Fish Focus Group Meeting – Cougar Creek Pilot 05/21/2020

In attendance: Jason Hall (JH), Deb Johnson (DJ), Mike Maudlin (MM), John Thompson (JT), Joel Ingram (JI), Frank Corey (FC), Chris Elder (CE), Shelby Burgess (SB), and Paula Harris (PH).

Overview and Objectives

Group discussed and reviewed current conditions and actions that can address departures to improve salmon habitat. Departures do not factor in whether we can fix them (landowner or physical constraints) or historical conditions. Stranding issues not currently evaluated/considered – will be evaluated from modeling of receding flood flows, as well as summer low flow issue and dewatering and fragmentation of wetted channels. Actions discussed are described below for each reach – see Figure 1 for map of reaches, online mapping resources and products that were reviewed and prepared for this meeting (https://arcg.is/1PH1b5), and Figure 1 and Table 1 for list of actions and locations.

Reach A-B:

Departures Discussed:

- Riparian conditions on banks
- Modified/confined bank edges
- Channel confinement and stability of levee banks
- Habitat complexity and large woody debris
- Floodgate configuration

Actions Discussed to Address Departures:

- Reconfiguring levees to address stability and confinement of channel.
    - PH: Reconfigure levee on north side to resolve SWIF deficiency (sloughing of over-steepened slope)
    - FC: Reconfigure levee on south side near culvert to address landowner concerns with the existing levee
- Riparian planting.
- LWD clusters at mouth.
    - FC: put 2-3 clusters in Bertrand near eroding spots, option to do that in Cougar Creek, seems like there is less sediment deposition at mouth of Cougar Creek.

    - LWD placement throughout reach
- Floodgate configuration:
    - Combine floodgates into one structure?
    - Realign culvert/creek so main channel/culvert doesn't flow directly into north bank.
    - FC: Landowner is considering perforated piping the upper ditch for water quality concerns rather than improving habitat.

Reach B-F-G:

Departures Discussed:

- Riparian conditions on banks
- Confined bank edges, confined channel
- Habitat complexity and large woody debris
- Floodgate configuration
- Culvert/subsurface flow

Actions Discussed to Address Departures:

- Further evaluation is needed in reach
    - Landowner outreach to understand what actions would be possible
    - Need to evaluate water quality, seasonal flows, and temperature to understand restoration opportunities
    - Need to understand drainage issues
    - Need to consider stranding with all restoration approaches
        - Ditch is only drainage to mainstem for large floodplain area in the Nooksack
        - Evaluate fish passage at culvert and floodgate
        - Evaluate seasonal flows with regard to stranding
- Farmers want to bury stream (FC) in perforated pipe to improve farming access and reduce water quality concerns
    - WDFW would likely object to burying stream, would have to offset for any totally lost habitat. Pipe would have to be deep enough to allow filtration and would have to use field contouring to reduce stranding. If temperature and flow seasonality is adequate ditch could provide floodplain rearing habitat.
    - Alternative would be to install head gates in ditch to improve groundwater recharge

    - Need to evaluate if it is better to restore what you can currently and reduce fish use but improve access back to the river.
- Could break this into near term (reduce stranding, shrub riparian/water quality) actions and long-term (full restoration). If long term restoration isn't possible, then consider tradeoffs, regaining some lost function
- JI/FC: Reach may be a low priority for habitat improvements but if it goes away there would be loss of habitat – would need to be offset
- MM: Reducing stranding may be a bigger issue
- Riparian planting
    - FC: Might be eligible for CREP
    - JT: Would likely only be able to plant shrub buffer or grass strip given farmers constraints
- LWD to improve channel complexity

Point B (Floodgates):

Departures Discussed:

- Floodgates limit flood conveyance and are potential fish passage barriers

Actions Discussed to Address Departures:

- Combine both floodgates into one
    - Would involve reconfiguring channel and addressing fish passage in upstream ditch
- Restore passage at both floodgates
    - Could be addressed along with levee setbacks and LWD placement to improve/reduce erosion, make more aesthetically pleasing for the farmers
    - Address flow direction concerns
    - Address fish passage
- Take into account sediment flushing from upstream Cougar main channel when evaluating restoration

