SCJ ALLIANCE
CONSULTING SERVICES

TECHNICAL MEMORANDUM

TO:	Camie Anderson, Shockey Planning Group
FROM:	Lisa Palazzi, CPSS, PWS, SCJ Alliance
DATE:	May 19, 2020
PROJECT #:	2512.01
SUBJECT:	May 2020 Wetland Field Work Summary

1.0 Project and Work Description

1.1 Project description

Wheeler Ridge, LLC (WR-LLC) is proposing a ~260-acre orchard development within 640 forested acres in Section 17, Chelan County, Washington State (Figures 1 and 2). This proposal also includes permanent set aside of the balance of acreage in the Section for elk habitat; proposed wetlands and stream restoration in a severe disturbance area in the SW quadrant; and removal and restoration / revegetation of off-road trails and other ill-used roads and ATV-impacted areas within the elk habitat conservation easement. The goal of the wetland, stream and road restoration work is to improve overall habitat and to enhance potential for longer periods of stream flow in spring and early summer months. Currently, there is no surface water onsite in most years by early to mid-June.

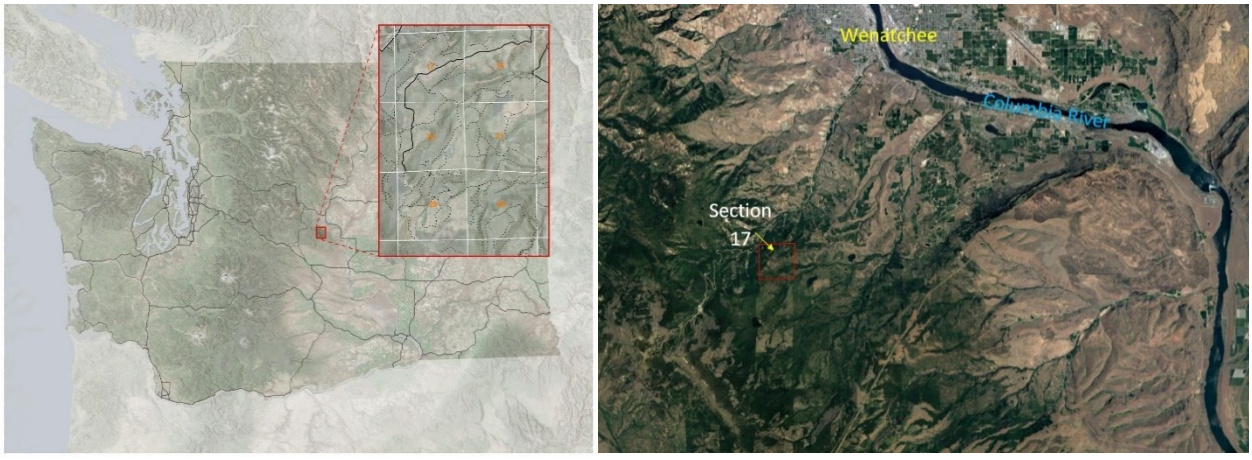

***Figure 1**. Location of the proposed project, Wheeler Ridge, Chelan County, Washington State; location of wetland delineation and riparian assessment.*

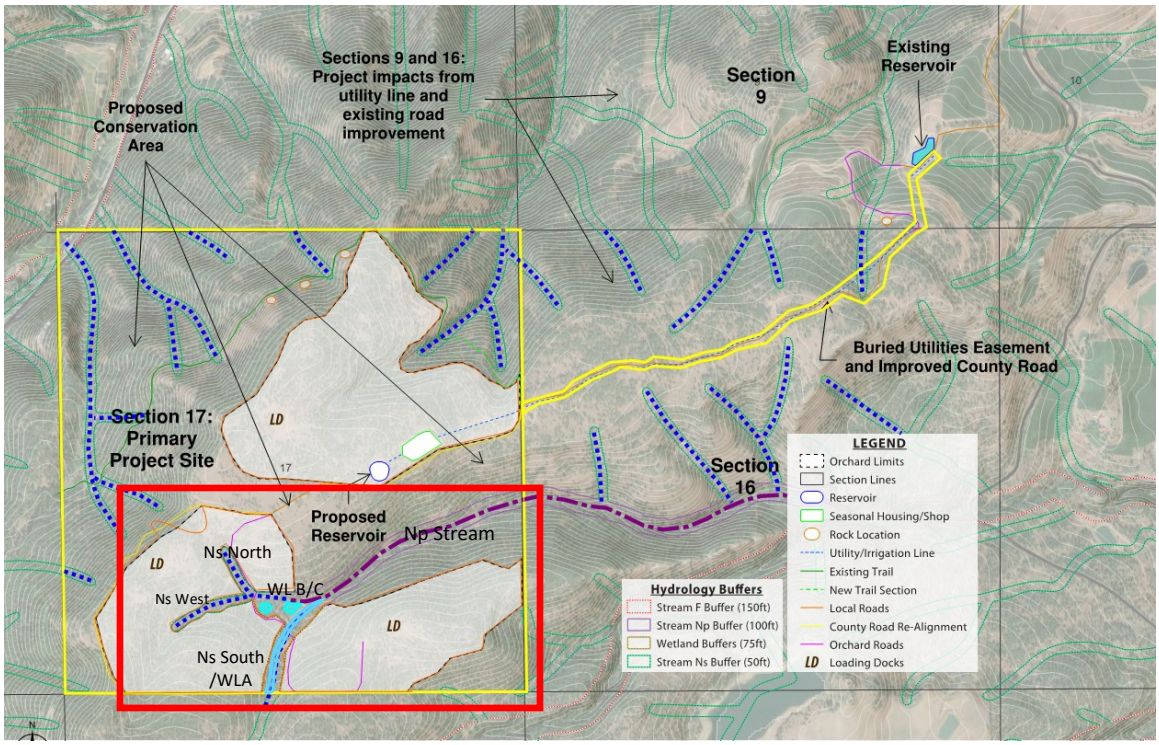

***Figure 2**. Project Site and area targeted for specific wetland and stream assessment/ restoration. (red outline). Orchard polygon shape and size may be adjusted as needed to accommodate wetland and stream buffers.*

1.2 Timeline Summary and Comments

The focus of this report is on wetland and stream conditions. Elk habitat enhancements will not be discussed, other than those enhancements that involve stream or wetland work.

1) May 2018: SCJ Alliance delineated Wetlands A, B and C in the SW quadrant of Section 17. We also walked and marked evidence of severe erosion along Ns West, and assessed wetland conditions along the Np stream that forms downstream from the confluence of Ns North, Ns West and the Ns stream corridor associated with Wetland A (Ns South).
    a) The buffers of all three wetlands and the three Ns stream corridor buffers were within the area proposed for orchard development. Therefore, a specific delineation and assessment was needed to define buffer limits, to help define where to move orchard areas outside of the buffers.
    b) The majority of the Np stream to the east was embedded in a wide area of proposed conservation easement, more than 300 ft away from any proposed orchard area. The stream ravine precluded development of extensive associated wetlands; therefore, the presence of narrow riparian wetlands was noted, but no detailed delineation was carried out – assuming that the wetland buffer width would be similar to that of Wetland A, a Cat III wetland with a low intensity buffer of 75 ft, but also assuming that these wetlands were hundreds of feet away from the nearest orchard area. And therefore, there would be no buffer impacts.
2) October 2018/November 2019: SCJ Alliance prepared a comprehensive report describing the orchard project. County comments from the first draft (October 2018) resulted in a rewrite

(November 2019) that reorganized the report to bring all of the specialty reports into separate Appendices.

   a) The wetland report provided a conceptual mitigation proposal for County review. Once details of the conceptual proposal are agreed on, a detailed mitigation plan will be prepared for a second phase of detailed review and permitting.

