated: "Acceptable". Conversely, smaller clusters of vegetation with larger openings (up to 25 ft.) will be provided when the levee structure is rated: "Minimally Acceptable, or Unacceptable". Additionally, levee inspections by staff may dictate the need to provide for widened inspection windows to inspect obvious signs of evolving levee deficiencies. **Action: Revise text on page 4 of Vegetation Management Strategy to be consistent with Figure: levee vegetation management plan view.**

Section	Comment	Pierce County Response
General Vegetation Management Strategies Vegetation Removal	Define tree size measurements to include that diameter measurement is at breast height.	It is the intent of the Strategy to retain as feasible trees of 6 inches in diameter or greater. Feasibility is determined by minimum standards for inspection windows, requirements for performing levee repairs, and situations where the tree has been deemed to be a hazard per the protocols set forth in the Strategy. Tree diameter measurements will generally be taken from breast height, but since tree trunks are generally larger near the base of the tree, these trees less than 6 inches at breast height will be retained as can be accommodated in clusters. **Action: Retain flexibility in how tree size is measured to accommodate successional growth.**
General Vegetation Management Strategies Vegetation Removal	It is not clear how many trees will need to be removed as part of the USACE requirements for levee inspections and access. Until we have an assessment of the impacts to aquatic habitats, there cannot be agreement upon the application of this vegetation management strategy.	The vegetation strategy calls for retaining trees > 6 inches in diameter as feasible, while also providing for inspection windows with emphasis on not reducing effective shading while providing for accommodating a multi-layer canopy (shrubs, limbs, and upper canopy). All overhanging vegetation will be retained, and all mature trees that do not interfere with levee access and levee integrity (hazard trees) will be retained. Levee repair work will look for opportunities to retain trees as feasible. **Action: Add language, "The retention of shade tolerant trees is a priority and will not be removed unless the tree presents an unacceptable hazard to the levee structural integrity, public infrastructure or adjacent private property."**
General Vegetation Management Strategies Vegetation Removal	The SWIF Plan should include short-term mitigation for shade from vegetation removal.	Short term impacts from this work are offset by the replanting of vegetation, incorporating LWD back into the system, and following appropriate BMPs. Tall growing, shade trees will be replanted on upper 1/3 of levee. **Action: Develop SOP to standardize the practice as Action Plan item.**
General Vegetation Management Strategies Vegetation Removal	A mapping exercise is needed to look at areas that are most critical for solar radiation shading.	The strategy will retain large trees that currently provide opportunity for shading of the river. **Action: No- Action… Already addressed in strategy.**
General Vegetation Management Strategies Vegetation Removal **Levee Vegetation Management Plan View Details**	In reference to, "Vegetation maintenance work should be conducted in a way that does not kill or weaken the remaining trees…", are there best management practices to reference for basic tree protection (e.g., http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/13729/EM8994.pdf?sequence=5) or is this covered in the Puyallup Tribal Vegetation Management Program?	There are several examples of best management practices that will be looked at as standard operating procedures are developed for the crews to follow. Attempts will be made to prune or thin the vegetation in a manner that does the least harm to the vegetation to be retained. Crews will first be using flags and tape to identify which vegetation is to be retained. Over time, this level of detail will not be as necessary as the inspection windows and clusters of vegetation to be retained are more evident. Additionally, larger trees that are adjacent to construction sites will be protected as practically feasible. Efforts will be made to clearly identify trees to be retained with flagging, with protective construction fencing use when appropriate. Efforts will be made to minimize disturbance of the tree trunk, tree roots, and overhanging branches. **Action: Develop SOP to provide guidance on protecting existing vegetation to be retained.**
General Vegetation Management Strategies Targeted Invasive Species Removal	The planting plan does not address invasive plant removal and we have not seen an invasive species management plan. Invasive plant removal is probably one of best opportunities to enhance riparian baseline conditions, by actively cutting and removal of invasive vegetation and planting trees in their stead. Our meeting discussions mentioned there would be opportunities for this, but have not seen any protocol that outlines this process.	The vegetation strategy states that a plan will be developed for managing specified invasive species, through a programmatic approach of working with resource agencies, tribal biologists, and private property owners. An assessment of invasive plant species (knotweed, tansy, and scots broom) was mapped in 2012. **Action: Develop Invasive Species Control Program/SOP in conjunction with Conservation District as an Action Plan item**.
