

Methow River Reach Assessment

Appendix A | Habitat Assessment

Methow River (RM 40.6 – RM 62.3)

May 2026

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1 Introduction & Background

The Methow River is located on the eastern side of the North Cascade Mountains in northern Washington, flowing south-southeast approximately 92 river miles from its headwaters to the confluence with the Columbia River near the town of Pateros, WA.

The Yakama Nation identified 21.7 miles of the Methow River for assessment and potential restoration efforts for native salmon and trout populations. The Methow River Habitat Assessment is intended to summarize existing aquatic habitat and watershed conditions within the Methow River assessment area, generally located between River Mile (RM) 40.6 and RM 62.3. The upstream extent of the assessment area was the confluence of Cassal Creek (RM 62.3), slightly upstream of the State Route 20 (SR-20) bridge over the Methow River (Weeman Bridge). The downstream extent of the assessment area was downstream of the town of Twisp, WA, at RM 40.6. The assessment area was divided into 16 distinct geomorphic reaches. RMs and reach breaks were based on the Upper Columbia Salmon Recovery Board reach boundary data (Upper Columbia Spatial Framework, 2021).

Field habitat surveys followed the U.S. Forest Service Stream Inventory Handbook: Level I & II, Pacific Northwest Region protocol (USFS, 2020). Inter-Fluve staff conducted the habitat survey between September 28th and October 30th, 2024. Due to the size of the Methow River in the assessment area, the habitat survey was conducted via watercraft from upstream to downstream. A Methow River discharge measurement was collected on October 30th, 2024, at approximately RM 51.05. The field measured discharge was recorded as 225.7 cubic feet per second (cfs). The USGS stream gage on the Methow River near Winthrop, WA (#12448500), located at approximately RM 51.6, recorded a discharge value of 224 cfs on October 30th. No significant precipitation was received over the survey period.

The habitat assessment was completed on behalf of the Yakama Nation as part of their efforts to assess and improve Threatened and Endangered salmon and trout habitat within the Columbia River Basin. The objective of the habitat assessment to characterize the habitat quantity and quality for salmonid species native to the Methow River by quantifying in-channel morphologic features, characterizing riparian conditions, and identifying anthropogenic features influencing aquatic habitat. This information is used to inform potential restoration and conservation actions and will provide a baseline for evaluating future habitat trends and measuring the effectiveness of restoration efforts to improve the quantity and quality of available habitat within the assessment area.

2 Methods

The Methow River assessment area was subdivided into 16 distinct reaches. Reach break locations were based on Upper Columbia Salmon Recovery Board data (Upper Columbia Spatial Framework, 2021), which are primarily driven by geomorphic changes in the channel and floodplain. Reach breaks and reaches used in this habitat assessment are consistent with those in the geomorphic reach assessment and restoration strategy (as documented in Section 6 of the main report and Appendix C, respectively).

The habitat assessment employed the methods outlined in the U.S. Forest Service Stream Inventory Handbook: Level I & II, Pacific Northwest Region, Version 2.20 (USFS, 2020). The “Eastside Forest

Option” protocol was used, which includes data categorizations for large wood and riparian vegetation specific to ecosystems east of the Cascade Mountain crest. All protocols were followed when safe and most of the suggested forest inventory options were applied in the survey. Adaptations to the protocol were made, including:

- Habitat survey crew could not wade safely in a majority of the assessment area, and watercraft were used for access. Habitat survey data was therefore collected from upstream to downstream; channel units and side channel units were collected in ascending order from upstream to downstream. Reaches are in ascending order from downstream to upstream.
- Field data was collected digitally, using an iPad and ESRA Field Maps software.
- All habitat unit lengths were measured in GIS from GPS survey data recorded. Habitat units were delineated by survey points collected with a Juniper Systems Geode unit (sub-foot accuracy).
- Flood-prone width was calculated using LiDAR and 2D hydraulic modeling results.
- Dominant riparian overstory and dominant riparian understory species within the 100-foot wide riparian zone was documented in addition to dominant overstory and understory class size.
- Gravel counts were documented using ocular estimate of dominant and subdominant gravel size.
- Wetted side channels included hyporheic-sourced channels and floodplain tributaries, a groundwater fed contributing channel that initiates on the valley floor or floodplain.

At all channel units, surveyors performed ocular estimates of unit metrics. At a subset of units, hereafter referred to as n^{th} units, surveyors collected both ocular estimates and recorded measurements of key metrics. The n^{th} channel unit measurement frequency consisted of the first three fast water channel units (riffle or glide) per reach when safe, and then at every 5th unit in each fast- and slow-water category after the first three. If fewer than three fast-water units were encountered in a reach, bankfull measurements were collected at slow water units instead. The length of anthropogenically-induced unstable banks was recorded for both the left and right channel banks in all units. Water depths for all habitat units were measured using a graduated stadia rod carried by the observer, or estimated when water depths or velocities exceeded the wading ability of the observer.

