

WHYCHUS CREEK MONITORING

GEOMORPHIC UNIT AND WOODY DEBRIS JAMS - 2020 FIELD MONITORING SUPPLEMENTATION

The following short memo describes field survey methods, metadata, and data products for supplementary channel geomorphic unit and woody debris monitoring surveys collected within two riverscape restoration treatment reaches on Whychus Creek during the summer of 2020. The field surveys were conducted within areas where thick vegetative canopy cover was anticipated to prevent the reliable delineation and quantification (i.e., abundance, dimensions, types) of geomorphic units and/or wood debris accumulations from aerial imagery captured during summer 2020.

AUGUST 31ST, 2020

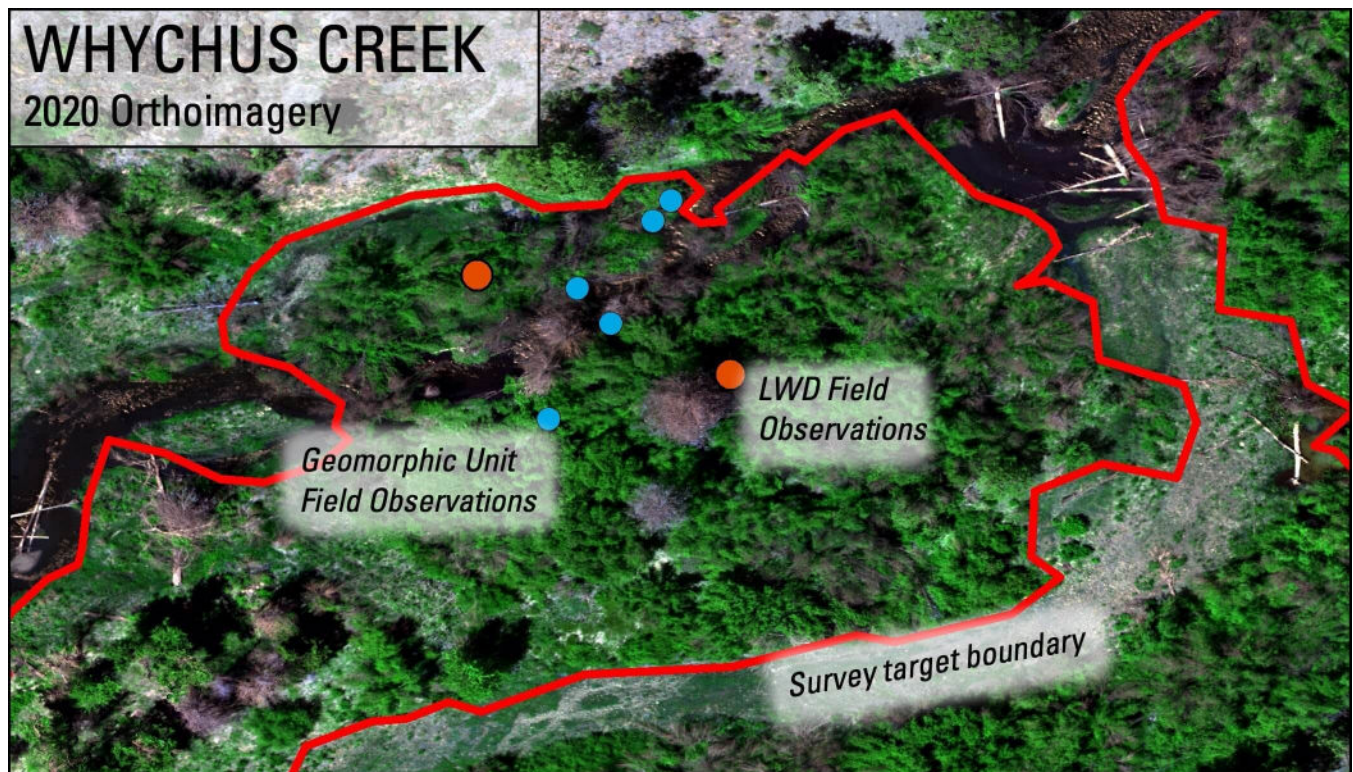


Figure 1. Orthoimagery acquired during summer 2020 and target survey extents based on canopy cover obscuring geomorphic units and woody debris accumulations within the valley bottom. Points show examples of wood debris (red dots) and geomorphic unit (blue dots) observations collected and spatially referenced during field surveys.