3) Summer 2019: Chelan County hired staff from Perteet Inc. to provide 3rd party review of the October 2018 report as well as a review of site conditions -- assessment of habitat features and wetland/stream conditions.
   a) June 12, 2019: Perteet (Bill Kidder, PWS) carried out the field assessment, accompanied by Ben Alworth (WR-LLC) and Charity Duffy (SCJ Alliance). Ben noted the locations where Perteet expressed concerns about potential wetland conditions -- marked on the field map and also waypoint-marked with a handheld GPS.
   b) Ben requested a copy of Perteet's field notes, and tried to schedule a follow up site visit with Perteet and SCJ Alliance (Lisa Palazzi, PWS, CPSS) to go over the areas of concern, but the County did not respond to the request for a field meeting with Perteet.
4) July 19, 2019: Ben and Lisa carried out a field visit (without Perteet) on July 19, 2019, to collect data in the areas indicated by Perteet.
   a) The County emailed Ben with a copy of Perteet's memo on July 19 – the day of the site visit. However, Ben's notes and field map from June 12 had been created in the field with Perteet. Therefore, Ben and Lisa were still able to adequately evaluate the areas of interest.
   b) Site conditions were evaluated and documented at each of the marked locations. Lisa provided Ben with a written summary of field notes, including a map of GPS waypoints (showing where data was collected), photos and data sheets describing soils conditions and hydrology indicators (as early season hydrology was no longer present). The results indicated there were no apparent wetlands in the areas Perteet had noted.
5) October 8, 2019: A field meeting with the Dept. of Ecology (DOE, Andrea Jedel, PWS) and USACE (Dale [Jess] Jordan) was scheduled to review the areas that Perteet had noted.
   a) Dale was unable to attend at the last minute, but Andrea reviewed the areas in the field with Lisa and Ben;
   b) Andrea conceptually agreed that the areas in question did not appear to be wetlands. However, she indicated that only the USACE could make the jurisdictional determination. She suggested that we send the field data sheets to Jess for a desktop determination.
   c) Lisa and Charity both sent follow up emails to USACE (Jess), asking for feedback about what he would need or what process to request, but never received any response.
6) November 7, 2019: As mentioned above in Item 2, the Wetland Report was updated and provided as an Appendix to the main Wheeler Ridge Project report. Because field work during the Summer and Fall of 2019 had not discovered any new wetland areas, no new data sheets relative to the original May 2018 delineation work were sent in with the updated critical areas report.
7) November 19, 2019: Chelan County staff (Mike Kaputa and RJ Lott), Ben and Lisa met onsite to review the areas where Perteet had expressed concern. We evaluated all areas listed by Perteet. None of the potential wetland areas evaluated had hydrology or apparent wetland indicators, and there was no apparent disagreement in the field. We also evaluated one of the riparian wetlands associated with the Np stream, to provide context about relative stream versus wetland buffer impacts.
8) November 20, 2019: Chelan County sends a letter indicating a change from MNDS to DS is "likely", citing a list of issues – including "new wetlands that have been identified but not delineated."
9) March 1, 2020: Governor issues COVID-19 Stay At Home Order.

10) March 23, 2020: Notice that the County has hired a 3rd party facilitator – Shockey Planning Group – to review the overall project and process, including wetland and stream issues.
11) April 24, 2020: Letter from Shockey Group requested a range of information, including other information that would resolve the "potential wetlands" issues identified by Perteet.
12) April – early May 2020: Efforts are made to schedule a field visit with a 3rd party reviewer (from Shockey Group or another E-WA PWS) to assess wetland conditions in the areas noted by Perteet. Due to the Governor's COVID-19 Stay At Home Order, no third-party or agency personnel were available to attend a site visit before July. Because the hydrology is fully-formed in May, it was agreed that it was best to conduct the visit as soon as possible in the spring.
13) May 8, 2020: Shockey Planning Group (citing COVID-19 limitations on travel and safe field work conditions) confirms that Lisa and Ben could go to the field without a third party while hydrology is fully formed to:
    a) Review areas where Perteet said there were "possible" or "probable" wetlands. Document and verify whether these areas are wetlands
        i) i.e., area at west end of Ns West; area at middle of Ns North; area east of "mud bog", between WL-A and WL B, area upslope from Wetland C;
    b) Review areas of "ephemeral creek" along Section 16 and Section 20 boundaries to determine the type of stream and associated buffer and the wetland categories and associated buffers to clarify which buffer extends farther based on typing / code
        i) i.e., assess Ns streams that are mapped directly adjacent in the SE corner of Section 17, and
        ii) Assess onsite riparian wetlands associated with Np stream;
    c) Review area of "isolated wetland" per comment from Perteet, and document and verify if there is no wetland
        i) i.e., area associated with old log deck east of WL-A near south property line.
    d) Address April 23, 2019 SCJ memo between Lisa and Charity where, on page 4, it references a data forms error.
        i) i.e., need to confirm that the corrected data forms have been submitted;
    e) Better document and confirm that there are no Aspen Grove wetlands.
    f) In general, it is agreed that there is no need to delineate all wetlands / streams within Section 17 as long as the orchard polygons (the Project Area) are more than 300 ft from the subject wetland and/or stream (i.e., outside of the maximum possible buffer width for onsite systems – Tables 1 and 2).

Table 1. Wetland buffer widths required per wetland category.

Buffer Width (feet)		
Wetland Category	**High Intensity (feet)**	**Low Intensity (feet)**
Category 1	300	200
Category 2	200	100
Category 3	150	75
Category 4	50	50

Table 2. Stream type buffer widths.		
	Buffer Width (feet)	
Stream Type	**High Intensity (feet)**	**Low Intensity (feet)**
Type S	250	200
Type F	200	150
Type Np	150	100
Type Ns	50	50

14) May 12, 2020: Lisa and Ben meet onsite to address all areas and issues described in Shockey memo above. Figure 3 shows the area that were visited and assessed. This Technical Memo documents results of that work.

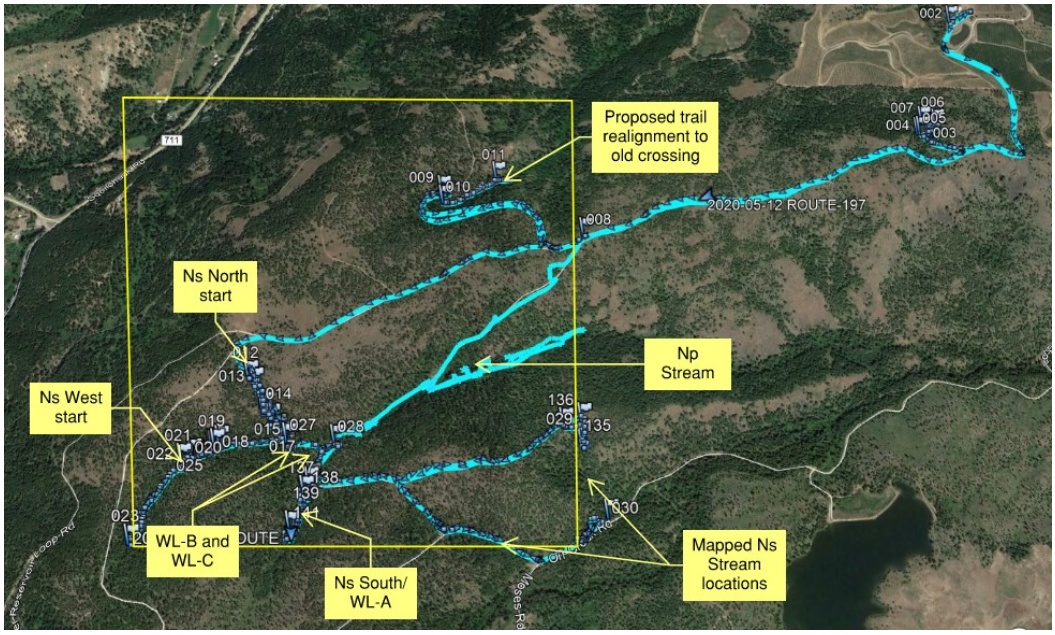

Figure 3. GPS track and waypoints on May 2020 site visit – overview.