For riparian vegetation measurements, the riparian corridor can be defined as either a single 100-foot wide zone or two adjacent riparian zones (inner and outer zones) totaling 100 feet in width (USFS, 2020). For this assessment, one single 100-foot wide riparian zone was designated for the Methow River assessment area. Survey methods dictate defining a dominant size class of vegetation type within the riparian corridor (e.g. small tree, shrubs), then defining the dominant species observed in the overstory and understory.

For this habitat survey, side channels were defined as wetted flow paths connected to the mainstem channel at their upstream or downstream ends (or both) at low flow. Side channel units were identified when the main channel split to form a stable island with soil or fine sediment accumulations and with established vegetation older than 2 to 3 years. Each side channel was determined to be primarily a fast-water or slow-water unit type. Total lengths of the side channels were recorded using GPS following the same protocols used for main channel unit delineation. If the entire side channel was not wet at the time

of survey, the length of the wetted portion of the side channel was recorded. This report provides data based on total side channel lengths, unless otherwise noted.

LWM was counted in the mainstem and side channels following the size class characterizations for “Eastside” forests (USFS 2020): Small (> 6 in. diameter, >20 feet long), Medium (>12 in. diameter, > 35 feet long) and Large (>20 in. diameter, >35 feet long). Pieces of LWM in each size category were tallied for each habitat unit and summarized at the reach scale below. A wood jam was classified as a group of three or more pieces of qualifying size (i.e., meeting any of the size category requirements above) that are in contact with one another and with at least one piece within bankfull.

3 Summary of Results

This section summarizes the results of the 16 mainstem reaches within the assessment area, from RM 40.6 to RM 62.3 on the Methow River. Detailed descriptions of the results on an individual reach-scale basis are included in Section 4 of this Appendix.

3.1 CHANNEL MORPHOLOGY

In general, this portion of the Methow River is predominantly a moderately meandering cobble to gravel alluvial system nested into a post-glacial outwash valley. Channel width increases in a normal downstream trend while channel bankfull depth increases in relationship to channel confinement (see Table 1). The 21.7 river miles within the assessment area can be divided into six distinct segments based on variabilities in channel morphology. See Section 6 of the main report for segment descriptions. The variability between the segments is related to differences in confinement, gradient, and the degree to which anthropogenic features and land management restrict or influence modern channel processes. Segments with higher sinuosity and decreased confinement often maintain active bars and higher morphologic complexity. Lack of mature floodplain forests and in-stream large wood reduce potential channel complexity in most of the assessment area.

Reach 1 is a straight confined section with armored banks and other anthropogenic infrastructure that restrict lateral processes, limit morphological complexity, and thus provides low habitat quality. Through Reach 2 to Reach 5 the channel forms wide but often bank-armor stabilized meanders with periodic split-flow or side-channels occurring where lateral processes and space allow. Increased confinement between bedrock exposures as well as intermittent anthropogenic bank modifications reduce meander amplitude through Reach 6 to Reach 8, compared to the downstream reaches. Some split-flow conditions occur in the downstream portion in Reach 6, but confinement increases, sinuosity decreases, and complexity decreases in the upstream portion. Upstream of Winthrop and the Chewuch confluence, (Reach 9 to Reach 11) the channel is relatively straight, simplified, and confined by anthropogenic features (armored banks, road, irrigation outtake structure, etc.) or by the Wolf Creek alluvial fan. Channel morphology increases in complexity in the upstream reaches of Reach 12 to 15, expressing an unconfined and sinuous form with increased morphological complexity of active bars, side channels, and contributions from floodplain tributaries – both naturally occurring and constructed. Reach 16, the upstream-most reach, is relatively straight and confined at the downstream end by a bridge crossing with armored banks.

Table 1. Methow River bankfull width results from habitat assessment.