General Vegetation Management Strategies Mature Tree Preservation	Saplings in between clusters, especially conifers, should be encouraged for recruitment to later become mature trees.	The strategy encourages the retention of saplings to provide for successional growth over time**.** **Action: Add statement to express desire to retain conifer saplings prior to mowing." Develop Vegetation Strategy SOP to standardize the practice as Action Plan item.**
General Vegetation Management Strategies Hazardous Trees	Could the County commit to notifying the Washington State Department of Fish and Wildlife and Tribes prior to removing hazard trees? While cutting is likely justified in some cases, the tree as in-stream habitat is better when the rootwad is still attached.	Typically, a tree does not pose a hazard until the tree is mature and nears the end of its lifespan. Although smaller trees may pose a hazard. In keeping with the agreement with the Puyallup Tribe, Pierce County will notify the Puyallup Tribe when major vegetation work is being conducted. This will include removal of hazard trees greater than six inches in diameter. Action: Develop SOP to contact Puyallup Tribe of Indians for removal of hazard trees greater than 6 inches in diameter.
General Vegetation Management Strategies Hazardous Trees	Hazard trees would benefit from a uniform method of identification. Whether this is flagging color, paint color, and/or a unique number so that everyone knows what trees are being identified and make field identification easier for everyone. This might also help in tracking these trees in some spreadsheet or database.	Standardized methods for identifying and marking hazard trees is an important component of the Vegetation Strategy. **Action: Develop Hazard Tree SOP, following the Hazard Tree Matrix guidance to standardize the identification of Hazard Trees as an Action Plan item. Add statement in SOP: "Those trees that are identified for monitoring will be marked "orange", those trees marked for removal will be marked "red". Notification will be provided to Tribal Interests.**

Section	Comment	Pierce County Response
General Vegetation Management Strategies Hazardous Trees	The hazard to habitat if these trees are removed should be considered equally in this evaluation. Riparian plantings will not provide an offset to the removal of trees that provide shade and other riparian functions. Adequate mitigation should be proposed as an addition to plantings.	Mitigation for the loss of the shade tree will include: • replanting of understory vegetation; • placement of removed tree into river channel for immediate benefit and to naturalize overtime; • Long term: replant with similar tree species 6:1 ratio. Plant on upper 1/3 of levee prism and/or on back side of levee where appropriate. **Action: Fold into Hazard Tree SOP**
General Vegetation Management Strategies Hazardous Trees	Hazard trees should be mapped in order to provide a better understanding of where those trees are and the risks associated with them.	Crews will perform annual inspection to identify where there is a hazard tree. The trees of concern will be further evaluated following the tree hazard matrix. Those trees that are deemed to be a hazard tree will be marked and removed. Only moderate hazard trees on the river side will be monitored. **Action: Fold into SOP as Action Plan item.**
General Vegetation Management Strategies Habitat Protection / Enhancement	"Riparian vegetation along the levees will be **maintained and enhanced with native plantings and removal of invasive plants** to support habitat functions critical to fish and wildlife resources." This is encouraging, but at what level can the County commit to this measure? What Chapter is this detailed?	The SWIF Vegetation Management Strategy includes provisions on enhancing existing vegetation as component of the levee maintenance program. The Strategy is detailed in Chapter 4.9 of the SWIF Plan. There are several sections of the Strategy that express this intent; to name a few: (Section 4.94)-Vegetation Removal, Targeted Invasive Species Removal, Mature Tree Preservation, Riparian Habitat Protection/Enhancement, Long-term Tree Preservation/Conservation; (4.9.6.6)- Levee Vegetation Plan View Details; (4.9.7) Hazard Trees, Trees removed will be offset with trees to be planted on the upper 1/3 of the levee riparian management zone, back slope zone, or the upland side of the levee upon County controlled land for long term preservation (See, 4.10 - Levee Upland Management Zone – Riverine Riparian Levee Plantings) ("Trees removed will be placed in river")
General Vegetation Management Strategies Habitat Protection / Enhancement	Restoring habitat needs to be a consideration so that habitat does not continue to diminish and endanger salmon species.	Although the SWIF Vegetation Management Strategy puts heavy emphasis on minimizing impact to habitat, the SWIF is not a habitat restoration plan. **Action: Add statement: "The HCP will look at means to offset long term impacts from levee maintenance work with appropriate level mitigation that will include expanded habitat."**
General Vegetation Management Strategies Habitat Protection / Enhancement	The SWIF Plan should incorporate language about what combination of tree height and density provides the best thermal buffer for fish species, especially in the southern and western exposures.	The vegetation strategy proposes to retain all trees > 6 inches in diameter, and will provide enhancement with plantings following levee vegetation repairs and removal of extensive invasive vegetation. A study to confirm optimum tree density and tree height for thermal cooling is not part of the SWIF. **Action: Add statement: "HCP should consider strategies to maximize thermal buffers.** "