2.0 Report Review Comments

The purpose of this technical memo is primarily to respond to questions from the Shockey Planning Group, listed above. We have answered some of these questions in the past in response to County questions that were based in Perteet's original questions about wetland conditions. For that reason, some of this information below is from previous memos and email transmissions. We have additional photo and video documentation of the May 12, 2020 site visit if needed.

Growing Season Note: WR LLC photos from 2019 and 2020 (2020 photos are provided in Figures 4, 5 and 6) document that there typically is snow on the ground at these locations and flowing surface water (from snow melt) in late April (documented on April 22, 2019 and April 17, 2020). Elevation on Wheeler Ridge ranges from about 3,600-3,800 ft. Therefore, the growing season is assumed to start no later than April 22 in most years; and hydrology must persist at least 21 days into the growing season (into mid-May) in most years, under normal circumstances, in order for an area to meet the minimum hydrology duration requirement needed to be regulated as wetland.

The original 2018 delineation was carried out on May 16, 2018; the work for this Technical Memo was carried out on May 12, 2020. In both cases, wetland hydrology should be present to meet the minimum requirements for an area to be regulated as wetland.

Figure 4. At Wetland C, April 17, 2020

Figure 6. Ns West, April 17,2020

Figure 5. At Wetland B, April 17, 2020

2.1 Shockey Group Data Requests

Request #1: Review areas where Perteet says there are "possible" or "probable" wetlands. Document and verify whether these areas are wetlands (i.e., area at west end of Ns West; area at middle of Ns North; area east of "mud bog", between WL-A and WL B, upslope from Wetland C).

Please refer to Figure 3 throughout the discussion below for context on where the described work is being carried out.

2.1.1 Potential wetland at Ns North

Ns North is a seasonal stream with periodic severe erosion scouring along the channel (Figure 7 and 9). In some areas, the erosion channel is over 8 ft deep, undercutting adjacent root systems (Figure 8). There was no continuous flow in most sections of the stream during the May 12, 2020 site visit. However, there were 2-3 locations where subsurface flow is visible in deep holes in the stream bed – possibly where trees uprooted in the past. That flow continues below the surface. These holes in the stream bed areas are not vegetated, and do not have hydric soils (Figure 10).

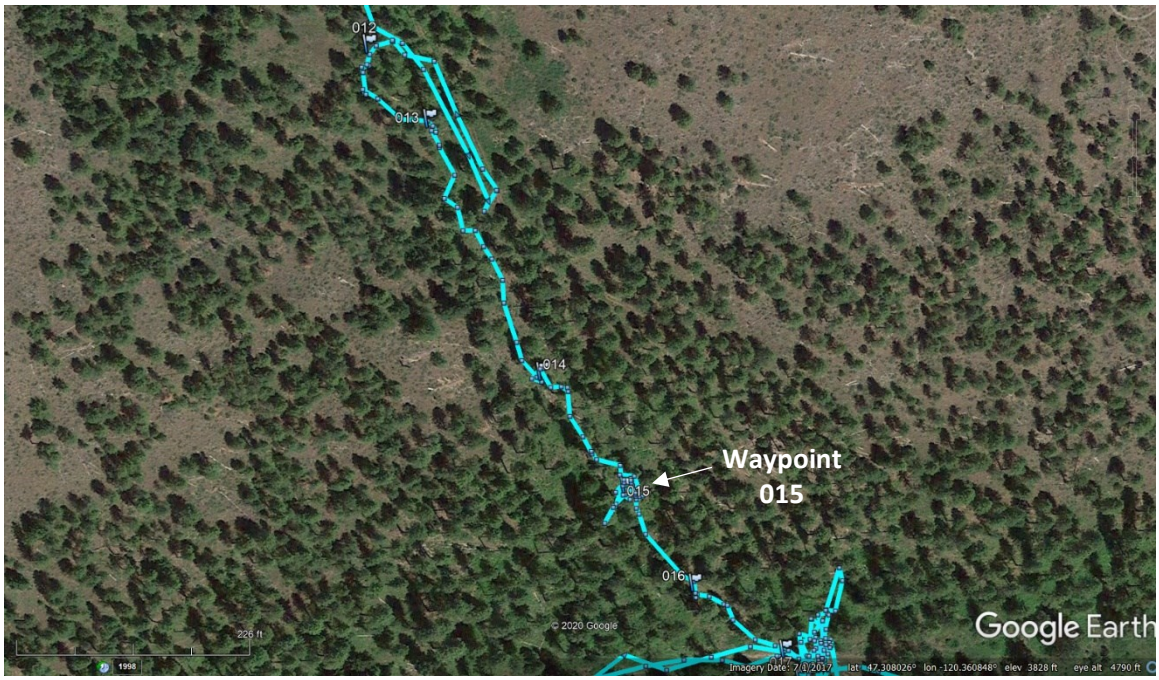

Figure 7. Showing GPS Track and waypoint locations.

Figure 9. 2020 photo: Showing dry flow path of Ns North on May 12, 2020.

Figure 8. 2020 photo: Downed tree creating hole in channel base.

Figure 10. 2020 photo: Showing deep hole in stream bed, base is about 2 ft below stream bed and about 5 ft below surrounding grade.

At one location (WP 015), an old logging road or ATV trail crosses the Ns North stream channel and dams stream flow, creating a small wetland area upslope of the crossing about 10 ft long and 2 to 3 ft wide. The soils are disturbed, mixed with wood chips and gravel, and saturated to the surface upstream of the crossing only. Soil characteristics meet Indicator F3 requirements (Figure 11).

This appears to be the area that Perteet identified as a potential wetland along the Ns North stream channel. The area upstream of the crossing was so small that the seasonal hydrology conditions were not apparent during the October 2019 site visit, when the channel and vegetation was dry, and the crossing area looked like the rest of the dry Ns stream bed.

It is proposed to restore and enhance this Ns North stream channel, with special attention paid to stabilizing severely eroding sections to reduce downstream erosion impacts. The compacted road crossing would be restored during that stream restoration process, and hydrology would no longer be trapped upslope of the crossing. However, if this small wetland is to be buffered under current conditions, it is likely to rate as a Cat III wetland, mostly due to surrounding habitat conditions, which would assign a 75 ft wetland buffer rather than 50-ft stream buffer in the crossing area.

Figure 11. 2020 photo: F3 indicator at WP 015 above, and full wetland extent shown below.

2.1.2 Potential wetland at Ns West

Ns West is a seasonal stream with severe erosion along most of the current flow pathway (Figure 13) due to the stream flow jumping from its natural channel into an adjacent logging road within a few hundred feet of the start. Its headwater area was noted by Perteet as being potential wetland (Figure 12). It is proposed to restore the stream to its original channel and install erosion control methods to eliminate this severe erosion and sediment problem, which impacts downstream wetlands and streams.