Bankfull Widths (feet)																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Max	291	309	229	225	237	252	203	220	185	144	124	193	146	147	156	156
Min	188	200	229	188	146	144	174	164	167	137	118	155	134	111	156	156
Mean	226	238	204	206	206	197	189	187	176	141	122	174	140	131	156	156
St Dev	46	35	26	15	42	36	12	24	9	4	2	19	5	15	0	0
Floodprone Widths (feet)																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Max	319	801	360	835	496	783	560	375	1315	146	103	1805	2063	1953	1781	627
Min	154	180	174	186	205	184	176	184	109	142	130	302	197	355	423	246
Mean	238	497	243	401	289	295	269	218	434	221	201	108	830	955	1163	399
St Dev	58	193	51	240	95	151	120	47	376	77	65	472	476	459	432	143
Bankfull Depths (feet)																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Max	7	8	6	6.4	5.6	7.3	7.1	6.5	9	6.2	7.1	6.3	7.1	6.3	5.6	4.4
Min	1.2	1.4	1.8	1.8	0.3	0.7	3.7	1.4	1	1.3	2.4	1.2	1.1	0	0	3.2
Mean	4	3.6	4.6	4.2	3.9	5.1	5.2	4.7	4	5.1	4.8	3.7	4	3.5	2.4	3.9
St Dev	1.7	2.5	0.9	1.4	1.6	1.7	0.7	1.3	1.7	1	1	1.6	1.4	1.6	2	0.4

3.2 HABITAT UNIT COMPOSITION

Pools were the primary habitat unit type within the assessment area, comprising 39% of the total habitat area. The remaining composition was comprised of riffles (30%), glides (22%) and side channels (9%; Figure 3). Reach 1 had the highest percentage of pool habitat (57%) followed closely by Reaches 5 and 7 (56% and 55%, respectively).

Reach 11 had the lowest percentage of pool habitat, with only 13% recorded as pool habitat. The mean residual pool depth for the Methow River reaches, ranged from 1.3 feet in Reach 11 to 4.5 feet in Reach 3. The maximum residual pool depth was recorded in Reach 9 (13.7 feet). Pool frequency was the highest in Reach 13, with eight pools per mile. Reaches 10 and 11 had the lowest pool frequency, with approximately two pools per mile. Average pool spacing for the assessment area was five pools per mile. In general, glide habitat was more prevalent in the downstream reaches.

Reach 8 had the highest percentage of glide habitat, with 51% recorded as a glide. Reach 10, Reach 14 and Reach 16 habitat unit composition were primarily glide habitat (49%, 38%, 48%, respectively). Glide habitat was not recorded in Reach 1 and Reach 2. Riffle habitat was the most frequently recorded habitat unit in Reach 1 through Reach 3, Reach 5, Reach 6 and Reach 11. Reach 11 had the highest percentage of recorded riffle habitat recording 72% of the reach. The lowest percentage of riffle habitat was recorded in Reach 15 with 2% of habitat units recorded as riffle. Fast water units, both glide and riffle, measured an average depth of approximately 1.7 feet, with the lowest average depth recorded in Reach 12 (1.2 feet) and the highest average depth recorded in Reach 5 (2.1 feet).

A total of 64 side channels were recorded in the assessment area, comprising 9% of the habitat unit area. No side channels were recorded in several reaches, including Reach 1, Reach 10 and Reach 11 (Figure 1). More information on side channels can be found in Section 3.3.

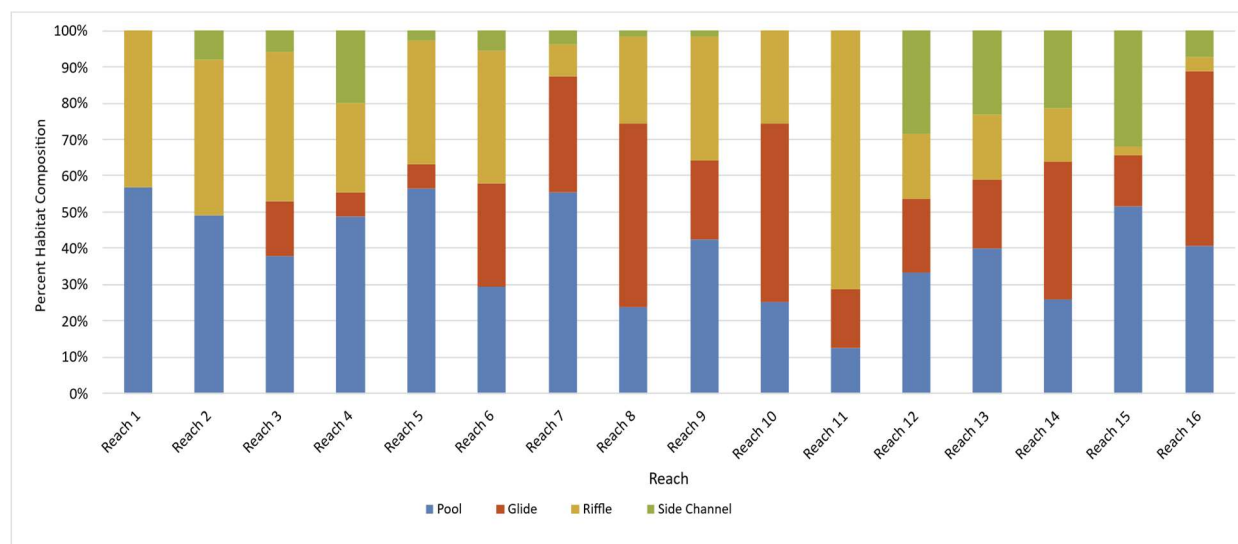


Figure 1. Figure illustrates the habitat unit composition (as a percent of total area) for each of the 16 surveyed reaches.