SURVEY TIMING

Field surveys were conducted shortly following summer 2020 aerial imagery acquisitions, both of which targeted baseflow discharge within Whychus Creek. The field survey was implemented on Friday, August 21st and Monday, August 24th, 2020.

SURVEY LOCATION

Field surveys were implemented within two restoration treatment reaches on Whychus Creek, both of which are within property owned by the Deschutes Land Trust. The treatment reaches included Camp Polk Reaches 1 and 2 (“Camp Polk”) within Camp Polk Preserve, and Phase 1 of restoration at Whychus Canyon Preserve, within Whychus Canyon Reach 4 (“Canyon Reach 4”; “Canyon 1” in “Whychus Creek Geomorphic Unit Assessment”, Anabran Solutions, 2021).

Within each reach the surveys targeted areas of the valley bottom where vegetative canopy cover would prevent the reliable delineation of the active channel, active channel geomorphic units, and woody debris accumulations (see [Figure 1](#)). The target survey extents were delineated prior to field survey implementation by Upper Deschutes Watershed Council personnel, and were defined by discrete areas within each reach (Figure 1, [Survey Polygon Extents](#)).

Implementation of the field survey consisted of searching the areas within each of the target polygons and recording the location and characteristics of all qualifying woody debris accumulations and active channel or surface water geomorphic units.

SURVEY DATA COLLECTION

The field survey data was conducted on a 9.7” iPad 7th generation with cellular running iPad OS 13. Data was collected using a custom database solution developed in Filemaker Pro 18 and running on Filemaker Go 18 for iPad. The data collection solution was set to ensure that all location information has an accuracy under 20 meters.

WOODY DEBRIS SURVEYS

Observations of woody debris accumulations were recorded if any portion of a qualifying piece was within the *active channel* (i.e., no wood was recorded if it was entirely on active floodplain, terrace, or upland surfaces). Qualifying pieces of wood were considered to have a minimum length of 1 m and diameter of at least 0.1 m. Standing woody debris that extended over a portion of the active channel was also not recorded ([Figure 2](#)).