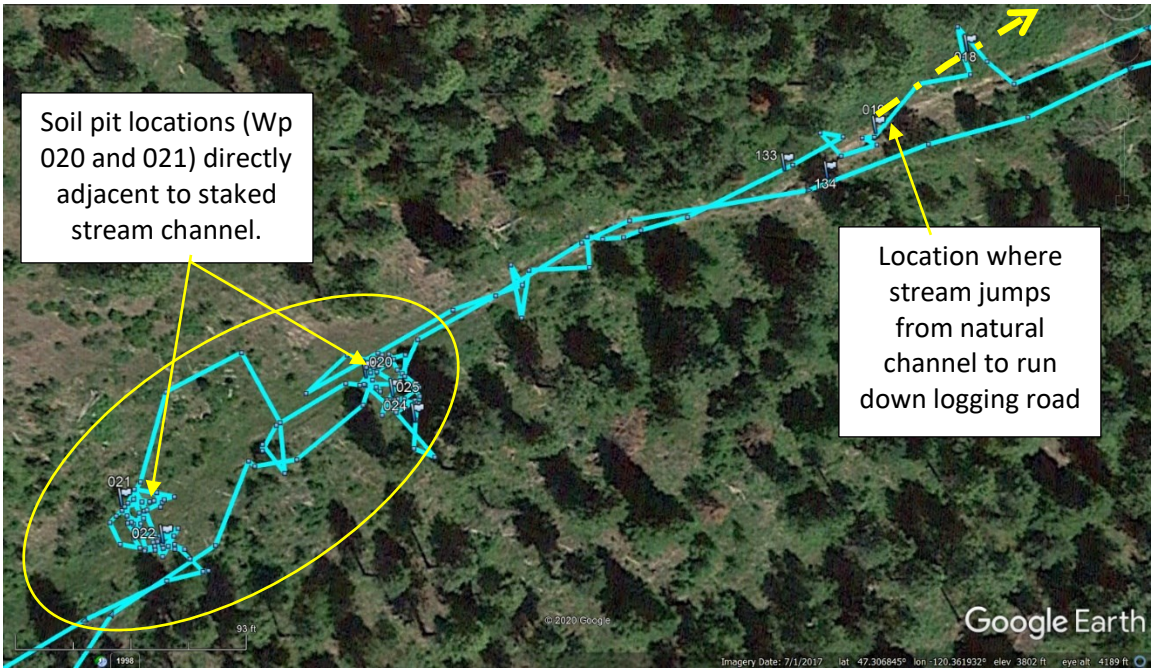

Figure 12. Western start of Ns West, as mapped by DNR.

Figure 13. 2020 photo: Ns West flow in road ruts

SCJ Alliance has dug and evaluated soil pits in this area on five different occasions – in May 2018; in July, October, and November 2019, and most recently on May 12, 2020. All of these times, results were the same. There were no hydrology or hydrology indicators within 12+ inches of the soil surface, and there were no hydric soil characteristics. It is early in the season for plant ID, but most vegetation is grasses and forbs – no sedges or other obvious hydrophytes.

We note that the Stemilt soil series, which is mapped across all of Wheeler Ridge, is a naturally dark colored soil, which can be confusing if one is not aware of the soil mapping. The NRCS describes the Stemilt soils as being "very deep and deep, well drained soils that formed in mixed ash and loess over material weathered mostly from basalt or andesite on mountains." They are classified as Argixerolls, which means they have at least 35% clay content within the upper 20 inches, and are Mollisols –

which by definition have an over thickened, very dark colored surface horizon.

The soil profiles at two different locations in the lowest elevation spots in this headwater stream area are described below. Neither soil profile had hydric characteristics. Furthermore, during the May 12 site visit, there was no surface flow or surface water in the Ns West stream channel or in the headwater area (Figures 14 and 15). There was standing water in road ruts at a couple of places, but soil pits dug directly adjacent to those areas (described below) showed that there was no groundwater within 19+ inches of the soil surface.

WP 020 (directly adjacent to rut with standing water)							
Layer depth	Layer matrix color	% cover	Redox features color	% cover	Type	Location	Texture
0-9 in	10YR 2/2	100%	None	NA	NA	NA	SiCL (heavy)
9-14 in	10YR5/4	100%	None	NA	NA	NA	SiCL (heavy)
Comment: No hydric soil characteristics. No hydrology within 14" of the soil surface.							

WP 021 (in "stream" center, at stake at upper end of mapped stream).							
Layer depth	Layer matrix color	% cover	Redox features color	% cover	Type	Location	Texture
0-9 in	10YR 2/2	100%	None	NA	NA	NA	SiCL (heavy)
9-19+ in	10YR3/2	100%	None	NA	NA	NA	SiCL (heavy)
Comment: No hydric soil characteristics. No hydrology within 15" of the soil surface.							

Figure 14. 2020 photo: Appearance of "potential wetland area" at start of Ns West.

Figure 15. 2020 Photo: Over-excavation of Soil pit at WP 020, shows no hydrology within 19+ inches on May 12, 2020.

2.1.3 Potential wetland on raised area east of "mud bog", between WL-A and WL B

This area was a small raised surface directly east of what has been called the "mud bog" in previous reports. The mud bog forms in a triangle that is flanked to the west by WL-B; to the east by WL-A and to the north by the confluence of Ns North and Ns West. Those two streams merge to form the start of the Np stream, which flows east from that location, receiving additional inflow from WL-A near the top right corner of the photo in Figure 16.

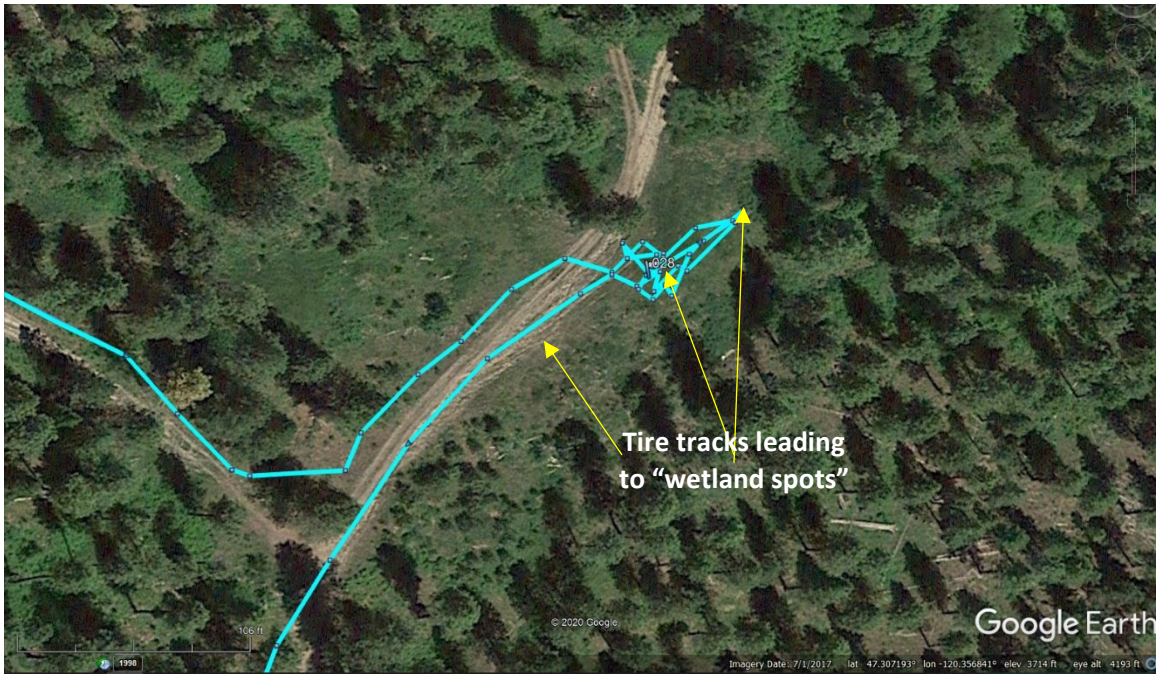

Figure 16. 2020 0513 site work, checking area on terrace east of mud bog for wetland conditions. Two small wetland depressions – one 9x9' and one 15x12' were noted. See Figure 15 for details.

The terrace surface east of the mud bog shows past evidence of ATV traffic – tire tracks leading up onto the surface and ruts within the surface. This condition is common throughout this area – a result of ATV users trying to find other ways around the mud bog when water is too deep. There are two spots on the surface where it appears ATVs were stuck in the past, each creating a small depression. One depression is 9x9 ft, and the other is 15x12 ft (WP 028). Both of these spots have wetland conditions -- current hydrology at or near the surface; hydric soils (Indicator F6) and hydrophytic vegetation (grasses plus one type of rush – too young to ID). None of the rest of the surrounding surface has hydrology within 12 inches of the surface or hydric soils.