General Vegetation Management Strategies Long Term Tree Preservation/Conservation	"As opportunities are made available, land may be set aside in conservation easements where existing native trees will be preserved and the area enhanced with appropriate conifer trees." Although not a part of the SWIF process, could Pierce County outline what and how these opportunities may be pursued?	The SWIF is a maintenance and operation plan for our levees. Although the Levee Vegetation Management Strategy sets a performance standard to retain functional habitat and perform levee maintenance work in a manner that avoids or minimizes impacts upon fish and wildlife, the strategy is not a restoration plan or conservation plan. In much of the leveed river system, the vegetation found upon the levees represents the extent of functional vegetated riparian habitat along the river. This is due to the fact that development has squeezed up to the edge of the levee along many reaches. In other areas, farming has extended up to the edge of the levee. Currently, county and City codes do not require the retention of vegetation on the backside of the levees, although along many stretches of the levee these private land holdings are vegetated often retaining very large trees beneficial to habitat. Other land holding are public, mostly controlled by Pierce County. The strategy recognizes that it would be beneficial fish and wildlife to promote a riparian buffer larger than the levee structure. The Strategy promotes the planting on County publicly held land as a component of the levee planting program. The Strategy also encourages that conservation groups work together to promote a widened protective riparian buffer on private land through the use of conservation easements, possibly overseen by land trusts or conservation groups. **Action: Additional language provided regarding planting in Upland Zone.**

Section	Comment	Pierce County Response
Proposed Levee Vegetation Maintenance Schematics "Clear Zone"	The "Clear Zone" is often characterized in the maintenance schematics as exceeding 15-ft minimum, but in the schematics, this is referred to as the "Additional Mowed Area" (5-15 ft.). The "Clear Zone" text appears to allow retention of trees (i.e., limbing of trees). Does this mean the clumping of trees/saplings would be allowed in this area 5-15 feet downslope towards the riparian area? The text may lead to believe same standard applies. Maybe it's better to assign this additional 5-15 ft., to the Riparian Management Zone, to avoid confusion and the definition of this zone fits better with mowing and limbing, and not so much keeping it clear for vehicular traffic in the Clear Zone.	The Clear zone is defined as the crown of the levee. The standard is for levee vegetation maintenance is to maintain a minimum 15ft (width and height) clearance for vehicular traffic. The other standard for vegetation management is the 5-15ft "additional mowed area" on both the Riparian Zone and Backslope Zone. This mowed area is intended to provide for additional vehicular clearance and to provide for maintenance efficiency through use of mowers to keep up with the vegetation growth in this area. This includes the growth of branches, saplings, grasses, and invasive plants like blackberry, tansy, and Japanese knot weed. **Action: No change.**
Proposed Levee Vegetation Maintenance Schematics Levee Maintenance Schematic "A"	Where are these types of levees typically found in the system? The other schematic types provide a general location and how they affect river hydro-geomorphology.	The Levee Vegetation Management Strategy proposes five (5) different scenarios representing typical levees structure types relating to vegetation growth and management. The scenarios recognize the somewhat unique differences in these levee structure types that are found throughout the system. Although each schematic gives an example where the specific schematic type is found, the Strategy does not intend to limit the strategy to a specific location; only the schematic type. **Action: Additional work is anticipated in the Action Plan to map where the silt benches are found throughout the system to implement the Strategy.**
Proposed Levee Vegetation Maintenance Schematics Levee Maintenance Schematic "A"	Described as "…situated on a steep river bank that functions as the levee embankment.", could these be also classified as revetments? Does a revetment typically require differing type vegetation maintenance than levees, such as the example on page 19? If not, then probably no need to distinguish between levee vs revetment.	Schematic 'A' represents the typical scenario of a steepened river bank formed by the levee. The Strategy is focused on levees within the PL84-99 program, and does not consider revetment structures; although this levee schematic type is most closely similar to the typical revetment structure scenario found throughout the system. The only distinction is there would be no Backslope Zone on a a revetment. **Action: No action needed.**