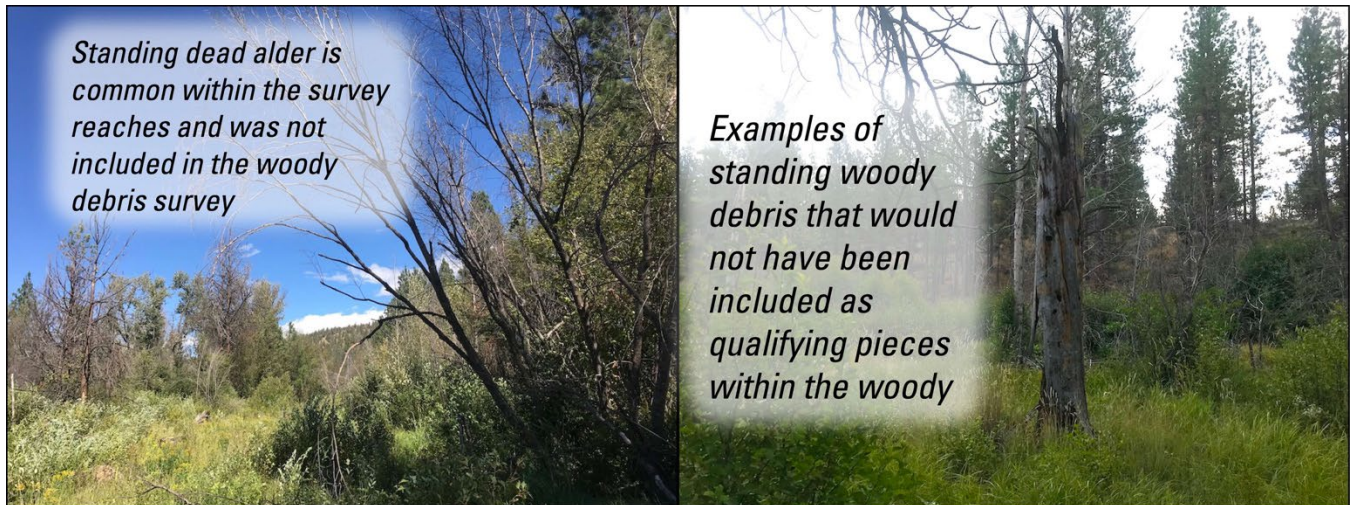


Figure 2. Example of standing woody debris that was not included in the woody debris accumulation survey.

The following attributes were recorded for each woody debris accumulation:

REACH – Survey reach being Camp Polk or Canyon Reach 4.

OBSID – A number used to identify an individual woody debris accumulation observation.

LATITUDE AND LONGITUDE – Location of the woody debris accumulation in decimal degrees (WGS 84, EPSG 4326).

WOOD COUNT – Number of qualifying pieces within the woody debris accumulation. Recorded as 1 for individual qualifying pieces of wood (e.g., large down ponderosa pines or large alders).

JAM LENGTH AND WIDTH (M) – Lateral dimensions of the woody debris jam, or length of single piece of large woody debris in meters (e.g., 5.6). Jam length was recorded from the very end to the opposite very end of a jam, including the length of skinny branches, to reduce subjectivity in estimating the “effective length” of a jam (i.e. mass large and solid enough to have a geomorphic influence and catch new debris and sediment). Jam width was recorded as the total jam width at the longitudinal mid-point of the jam or the stem diameter at the longitudinal mid-point for single pieces of large wood.

JAM HEIGHT (M) – Total elevation height of the jam accumulation, or diameter at the longitudinal mid-point for single pieces of large woody debris (e.g., 2.3). Note – the height and width should be equivalent for single pieces of woody debris.

PALS - POST ASSISTED LOG STRUCTURE STRUCTURE DIMENSIONS

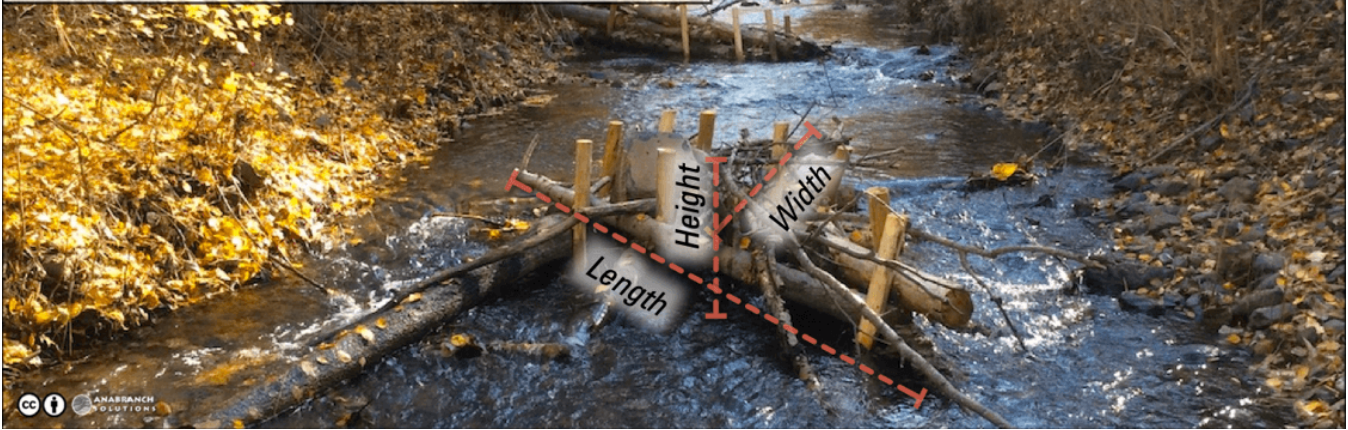


Figure 3. Example of woody debris jam length, width, and height dimensions.