These two areas, if regulated as wetlands, would be expected to rate no higher than Cat III, and as such, would have 75 ft buffers. These buffers are entirely embedded within overlapping buffers from WL-A (from the south and east), WL-B (from the west) and the Ns/Np stream confluence (from the north).

We note that this entire area is slated for restoration, and will be designed to eliminate the mud bog, and replace the currently severely disturbed confluence area with a PEM/PSS wetland / stream complex. Figures 17, 18 and 19 show conditions around the mud bog as the two small wetland depressions on the raised area east of the mud bog.

Figure 17. 2020 Photo: View of mud bog disturbance from the south. Raised area to right has the two small wetland depressions.

Figure 19. 2020 photo: 15 x 12 ft wetland depression

Figure 18. 2020 photo: 9 x 9 ft wetland depression

2.1.4 Potential additional wetland area upslope from Wetland C

Wetland C – mostly PEM vegetation -- is fed by a groundwater seep from the south that surfaces once the slope flattens. The change in slope is essentially the edge of the wetland, and there was current hydrology at the surface in WLC during this May 12, 2020 site visit (Figure 21), matching what was documented during the first May 2018 site visit.

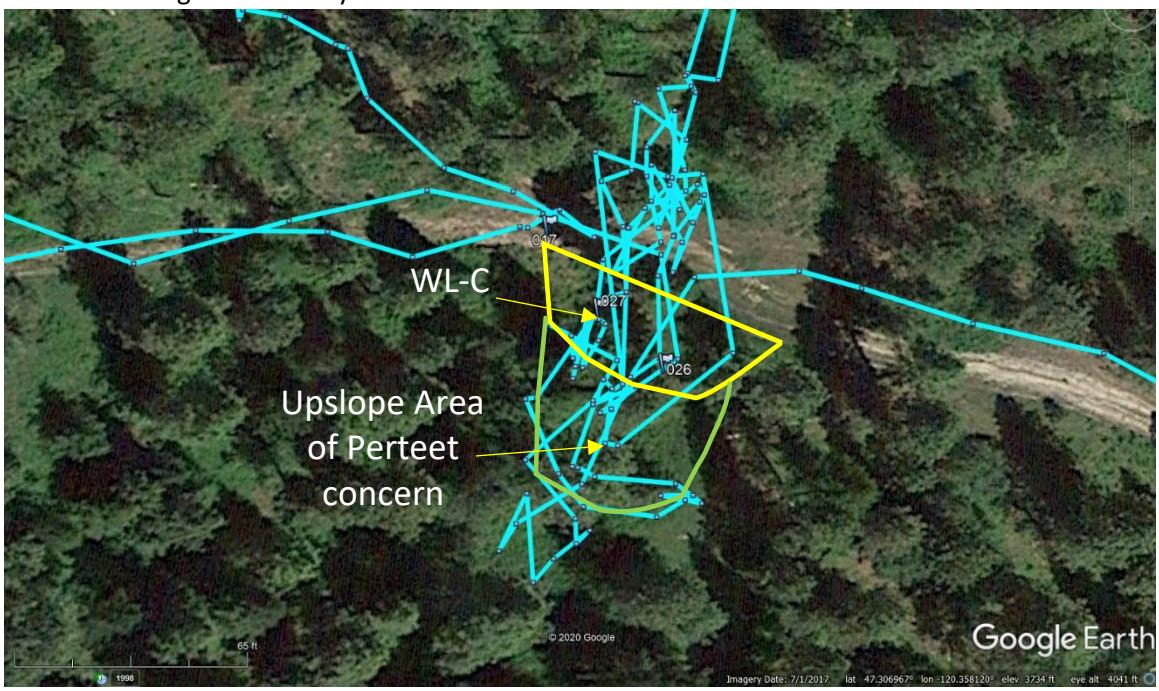

Figure 20. Showing area where Perteet thought there might be upslope wetlands.

The area just upslope from WL-C has different vegetation – transitions abruptly to a mixture of snowberry and wild rose (Figure 23). The soil profile in this shrubby area is similar to what we documented and observed at the start of Ns West – a very deep, dark colored, silty clay loam soil profile, but with no hydrology, no redox concentrations or any other Hydric soil indicators within 14 " of the soil surface (Figure 22).

Figure 21. 2020 Photo: Surface Hydrology in WL-C on May 12, 2020.

Figure 23. 2020 Photo: View of shrubby area upslope from

Figure 22. 2020 Photo: Soil pit in shrubby area, very dark colors, but no hydrology, and no redox concentrations or depletions within 14 in of surface.

Perteet thought that the shrubby area upslope from WL-C might be wetland, likely due to the presence of wild rose, and ranunculus in the forb class. However, the slope drives hydrology at that location, and only the flat areas at toeslope had current hydrology in May 2018 and 2020. The area upslope is not wetland.

Request #2: Review areas of "ephemeral creek" along Section 16 and Section 20 boundaries to determine the type of stream and associated buffer and the wetland categories and associated buffers to clarify which buffer extends farther based on typing / code, (i.e., assess Ns streams that are mapped directly adjacent in the SE corner of Section 17, and assess onsite riparian wetlands associated with Np stream).

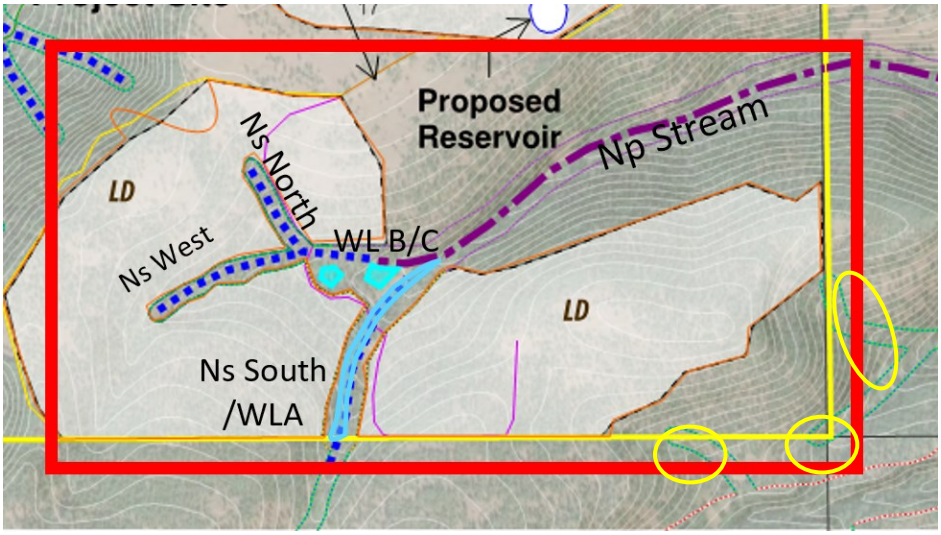

Figure 24. Extracted from Figure 2 – to show area in far SE corner with streams (green polygons.

2.1.5 Potential Ns stream impacts in the SE corner of Section 17.

Figure 24 (extracted from Figure 2 on Page 2 above) and Figure 25 show the SE corner of Section 17 where three sections of Ns streams are mapped. None of these streams would have buffer impacts to the proposed orchard area in any case. However, two of the mapped streams crossing the southern boundary and SE Section corner are in the same location as existing roads (Figure 25 and 27). There are no streams with current flow (on May 12, 2020) at these locations, aside from the stream possibly being the roadside ditch. There was no flow in the roadside ditch either.