Proposed Levee Vegetation Maintenance Schematics Levee Maintenance Schematic "B"	Although the silt bench can be very beneficial from a maintenance and habitat perspective, they can also be washed away or encroach on the toe of the levee from flood action. You may want to add some language that indicates when this occurs, the County manage according to "Schematic "A", in addition to any re-planting plan that may be required. Basically, recognize that there may be a conversion of one type of levee vegetation management to another.	Since the river system is very dynamic it will be important to maintain flexibility in how the Strategy is implemented. Although there will be efforts to retain vegetation growth and enhance formed silt benches on the levee, the river will ultimately determine the existence of these silt benches that are formed then ultimately go away as the river finds a balance within the system. **Action: Include language to recognize that Levee Schematic A & B may convert to the other through natural processes, and will then be managed accordingly.**
Proposed Levee Vegetation Maintenance Schematics **Levee Maintenance** Schematic "C"	What happens if the silt bench and access road are washed out by floods? How is the structure rebuilt and re-planted? Will the County 'rebuild' the silt bench along with the access road?	The lower Puyallup levees formed with concrete panels and silt bench were constructed with the idea that a levee maintenance road would be constructed upon the silt bench along the concrete panels, behind the vegetated riparian corridor. The silt bench is considered a component of the levee structure and is maintained as such. The access road is affected each year as seasonal high flows inundate this area depositing silt and eroding away other areas. This dynamic is recognized and maintenance work is typically limited to smoothing out the area and compacting the silt again to allow the service vehicles the ability to drive here. The silt bench is an important component to the levee structure and will be reinstated if fully removed by the river. An example is the silt bench project constructed along the right bank of the lower Puyallup where dolos (concrete jack-like structures) were placed to promote silt deposition. If the vegetation is taken out by the river, then typically no action is taken allowing the river to naturally propagate this area. **Action: No Action**

Section	Comment	Pierce County Response
Proposed Levee Vegetation Maintenance Schematics Levee Maintenance Schematic "E"	The logic for whether to maintain a riparian buffer, according to Schematic "A" or "B" applies, if less than 50-foot vegetated buffer exists, assumes the river thalweg will not migrate to the toe of the new setback levee. Allowing all new setback levees to have a greater "clear zone", does not allow for a positive riparian buffer baseline. An established riparian baseline would be critical, when and if the river thalweg, migrates and is established at the toe of the new setback levee. Developing mature, contributing mature riparian buffers takes decades. Implementing Maintenance Schematic "A" or "B", after the fact, would lose valuable riparian function, increasing thermal stress to the river, loss of woody materials, allocthonous input and insect prey, for potentially significant period of time. The County should demonstrate why levee riparian vegetation standards implemented under Schematics "A" and "B", should not be the baseline standard for new levee setback riparian vegetation in order to qualify for USACE levee inspection and eligibility status.	This strategy recognizes that the natural system will find balance within the river channel to promote long-term growth of vegetation to mature overtime and better withstand the forces of the river. The constructed setback levees were intended to provide for additional relief from high flows through the system allowing lower velocities within the stretch of the setback levee and the ability of vegetation to better withstand the forces of the high flow events. The maintenance standard intends to use mowers to promote levee vegetation management efficiency within the 39 miles of levees within the program. All setback levees constructed within the system were constructed to be within the PL84-99 program The recently built Calistoga Levee, is conceived as a levee setback from the old Calistoga Levee segment was partially dismantled, where the large tree found upon the levee will naturalize within the system. Some of these trees will remain, others will die back and fall inot the system allowing them to naturalize as large woody debris; likely positively contributing to habitat. This is similar to the concept of the Soldiers Home setback levee and Ford Setback levee where the vegetation that was once behind the levee is now within the river channel. These levees will be maintained for levee maintenance efficiency using primarily mowers. If the river decides to migrate further up against the levee then the levee will be maintained to Schematic 'A' or 'B'. Since the river has more room to migrate it may be just a matter of time before the river flops to the other side of the river channel. The exception is the Countyline Setback Project was constructed to a different standard incorporating LWD within the structure, and will be maintained by King County. **Action: No action needed**
Levee Vegetation Management Plan View Details	The distance between clusters should be consistent throughout the document.	Comment noted. (see comment under general vegetation strategies above.) **Action: Revise text on page 4 of Vegetation Management Strategy to be consistent with Figure: levee vegetation management plan view.**