GEOMORPHIC UNIT SURVEYS

Observations of geomorphic habitat units within the active channel. All geomorphic units were delineated (i.e., surveyed) if they were within a target polygon and had a channel length greater than half of the average active channel width of the channel in which the geomorphic unit was located. Geomorphic unit observations included the following attributes:

REACH – Survey reach being Camp Polk or Canyon Reach 4.

OBSID – A number used to identify an individual geomorphic unit observation.

LATITUDE AND LONGITUDE – Location of the center of the geomorphic unit in decimal degrees (WGS 84, EPSG 4326).

UNIT TYPE – Geomorphic unit types were primarily delineated based on the lateral and longitudinal profile of the active channel bed:

- **POOL** – Laterally and longitudinally concave
- **TROUGH** – Laterally concave.
- **PLANAR** – Laterally and longitudinally planar.
- **RIFFLE** – Longitudinally convex and longitudinally concave.
- **BAR** – Laterally and longitudinally convex.
- **NON-PRIMARY** – generally used within small non-primary channels and isolated wetlands with little geomorphic form and/or activity.

PRIMARY CHANNEL – Describes whether the unit is within the primary or a non-primary channel ([Figure 4](#)).

- **PRIMARY CHANNEL** – The unit is within the active channel that carries the majority of surface flow.
- **NON-PRIMARY CHANNEL** – The unit is not within the active channel carrying the majority of flow (i.e., secondary or tertiary channels).

PRIMARY UNIT – Descriptive of geomorphic unit position and relationship to other geomorphic units within the active channel ([Figure 4](#)).

- **PRIMARY UNIT** – Geomorphic units that follow the channel thalweg and/or encompass the majority of the active channel at any given point. Primary units should be continuous throughout the geomorphic survey, and the sum of primary unit lengths is used to calculate the total length of primary and non-primary channels within the survey reach.
- **NON-PRIMARY UNIT** – Non-primary units will never span the entire active channel, generally will not encompass the channel thalweg, and are always adjacent to at least one primary unit.

UNIT LENGTH AND WIDTH – Average dimensions for the unit wetted extent. Length and width should be measured parallel and perpendicular to the direction of flow, respectively. Used to calculate a total area for the geomorphic unit.

UNIT DEPTH – An average depth for the geomorphic unit. Maximum depth was measured for concave unit types (i.e., pools). For all other units an average unit depth was recorded.

PERCENT WETTED – Percent of the unit area currently inundated by surface flow. Ultimately used to calculate a total wetted area for the reach. Because this survey focused on wetted area, percent wetted was recorded as 100%.

ISOLATED WETLAND – Used to denote that the unit was an isolated wetland and not functioning as salmonid habitat during low flows.