Reach B-C:

Departures Discussed:

- Riparian conditions on banks
    - Some willows present but lacking riparian cover, channel choked out with cattails and grasses

- Modified/confined bank edges
- Channel confinement and stability of levees/banks
- Little habitat complexity and lack of large woody debris
- Water surface diversions are present through this reach
    - WDFW has worked on some of these to update screens
- Dredging has occurred in the reach – levees may be just spoil piles from past dredging
    - Drainage concerns – may be sedimentation issues

Actions Discussed to Address Departures:

- JI: WDW has discussed changing surface water right to ground water rights
- Need to evaluate historical context
    - FC: Cougar Creek used to move back and forth in the floodplain, it may have meandered to the south (Note: GLO mapping shows Cougar Creek confluence north of its present location)
    - Used to be hedgerows that were removed
    - Beaver activity unknown
- Evaluation of levees is needed
    - Levees were likely installed by farmers over the years to prevent flooding or could be spoil piles from past dredging; unclear as to whether they are needed for flood protection or if channel is perched
    - Need to evaluate impacts of removing levees on flooding during the growing season?
- This reach would be ideal to setback/lower levees, install riparian plantings, and place wood to improve habitat complexity, wood recruitment, temperatures, and water quality
    - Unlikely to be able to install 50-foot buffer given farming constraints
    - Need to set expectations from restoration. What are functions to be considered? Shading, leaflitter, bugs or conifers and LWD
- Could do smaller scale modification of levees and do some planting to improve habitat
- Need larger habitat context, how does this reach compare to other reaches in the floodplain, should it be prioritized for restoration dollars?
    - Need to understand what the possibilities are for full restoration versus just levee setbacks and 10 feet of planting?

Reach C-E:

Departures Discussed:

- Low habitat complexity
- Riparian conditions
    - Scrub, shrub, cattail, and reed canary grass cover
- Invasive species (reed canary grass)

Actions Discussed to Address Departures:

- Removing reed canary grass
    - Expensive and time consuming to excavate reed canary grass, would take a lot of maintenance and upkeep
    - Difficult to plant on reed canary grass mats
- Evaluate temperature, sediment, and water quality, and limiting factors
- May have impoundments that cause sedimentation
    - Impacted drainage?
- Need to evaluate historical context and whether process-based restoration would work
    - Rich A says area was historically a large lake-like feature 50 feet wide
        - Would like the reach to be restored to historic status but would it fill back in again?
        - Would need large-scale excavation
        - Temperature data would be useful to justify large-scale project
- Called wetland in WDFW channel type classification, may evaluate wetland restoration strategies, establishing wetland vegetation
    - FP deficient in wetland habitats, may be functional but not as high quality as would be preferred
- Wood placement to improve sediment storage, beaver dam analogue devices.

Point D:

Departures Discussed:

- Unmapped water crossing, no one knows if barrier or current status, evaluation is needed

Metrics:

- A lot of metrics, might not be able to get to level of detail with every tributary in system, not sure how metrics feed into salmon recovery planning, will likely need to rate which are most important and target those
- Choose what's most relevant to a given project and evaluate those metrics – but all tie to productivity of habitat
- May want to add water quality, seasonal flows, and dissolved oxygen to list of metrics, some ditches have really poor water quality and would want to take that into account with prioritization (all would be addressed with riparian plantings)
- Is there something we can use as a biodiversity metric?
- Ability to use eDNA as simple presence absence pre-post analysis
- Temperature monitoring
    - Monitor temperatures at floodgates or discrete locations in channel
    - Could walk channels with YSI (handheld water quality sensor) to get temperature profiles
- Possibility to use students/internships to facilitate some of this monitoring

Next step:

Meet with landowners to discuss ideas, understand farm issues and walk streams

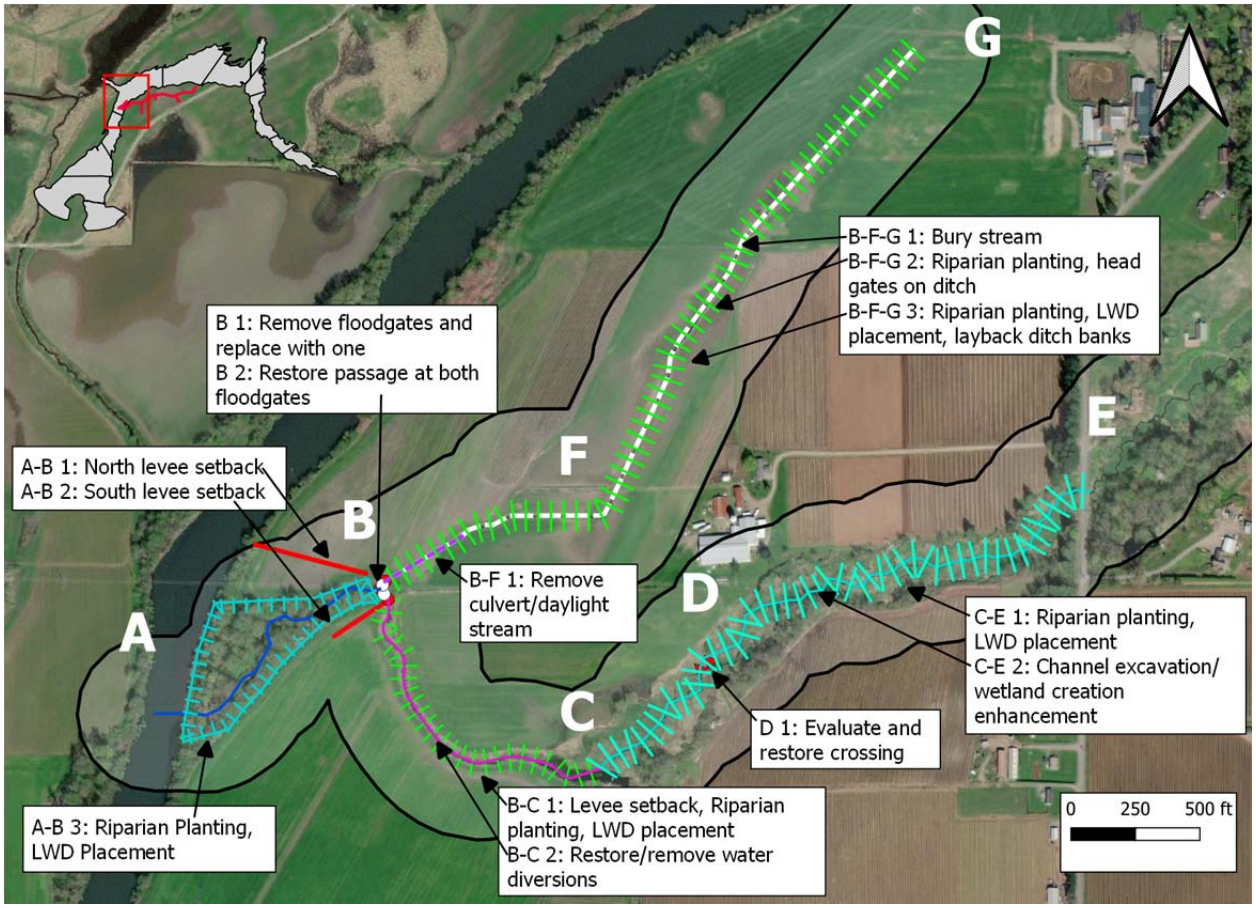

Figure 1. Overview of lower Cougar Creek reaches by restoration opportunities, located in Reach 2 of the Lower Mainstem Nooksack River. Labels refer to corresponding restoration actions shown in Table 1 below. The riparian zone of influence is represented by the black polygon buffered by 300 ft around the stream flow path, and restoration areas described in Table 1 are shown as colored hatched lines along the stream flow path.