Levee Vegetation Management Plan View Details	All mature trees not identified as high risk hazard trees should be retained to the fullest extent possible. The text indicates that only those that provide significant shade might be retained. Trees near the river that do not directly shade the water contribute to temperature moderation by keeping the microclimate cooler.	The intent is expressed under the General Strategies for woody vegetation, that trees over 6 inches in diameter will be retained as feasible. Additionally, emphasis is placed on recognizing the larger trees that are of mature size (relative to the species and site conditions). These mature trees are to be retained as practically feasible, if the location of the tree conflicts with another standards such as a mowed zone or clear zone, then the tree will be evaluated on a case by case basis to determine the ability to retain the tree and not impair higher standards for access and flood fighting ability. **Action: No action needed**
Vegetation Risk Matrix	The matrix only allows for the recommendations of "Keep/Remove," but inspectors may want to specify full tree or part of a tree (e.g., an overextended branch may be the problem, not the entire tree).	A tree once recognized as a potential Hazard Tree will be catalogued and reinspected to determine how the condition may have evolved since last inspection. A tree can be a hazard due to its proximity to the clear zone. If the condition can be relieved by removing branches then that will be documented. **Action: Include language in SOP to clarify that inspectors should look for options to relieve the conditions of a Hazard Tree as the first option. The last option would be to remove the tree.**
Vegetation Risk Matrix	"Sideslopes" should be two words.	Comment noted **Action: spell out as two words**
Vegetation Risk Matrix	The County should include a record of how often and where hazard trees are removed. This puts the risk to flood control facilities and threat to public safety and effects to riparian habitat function in perspective.	As intended in the Action Plan, we will be developing the protocols for identifying and tracking Hazard Trees, any Hazard Trees will be fully documented, with basis for determining whether to retain the Hazard Tree (as a low hazard or through mitigation such as limbing or shoring up the slope or remove the Hazard Tree. The protocols will also document how the removal of the Hazard Tree is offset with replanting.
Vegetation Risk Matrix	This matrix is complex and not intuitive. Include a real on-the-ground example.	The Vegetation Risk Matrix is complex due to the complexity of balancing the interest to retain trees, and the need to insure levee structural integrity. Hazard trees that are deemed to be a "High Risk" will be removed. **Action: Utilize the Vegetation Risk Matrix in a real on-the-ground example. Refine as necessary to provide a more intuitive guide.**
Levee Plantings	Does the County have picture examples of where they have preserved large, mature trees during regular operations and maintenance work? How often are mature trees retained?	As mentioned in many of our CTG sessions, in most instances when there is the need to perform a levee repair many of the large trees have been removed by the forces of the river. In cases where there are remaining large trees, crews will look for opportunities to work around the tree in an effort to retain the tree and still be able to perform the levee repair. Crews will look for opportunities to access the levee repair site from the dry river bar in order to repair levee toes and not disturb remaining vegetation. A good example is along the lower Carbon (0.5) where crews worked around existing vegetation performing smaller stretches of repair only where most critical. **Action: None needed**

Section	Comment	Pierce County Response
Planting Plan	This section should spell out more explicitly when and how much vegetation will be planted on the levees.	The Strategy specifies that levee repair sites will be replanted after the repair. Typically, levee repairs are made during the summer months, and the plantings are performed during the late fall- winter months when the plant are dormant. **Action: Provide a typical planting plan as an appendix to the final SWIF plan.**
Planting Plan	We have informally discussed retaining trees on the levee but that is not included in this document. The document discusses natural colonization/recruitment of trees, but does not discuss planting the same and also how volunteer trees are identified and maintained. It also does not identify planting of trees, other than smaller, bushy trees such as willows.	The vegetation strategy has included language about retaining trees over the course of the strategy document. **Action: Include language on retaining trees over 6 inches in diameter. Saplings will be retained in clusters for successional growth. Mature trees will be retained as feasible, unless they conflict with accessibility, or pose a hazard.**
Planting Plan Technique 1: Bioengineered brush layering	Include a cross-section figure, similar to that for technique 2.	Comment noted **Action: Provide a cross-section of Planting Plan Technique 1 "Bioengineered brush layering" as an appendix to the final SWIF plan.**
Riparian Plant Selection	Planting big leaf maples with willows on the upper 1/3 of the levee may hinder its growth.	Since Big Leaf Maples tend to grow slower initially than willow trees, the Maple will be planted in the upper portion of the levee providing for light around the tree. Typically, big Leaf Maples are difficult to plant, but with proper soil preparation they will have a higher chance of survival. Additionally, crews will look for Maples that have started through natural seed propagation and will tag these trees to be retained. Action: Specify that Big Leaf Maples should be planted along the upper edge of the levee planting area away 4 ft. – 5ft. away from the willow trees to provide for light. Specify that Big Leaf Maples growing naturally will be flagged for retention.