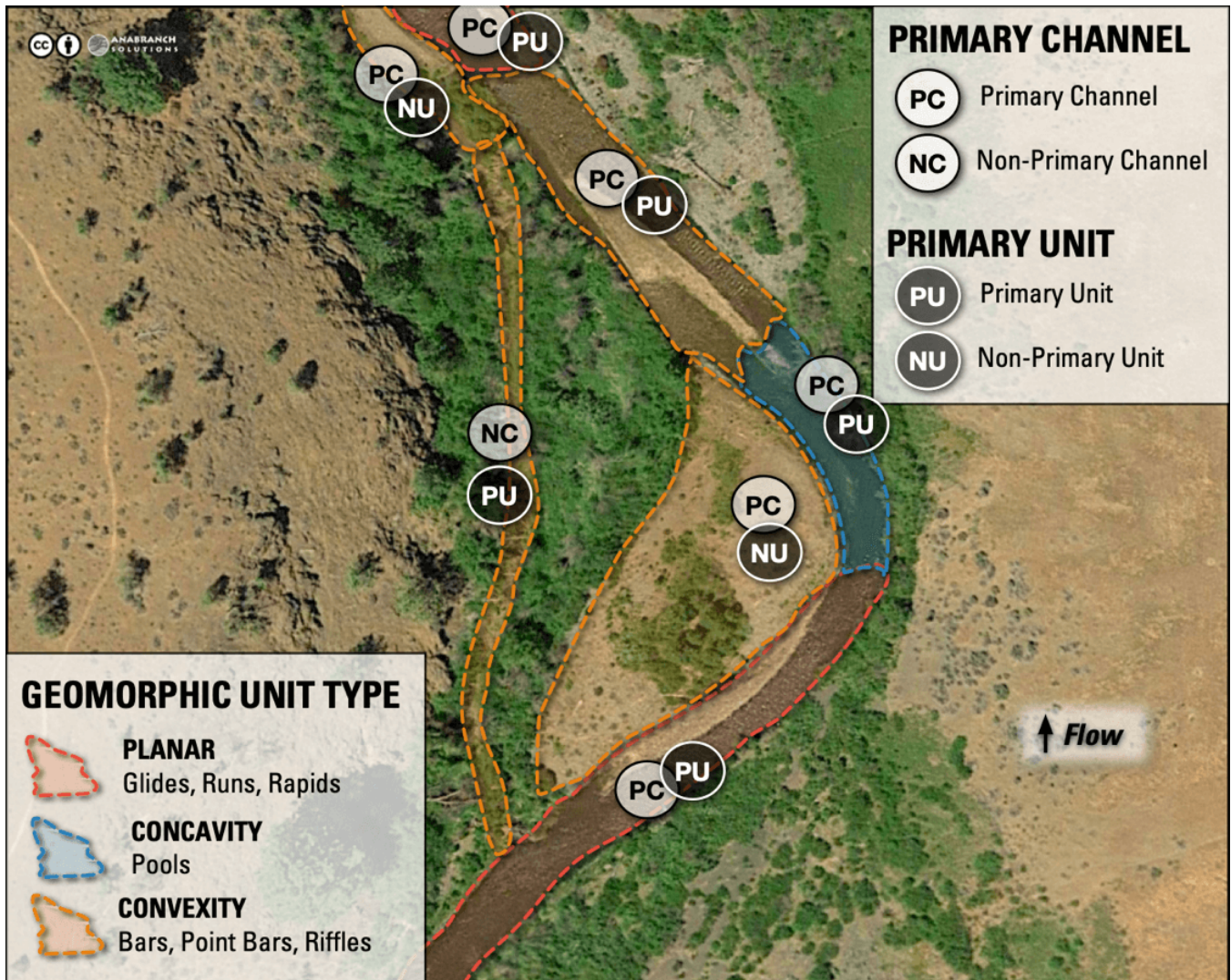


Figure 4. Visualization of primary and non-primary channel and unit qualifiers used within the channel geomorphic unit survey.

SURVEY DATA

Survey data can be downloaded in common table (.xlsx) and GIS (.shp) formats. GIS data is projected in WGS 84 – EPSG 4326. Images for many observations can also be downloaded that may assist with interpretation of the data.

- [Table Data Download](#) – In Excel format.
- [GIS Data Download](#) – in ESRI shapefile format.
- [Observation Images](#) – Images are named consistent with the ObsID for geomorphic unit and wood accumulation records.
- [Survey Database](#) – The survey database solution can be used in the field on an iPad running Filemaker Go.