Table 1. An overview of restoration strategies discussed in the Fish Focus meeting by reach and strategy. Locations of restoration strategies are shown on the above map.

Reach-Option	Actions	Benefits	Considerations	Description	Comments
A-B 1	North levee setback	Reduces confinement, small increase in floodplain area, improves bank stability, potential for improved riparian and LWD placement	Could be combined with flood gate replacement	Set or lay levee back to flatten riverward slope	Would resolve existing SWIF deficiency related to bank sloughing
A-B 2	South levee setback	Reduces confinement, improves bank stability, potential for improved riparian and LWD placement	Could be combined with flood gate replacement	Set levee back to flatten riverward slope	Farmers had requested that this area be improved
A-B 3	Riparian planting, LWD placement	Increases shading, thermal regulation, water quality, and habitat complexity, reduces erosion	Could be combined with flood gate replacement	Plant throughout area, place LWD throughout stream	
B 1	Remove floodgates and replace with one	One floodgate to maintain, improves fish passage, allows access to both mainstem and ditch	Would need to move daylight long pipe on north ditch, and address stranding and conveyance	Remove floodgates and replace with one floodgate; would include moving channel networks to converge upstream of floodgate	May negatively impact farm access and field area
B 2	Restore passage at both floodgates	Improves fish passage, allows access to both mainstem and ditch, reduces stranding potential on north ditch	Still have to maintain and inspect two culvert/gates	Replace two culverts with fish passable culverts and flood gates	Passage to north ditch may not be cost effective if habitat not improved
B-C 1	Levee setback, Riparian planting, LWD placement	Wider channel, increases habitat complexity; improves water quality, reduces temperatures	Unclear whether levees are needed for flood protection during growing season	Setback or remove levee, install riparian buffer (could be CREP), large wood jams	Need to evaluate current degradation of stream to see if it should be prioritized for restoration
B-C 2	Restore/remove water diversions	Improves flow		Need to evaluate impact on water quality, temperatures, and flows	Water surface diversions exist throughout this reach, these could be replaced with ground

Reach-Option	Actions	Benefits	Considerations	Description	Comments
					water diversions or removed
B-F 1	Remove culvert/daylight stream	Reduces stranding and improves fish passage and habitat	Decrease in farming area and field access	Daylight stream at long culvert to allow for fish passage two-way passage from north ditch into main channel	Passage to north ditch may not be cost effective if habitat not improved
B-F-G 1	Bury stream	Improves water quality and farm access	Large reduction in salmon habitat, would need increases in habitat elsewhere to offset, may need to regrade field to reduce stranding	Completely or partially bury stream	
B-F-G 2	Riparian planting, head gates on ditch	Improves water quality and groundwater recharge, reduces temperatures	Head gates would need to provide for passage or be removable	Plant minimally throughout reach, install head gates in ditch to increase groundwater recharge	Would have minimal habitat improvements for degraded ditch
B-F-G 3	Riparian planting, LWD placement, layback ditch banks	Would enhance large area for rearing habitat and high flow refuge, would improve water quality, reduce temperatures	Would take land out of production and impact field access	Install riparian buffer, large wood jams, and layback banks to reduce confinement	May promote future channel movement that would affect farm operations
D 1	Evaluate and restore crossing	Improved fish passage		Evaluate crossing to see crossing type, impacts on fish passage and flood conveyance	Unclear if access is still being used
C-E 1	Riparian planting, LWD placement	Improved rearing habitat	Reed canary grass removal is difficult to perform and maintain, may not be feasible; unclear as to whether this will restore channel due to sedimentation issues	Reed canary grass removal, install LWD, restore riparian	Little is known about status of this reach, need to evaluate current habitat, water quality, temperature and flows in order to evaluate options

Reach-Option	Actions	Benefits	Considerations	Description	Comments
C-E 2	Channel excavation/wetland creation enhancement	Increase shading, reduce temperatures, improve water quality and groundwater recharge		Excavate to create more wetland area and plant wetland species to enhance wetland area	Little is known about status of this reach, need to evaluate current habitat, water quality, temperature and flows in order to evaluate options;