Riparian Plant Selection	Is there a recommended planting stock size or is there a separate installation/planting plan where that information will be included?	Pierce County has had good success with using bare root stock for planting during the dormant period. The benefit is the plants have well defined root structures not confined by the pot size. The planting plans provided with our levee repairs does specify a plant size appropriate for the species type that is commonly available as bare root stock. **Action: Provide a list of plant species and size as an appendix to the final SWIF plan.**
Riparian Plant Selection	Mature trees should be defined earlier in the document.	Comment noted. **Action: Provide a definition of mature tree in the final strategy under General Guidelines.**
Riparian Plant Selection Native Tree Species List	The list should include black cottonwood and red alder.	Black Cottonwood or red alder are not preferred for planting, but are accommodated when found upon the levee face through natural propagation. Black Cottonwood will be planted within the Upland Zone for long term tree preservation. **Action: Clarify that Black Cottonwood is a preferred tree along with conifer trees within the Upland Zone.**

SWIF ACTION PLAN DRAFT COMMENTS

Section	Comment	Pierce County Response
Full document	Suggest referring to the US Army Corps of Engineers as "USACE" rather than "the Corps" for consistency with other documents.	"USACE" is used to reflect the Army Corps of Engineers Division of the Army, the Federal Program, and reference to the relevant federal rules and policies. "Corps" is used to refer to the personnel that we work with. **Action: Check final plan for consistency. Confirm with Corps.**
Full document	Include a list of acronyms at the end of the document for reference.	Comment noted. **Action: Provide a list of acronyms with final SWIF plan.**
Full document	Thermal buffering should be addressed in the action plan.	Thermal buffering of riverine habitat is recognized to be an important consideration in providing for a properly functioning riparian habitat. Pierce County's river system is glacial fed cold waters, where water temperature has not been a major concern except at specific inputs from upland sources. Still, the benefits of providing for shade and cooling effects from vegetation along shallow side steams within the river channel is important most important to the earlier lifecycles that are more susceptible to higher temperatures caused by extended heatwaves, and most importantly to climatic changes anticipated. The SWIF Vegetation Management Strategy recognizes the importance of a multilayer canopy of riparian vegetation provides for the survival of fish species. **Action: Provide SOP as part of the Action Plan to guide levee planting program.**

Section	Comment	Pierce County Response
Full document	Include a functional riparian corridor as part of the management levee system equal with flood control.	The SWIF Levee Vegetation Management Strategy sets Goals, Objectives and Performance Considerations that recognizes the importance of habitat in consideration of appropriate measures to address flood risk: Goal: "to provide for the riparian vegetation habitat requirements of the fish and wildlife resources…" Objectives: Risk – "Vegetation management will be performed in a manner to minimize risk to both habitat and flood risk reduction structures. Habitat – "Vegetation management will be performed in a manner that avoids or minimizes impacts upon fish and wildlife habitat." Performance Consideration: Habitat – "Retain Functional Habitat" **Action: None needed.**
Full document	Include elevation of habitat conditions where possible.	Not clear on what is meant by this comment. **Action: Need Clarification**
Level of Services Goals incorporated into the SWIF	Include habitat goals for salmon by maintaining a viable riparian forested corridor adjacent to the river. Salmon habitat protection should be an equal goal with flood protection and a function of the levee composite.	The SWIF Levee Vegetation Management Strategy addresses this interest… see comment above. **Action: None needed**
Phasing and Sequencing of the Action Plan	Are these actions funding-dependent or are the funds locked in to cover all tasks listed?	Actions to implement the SWIF are funding dependent. The Action plan states that implementation is subject to funding being appropriated. Funding is made available through numerous sources, including SWM utility district funds, Flood Control Zone District, and outside grants. The Action plan implementation projects funding availability for when the project will be completed. Projects are categorized as those that are currently funded, (near-term), partially funded (mid-term), or funding not yet identified (long-term). **Action: None needed**