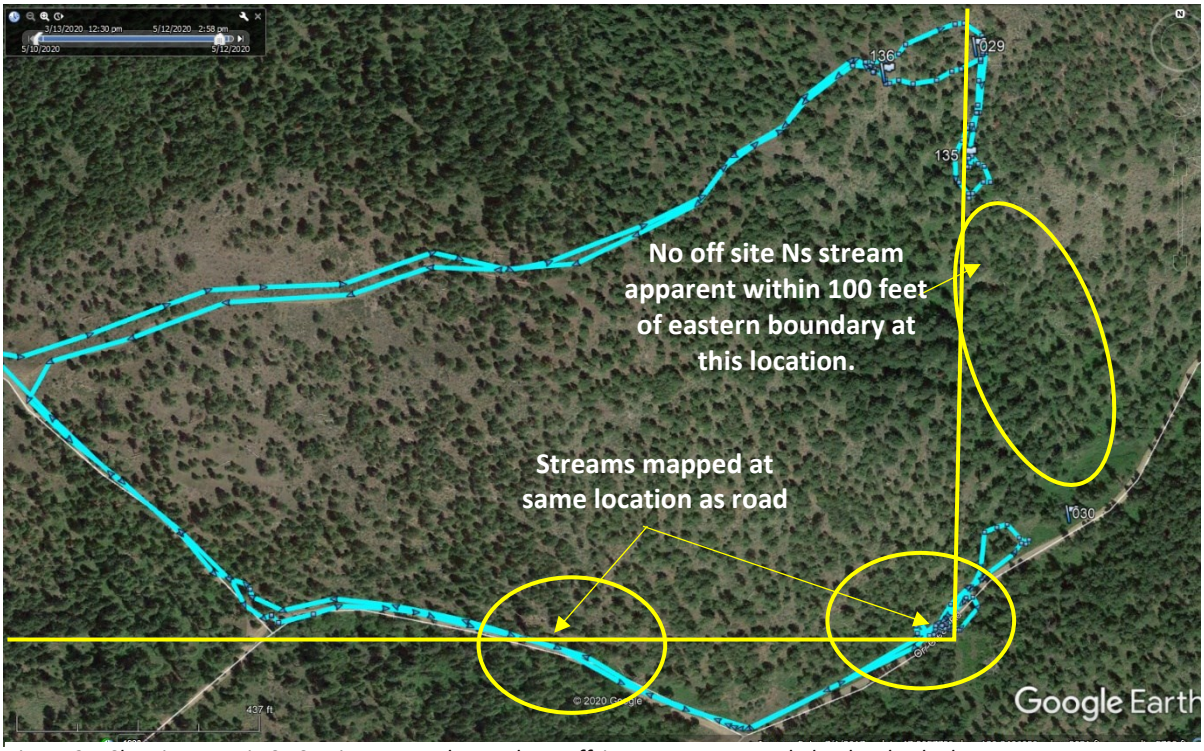

Figure 25. Showing area in SE Section 17 quadrant where offsite Ns streams needed to be checked.

Neither is there any Ns stream within 50 feet of the eastern boundary. That area slopes at a relatively steep angle to the SE, and there was no swale feature or evidence of a flow pathway along the eastern boundary (Figure 26).

Figure 26. 2020 photo: Sloped area in vicinity of mapped Ns stream. No stream corridor in the

Figure 27. 2020 photo: Road crossing SE corner of Section 17.

2.1.6 Mapping of riparian wetlands on the Np stream corridor.

Figure 28 shows locations of 7 riparian wetlands associated with the Np stream corridor. In most cases, these wetlands are no more than 10 feet wide and less than 30 feet long along one or the other side of the incised stream. Three of the wetlands are forested; two are scrub-shrub with forested perimeter, and two are emergent. There is only one wetland with more than 2-3 quaking aspen trees inside the wetland. In most areas, where aspen are present, they are in the upland buffer area adjacent to the stream, or in one location, they are on an upland island between two branches of the incised stream. In most locations, the forested wetland is dominated by red alder. All of these wetlands are more than 300 feet from the nearest orchard area. No impacts to these wetlands are proposed, aside from restoration of the PEM wetland and stream channel at the far western stream crossing visible near the lower left corner of Figure 28, and shown in Figure 29. There are no aspen at that location.

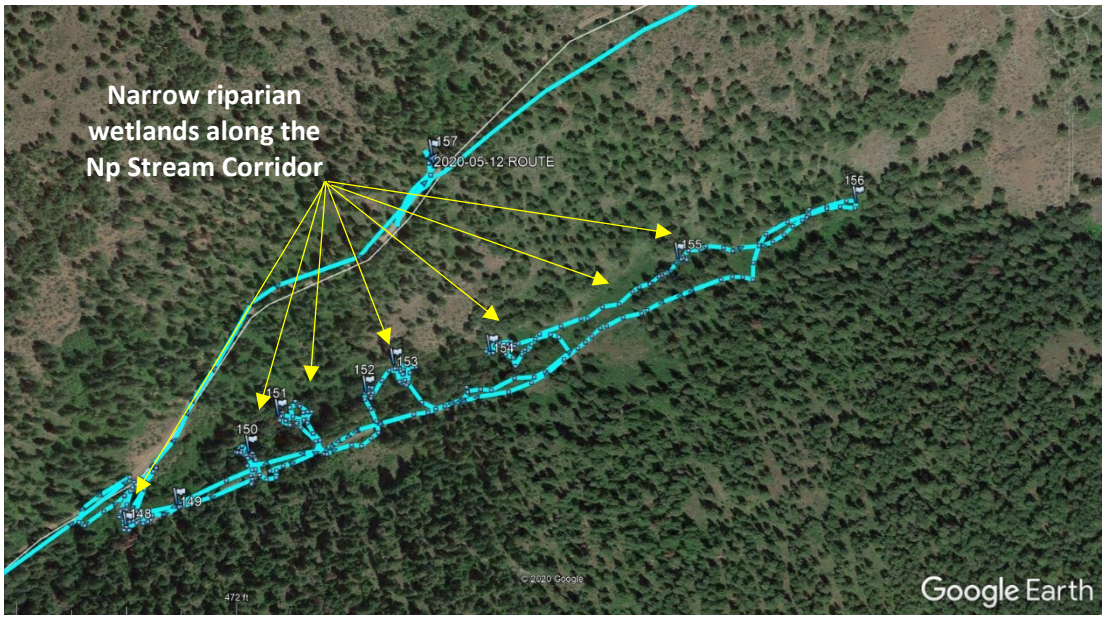

Figure 28. Showing location of narrow riparian wetlands along Np stream corridor.

Figure 29. 2020 photo: Showing proposed wetland enhancement area at crossing.

Request #3: Review area of "isolated wetland" per comment from Perteet and document and verify no wetland (i.e., area associated with old log deck east of WL-A).

2.1.7 Assessment of "potential isoloated wetland" area.

During the May 2018 field work, a mildly sloped area with minimal forest cover east of Wetland A was evaluated for wetland conditions. This area appeared to be disturbed, and cleared. It had small patches of hydrophytic vegetation, but the hydrophytic vegetation was not associated with consistent hydrology or clear hydric soil characteristics. We could not find a pattern to follow, and never had all three wetlands parameters at the same location. For that reason, we placed a stake in the area labeled "potential isolated wetland", intending to come back later and resolve the question. This is the stake observed by Perteet.

After looking at historic photos of the area when back in the office, it was apparent that the disturbed area was at the end of a logging road, and had been used to store logs during tree harvest. As a result, the soils in this area are somewhat compacted and mixed, but during the recent May 12, 2020 work, we documented only non-hydric soil conditions, and found only one area with hydrology within 12 inches of the surface. Because that spot had severely disturbed soils, we dug a new pit 5 ft away, and there was no hydrology at all within the upper 16 inches. For these reasons, we did not delineate a wetland at that location in 2018, and we did not delineate any wetland during this recent May 2020 site visit.