SWIF Priority Ranking	The priority ranking worksheet lists commercial higher than high-density residential. That does not seem consistent with ensuring that lives are given the highest priority.	The "Priority Ranking Worksheet" (table 8.1) provides a methodology to prioritize the repair and rehabilitation of flood risk reduction structures. The scoring takes into account numerous factors that includes land use types, assessed value, and infrastructure at risk. Warehouses/Industrial land uses are rated high based on the importance to our local economy and valuation of the land uses. Additionally, High Density Populations are rated equally high. The next consideration is the "Infrastructure at Risk" category; where Critical Facilities are rated equally high. Next is consideration of the frequency of damage exhibited at the site. Lastly, is consideration of the "Severity of Damage found at a site. **Action: None needed**
SWIF Priority Ranking	Include a metric that considers the degree of habitat impairment imposed by the levee.	The determinant to repair a levee will be made based on the degree of severity of the levee and the level of risk exhibited at the site based on the "Priority Ranking Worksheet". All noted levee maintenance deficiency will be addressed by the SWIF Action Plan. Those maintenance deficiencies rated as "Unacceptable" and highest risk will be corrected first (worst deficiencies corrected first). Those deficiencies rated "Minimally Acceptable" and high risk will generally be corrected in the near-term. Other deficiencies rated as Low risk will be generally monitored to insure that the risk does not increase prior to correction. The Setback Feasibility Study includes consideration of habitat in the prioritization of projects. Generally, projects will be chosen by this prioritization schedule since funding is limited. **Action: None needed**
Deficiency Action Plan	Corrective actions and maintenance to flood protection facilities should address ecological needs to the fullest extent possible.	The ecology of a site is always an important consideration of how SWM M&O performs maintenance activities. Levee maintenance is performed with this in mind, employing Best Management Practices to minimize impacts upon the environment. This is includes considerations of not impairing water quality, minimizing effects upon habitat, and the human environment as well. **Action Plan: Establish a protocol to document use of BMPs with levee repair work.**

Section	Comment	Pierce County Response
Deficiency Action Plan	A thorough analysis of existing conditions must be conducted so that a comparison of future conditions can be referenced. This analysis must include: water temperature profiles taken throughout the managed levee reaches, canopy density measurements collected in a scientifically meaningful fashion, inventories of woody debris presence and function (in channel, wet; out of channel, dry) pool frequency and the frequency and location of levee repairs.	Baseline conditions is consideration of how levee maintenance work is performed. With each levee repair, an assessment of the maintenance baseline is conducted; establishing the extent of levee prior to damage. Repair work is performed within this maintenance baseline. Work is performed to insure that there is a no-net loss of habitat functions and values. A number of resource agencies (SWM, WDFW, USGS, Tribes) have shown interest to document habitat conditions (functions and values) in the river systems in an attempt to qualify habitat and understand the current condition of the river aquatic habitat in reference to properly functioning conditions. As this information is obtained, it will be important that this information be shared across all resource agencies to better understand the trend on the quality of habitat conditions overtime. **Action: Establish a protocol for levee repair work that includes documentation of current site conditions prior to maintenance work to be conducted.**
2016 Maintenance and Operations Scheduled Levee Repair Work	Suggest including the table on its own landscape page to improve readability.	Comment noted: **Action: Provide table on landscape format in SWIF final plan to improve readability.**
Maintenance Program	Past maintenance on levees has typically placed rock waterward of the original levee footprint and significantly removed critical vegetation needed for shade. Future maintenance actions under the SWIF should not further encroach on the river channels and should retain at least 75% of the largest trees.	Levee repair work is conducted within the footprint of the pre-damaged levee segment. Efforts are made to insure that work does not extend beyond by determining the pre-damaged footprint area and prescribing these limits prior to the work being conducted. Additionally, efforts are made to conduct levee repairs without damaging existing vegetation, with emphasis on preserving overhanging vegetation. Levee maintenance work will be conducted from the adjacent dry gravel bar in an effort to minimize disturbance of vegetation on the levee face from working from the levee access road. **Action: Establish protocol to identify pre-damaged footprint and construction limits.**
Maintenance Program	How will the proposed changes affect the natural growth and maturation of the riparian community and ultimately the vegetation canopy necessary to provide a thermal barrier to solar input.	The SWIF Levee Vegetation Management Strategy works in concert with our levee maintenance and repair program to maintain our levees with minimal disturbance of existing vegetation; while allowing inspection and access to insure levee integrity and ability to perform flood fighting as necessary. Much of the existing vegetation along the developed portions adjacent to the river system is found upon constructed levee and revetments. This vegetation has evolved over time, influenced by adjacent development, the forces of the river system, and levee maintenance/repair practices. In keeping with the Puyallup Tribe of Indians Levee Vegetation Management Program, vegetation removal for purposes of maintenance and repair will be offset with plantings. Additionally, vegetation growth along the rivers has matured in many locations to provide for a riparian vegetated corridor of large trees along significant stretches of the river. This vegetation is an important element of the functional fish habitat found within the river system. The Strategy provides for further protection of this existing vegetation, by retaining trees > 6inches in diameter that do not conflict with the ability to access and inspect the levee to insure levee structural integrity is maintained. Additionally, the The continuous forces of the river upon the levee which much of the riparian vegetation is located, will require routine maintenance to insure that the levees do not fail, and vegetation beneficial to fish habitat is lost. Additionally, the SWIF Capital Maintenance Program will focus efforts where the risk is greatest, providing greater assurance that the levees are structurally resilient. Over time, levee repairs will build increased resiliency into the levees with increased assurance that vegetation will be better able to withstand the seasonal high flows and grow in extent and height. Recognizing that the forces of the river system will continue to damage levee segments, additional efforts are made to provide for long-term tree growth on the upland side of the levee. Trees will be planted as a component of the levee repair program. These trees will continue to grow and over time will increase in height and provide additional shading of the nearshore river channel, as well as additional thermal buffering from the solar effects of the sun. **Action: none needed**
Interim Risk Reduction Measures Plan IRRM Evaluation Matrix	The risk assessment should include ecological risk to fish habitat.	The decision to perform a levee repair is conducted with the understanding that this work will be performed in a way to insure no net loss. Repairs are conducted in a manner that minimizes impacts through several means: timing the repair work to be performed during prescribed in water work windows to minimize conflict with critical life stages of fish; looking for opportunities to minimize in water work that might otherwise conflict with fish processes (including working from the dry river gravel bar when possible); minimize impacts using Best Management Practices as a mitigation measure; replanting levee areas following levee repair work; offsetting the removal of larger tress >6inches with planting on the Upland Zone of the levee for long-term improvement of the riparian zone. **Action: none needed**

Section	Comment	Pierce County Response
Capital Improvement Projects	Focus on levee setbacks and establishing a flood plain corridor throughout the river basin.	The SWIF Action Plan identifies Capital Improvement Projects that will be implemented overtime. The 2008/2014 Levee Setback Feasibility Study identifies 32 sites where a levee setback might be constructed to provide additional river channel capacity and expanded habitat. The County has incorporated the Levee Setback Feasibility Study into the Pierce County Rivers Flood Hazard Management Plan and the SWIF. These projects will be implemented as funds are available. **Action: none needed**
Capital Improvement Projects **Cost – Capital Improvements**	Suggest modifying the footnotes to letters to improve readability.	Comment noted. **Action:** Footnotes are to be numbered consecutively from the beginning. Notes to tables will be tracked with the table, listed alphabetically.
SWIF Schedule & Milestones	Suggest using something other than color for the key to improve readability in black and white.	Comment noted. **Action:** Review all maps for consistency in final SWIF Plan. Identify if gradients of color will improve readability if printed in black and white.