Figure 30 shows the unforested area, and a logging road extending to the SSW into the trees (see GPS paths). Soils pits were dig at several locations in the open area and formally documented at three locations, walking along a transect along the centerline of the area from upslope to downslope. The soil characteristics were very similar to what we observed and documented previously at WL-C and at the end of Ns West – the same dark-colored, deep, silty clay loam soil with no hydrology in the upper 14+ inches and no redox features. Soil color became increasingly brown with depth, rather than gray (Figure 31).

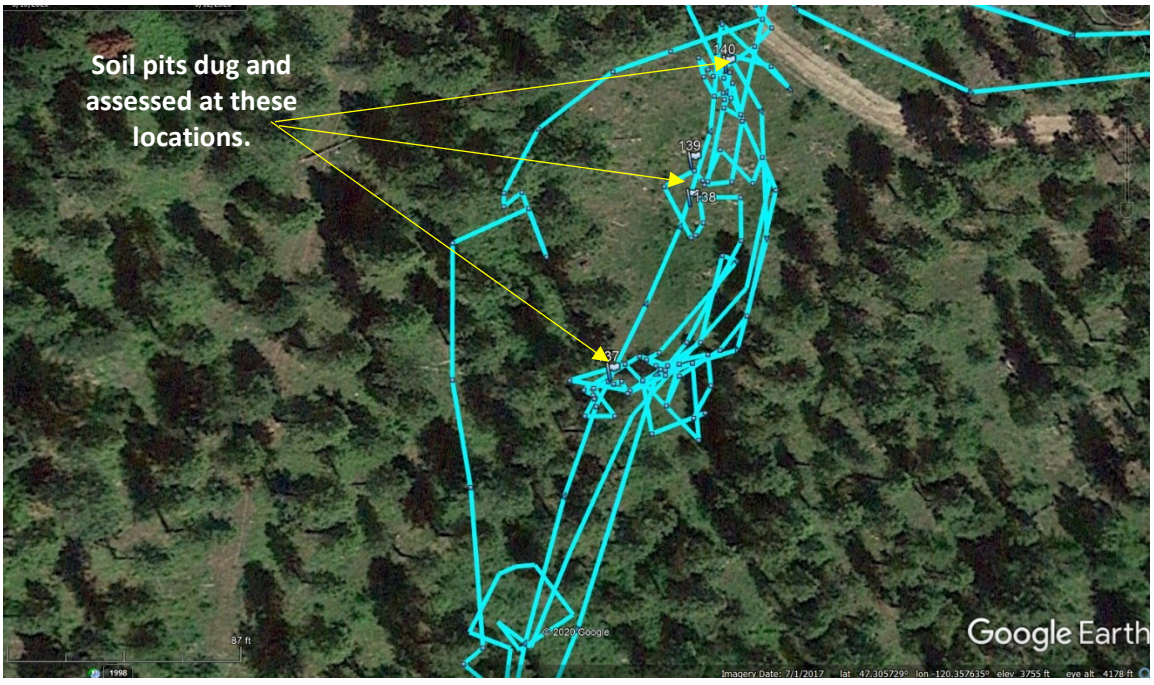

Figure 30. Close up of logging deck area, and locations of soil pits

WP 140 Farthest downslope in old log deck area, which should be wettest							
Layer depth	Layer matrix color	% cover	Redox features color	% cover	Type	Location	Texture
0-6 in	10YR 2/2	100%	None	NA	NA	NA	SiCL (heavy)
6-14+ in	10YR3/3	100%	None	NA	NA	NA	SiCL (heavy)
Comment: No hydric soil characteristics. No hydrology within 13" of the soil surface.							

Figure 31. 2020 photo: Soil Profile at SP 140 – no redox concentration or depletions; no hydrology within 14 inches of the soil surface.

Request #4: Address April 23, 2019 SCJ memo between Lisa and Charity where, on page 4, it references a data forms error, (i.e., we need to confirm that the corrected data forms were submitted in the November 2019 report).

2.1.8 Response to clarify Data Forms confusion

This data plot was where we first collected field data, the start of delineating the first wetland on the site -- WL-A at the southern property line. At that location, the wetland was still PSS/ PEM, but it was surrounded by forest, and there was at least one tree rooted in the wetland. However, most of the trees were not rooted in the wetland, but they did form a canopy, because the wetland is very, very narrow. The entire wetland associated with the stream is perhaps around 5 feet wide at that location. The narrow wetland conditions extends and one or the other side of the Ns South stream system as it flows to the north. The mistake I made when filling out these first forms was in that I was documenting what I saw overhead, even as I knew in my mind that the associated trees were mostly rooted upslope – outside of the wetlands.

Wetland A as a whole is very narrow -- an Ns stream with surface flow width of no more than 1-2 feet, and associated riparian wetland that is at most 3-4 feet wide outside of the OHWM. Most of this wetland is a PSS/PEM system with relatively open forest buffers on both sides. But there is a small section at the far south end where the wetland splits just as it is entering Section 17. In this area, there is a secondary channel along one side with a 3-4 ft higher upland island area between the two channels that supports some forested vegetation – Ponderosa pine, Douglas fir and some aspen. These forest trees are not rooted in the wetland, but they do form an almost closed canopy overhead. During this May 12, 2020 site visit, and also in May 2018, we dug soils in these directly adjacent upland areas to document that there is no hydrology and no hydric soil condition. The surface slopes up from the stream rapidly, making area within 3-4 feet horizontally more than a foot higher in elevation relative to the adjacent water surface.

WP 143 One of three similar soil pits dug in the upland area with forested vegetation adjacent to flow pathway.							
Layer depth	Layer matrix color	% cover	Redox features color	% cover	Type	Location	Texture
0-10 in	10YR 2/2	100%	None	NA	NA	NA	SiCL (heavy)
10-13 in	10YR3/2	100%	None	NA	NA	NA	SiCL (heavy)
13-16+ in	10YR 3/3	100%	None	NA	NA	NA	SiCL (heavy)
Comment: No hydric soil characteristics. No hydrology within 16 in. of the soil surface.							

Figure 32 shows a flag on a tree at the southern property line. The wetland stakes are visible in a line from the person in the distance to the foreground. Clearly, the area between the two people is dominated by short shrubs, but also clearly, the surrounding upland is forested and includes some aspen, along with other trees. Figure 33 shows a similar condition.

I did explain this issue previously, but because this Field Data Form has created confusion, I have replaced it with data collected near WP 020 (May 2018 waypoint). I provide this substitute and more representative paired plot as an attachment in the Appendices below.

Figure 32. 2018 photo. Flag hung on tree is at wetland edge, and other trees are all upslope, outside of the wetland. Wetland is dominated by short shrubs and herbaceous plants. Stream system marked by green-flag stakes is barely visible under shrubs.

Figure 33. 2018 photo: Marking wetland edge and location of paired sample plots.

Figures 34 to 36 below show terrain in the area around the wetland, and how it affects hydrology.

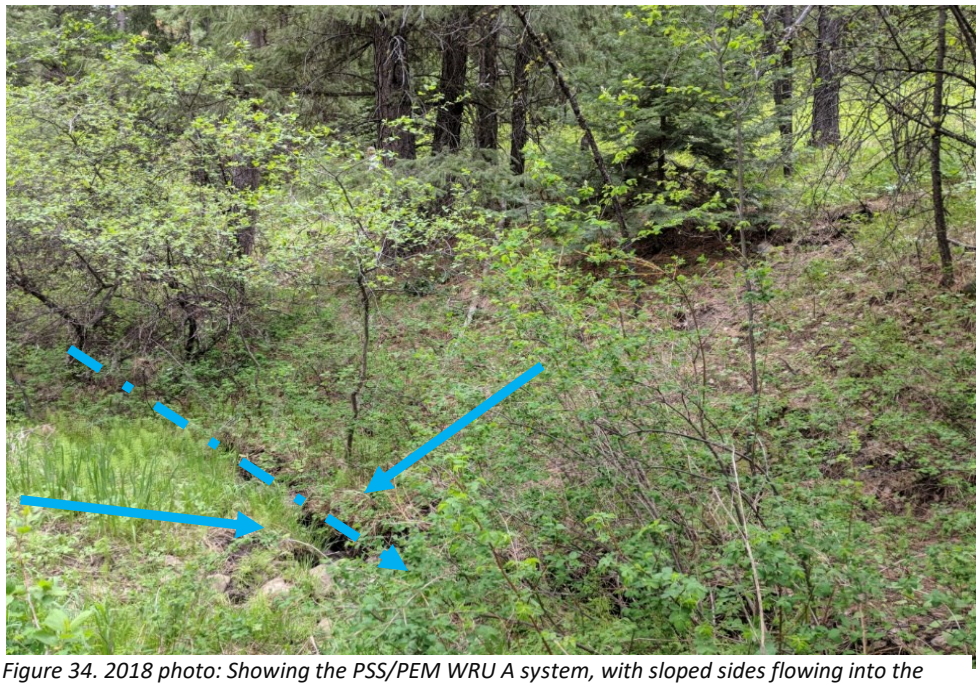

Figure 34. 2018 photo: Showing the PSS/PEM WRU A system, with sloped sides flowing into the stream channel, and no floodplain.

Figure 35. 2018 photo: Another example of the incised WRU A stream with narrow strip of sloped PSS/PEM wetland on either side.

Figure 36. 2018 photo: Showing a typical view of WRU A PSS/PEM stream/wetland system. Herbaceous and small shrubs; sloped sides concentrating into incised flow pathway. Minimal over-bank flow floodzones.

Request #5: Better document and confirm that there are no Aspen Grove wetlands.

2.1.9 Answering question about presence/absence of aspen wetlands

There are no aspen grove wetlands associated with Wetlands A, B or C. Please see discussion in Section 2.1.8 above about conditions in Wetland A. Please also refer to discussion in Section 2.1.6 about riparian wetland along the Np stream corridor. As discussed above, there are some forested wetlands along the Np stream farther east, and some have a few aspen inside the wetlands. However, in most cases, the aspen present in Section 17 are in uplands, sometimes adjacent to wetlands, but often the aspen groves are far from wetland areas.

As requested and described above, we have marked the location of various wetlands along the Np system to the east, but as none of these wetlands or streams are within 300 feet of the orchard areas, and because there are no impacts proposed to any wetlands long the Np stream, aside from restoration at the existing road crossing, we have not delineated or rated those wetlands. We did not observe any previously unobserved wetlands or streams within 300 feet of the orchard areas. Because such areas are more than 300 feet from the proposed orchards and are within an area that will be a dedicated conservation easement with no possibility of future impacts from human development, there is no regulatory need for further description or definition of those wetlands.

3.0 SUMMARY

We hope the information above adequately explains the work carried out on the Wheeler Ridge LLC site. Please let us know if you have any more questions.

Appendix I
Substitute Field Data Forms for Wetland A

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland A City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-A-020

Investigator(s): Lisa Palazzi, CPSS, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

Landform (hillslope, terrace, etc.): Depression, Stream sideslope Local relief (concave, convex, none): Convex Slope (%): 2-5%

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes XX No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes XX No _____	**Is the Sampled Area within a Wetland?** Yes XX No _____
Hydric Soil Present?	Yes XX No _____	
Wetland Hydrology Present?	Yes XX No _____	

Remarks:
Spring growing season -- hydrology still present but waning

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	30%	Y	FAC
2. Serviceberry (Amelanchier alnifolia)	10%	N	FACU
3. Twinberry (Lonicera involucrata)	15%	Y	FAC
4. Red osier dogwood (Cornus sericea)	15%	Y	FACW
5.			
	70 = Total Cover		
Herb Stratum (Plot size: 30 ft)			
1. water parsley (Oenanthe_sarmentosa)	20%	Y	OBL
2. horsetail (Equisetum hyemale)	20%	Y	FACW
3. wild iris (blue) (Iris missouriensis)	25%	Y	FACW
4. sedge spp (Carex spp)	10%	N	FAC (avg)
5. colts foot (Petasites frigidus)	25%	Y	FACW
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	85	x 2 =	170
FAC species	55	x 3 =	165
FACU species	10	x 4 =	40
UPL species		x 5 =	
Column Totals:	170 (A)		395 (B)

Prevalence Index = B/A = 2.32

Hydrophytic Vegetation Indicators:

- ✔ Dominance Test is >50%
- ✔ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes XX No _____

Remarks:
Plants are actively growing; appears to be at least 1-2 months into the growing season

SOIL

Sampling Point: WL WP 020

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR2/2	100	NA				GrSL	
6-18	10YR4/2	75	10YR 4/6	15	C	M	GrSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** XX **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☑ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes XX No _____ Depth (inches): 1"

Water Table Present? Yes XX No _____ Depth (inches): 5"

Saturation Present? (includes capillary fringe) Yes XX No _____ Depth (inches): 5"

Wetland Hydrology Present? **Yes** XX **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water right by stream; farther away, subsurface only

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wheeler Ridge Wetland A City/County: Chelan County near Wenatchee, WA Sampling Date: 05/16/2018

Applicant/Owner: Wheeler Ridge LLC State: WA Sampling Point: WL-A-020

Investigator(s): Lisa Palazzi, CPSS, PWS Section, Township, Range: Section 17, Township 21N, Range 20E

Landform (hillslope, terrace, etc.): Depression, Stream swale s Local relief (concave, convex, none): Convex Slope (%): 2-5%

Subregion (LRR): LRR B Lat: 47deg 18' 35.77" N Long: 120deg 21' 57.95" W Datum: _____

Soil Map Unit Name: Stemilt Silt Loam, 0-25% slopes NWI classification: PSS (downslope from this point)

Are climatic / hydrologic conditions on the site typical for this time of year? Yes XX No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes XX No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No XX	**Is the Sampled Area within a Wetland?** Yes _____ No XX
Hydric Soil Present?	Yes _____	No XX	
Wetland Hydrology Present?	Yes _____	No XX	

Remarks:
Spring growing season -- hydrology still present but waning

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red Alder (Alnus rubra)	15%	Y	FAC
2. Douglas-fir (Pseudotsuga menziesii)	15%	Y	FACU
3. Ponderosa pine (Pinus ponderosa)	20%	Y	FACU
4.			
	50	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Cluster rose (Rosa pisocarpa)	30%	Y	FAC
2. Oceanspray (Holodiscus discolor)	25%	Y	FACU
3. Snowberry (Symphoricarpos albus)	30%	Y	FACU
4. Oregon grape (Mahonia nervosa)	15%	N	FACU
5. Bitterbrush (Purshia tridentata)	10%	N	NI
	110	= Total Cover	
Herb Stratum (Plot size: 30 ft)			
1. Yarrow (Achillea millefolium)	20%	Y	FACU
2. Columbine (Aquilegia formosa)	20%	Y	FAC
3. Arrowleaf balsamroot (Balsamorhiza sagittata)	25%	Y	NI
4. Violet (Viola howellii)	25%	Y	NI
5. Bleeding heart (Dicentra formosa)	15%	N	FACU
6.			
7.			
8.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	140	x 4 =	560
UPL species		x 5 =	
Column Totals:	205 (A)		755 (B)

Prevalence Index = B/A = 3.68

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No XX

Remarks:

SOIL

Sampling Point: UL -- WP 020

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR2/1	100	NA				GrSL	
8-16	10YR4/3	100	NA				GrSL	no redox features

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** XX

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No XX Depth (inches): _____

Water Table Present? Yes _____ No XX Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No XX Depth (inches): _____

Wetland Hydrology Present? Yes _____ **No** XX

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Shallow water by stream only; this site is farther upslope