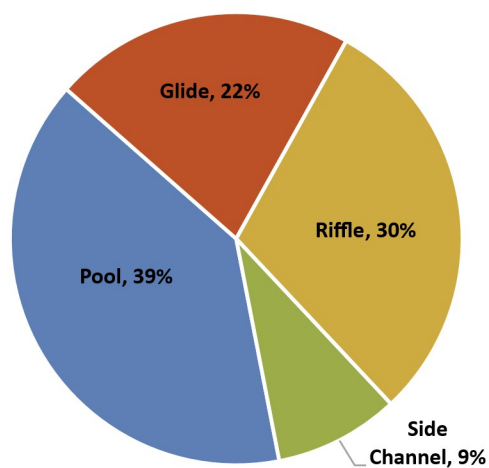


Figure 2. Figure illustrates the habitat unit composition for the entire assessment area.

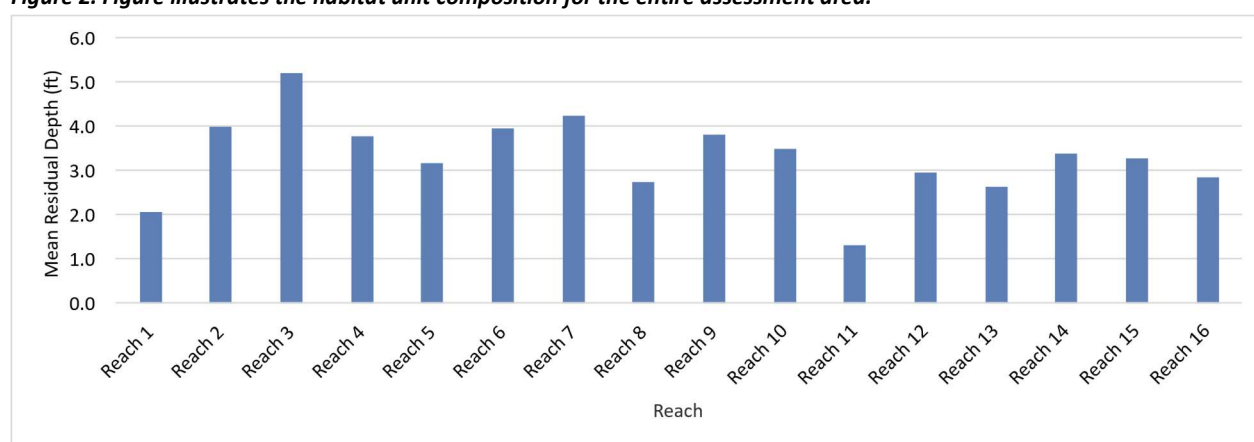


Figure 3. Mean residual depth per reach.

3.3 SIDE CHANNEL HABITAT

Side channel habitat throughout the survey composed of approximately 9% of the surface habitat area. In total, 64 side channels exist, average 3 side channels per mile of stream. The side channels averaged a length of 891 feet and an average wetted width of 15 feet. Total side channel length throughout all reaches is 10.8 miles. The side channels recorded a total of 2,707 pieces of small, medium and large LWM. A total of 1,828 pieces of medium and large LWM were recorded, which results in a frequency of 85 pieces of medium and large LWM per mile of side channel. In many reaches, side channels were observed as hyporheic, with no mainstem inlet. Many of which were identified as floodplain tributaries, a groundwater fed contributing channel that initiates on the valley floor or floodplain. Two gallery channels, associated with previous habitat enhancement projects, were observed in Reach 2 and Reach 15. More information on previous projects assessed as part of in this study, including constructed side channels, habitat enhancement projects and large wood structures, can be found in Section 2.2 of the main report.

3.4 LARGE WOODY MATERIAL (LWM)

A total of 7,653 pieces of LWM were counted in the assessment area averaging 352 pieces per mile; 41% were small LWM pieces with diameters between 6 and 12 inches and lengths greater than 20 feet, 37% were medium LWM pieces with diameters between 12 and 20 inches and lengths greater than 30 feet, and 22% were large LWM pieces with diameters over 20 inches and lengths greater than 30 feet. Of all the reaches in the assessment area, Reach 15 had the highest amount of LWM recorded with 529 medium and large LWM per mile (Figure 4). Reach 11 maintained the least LWM per mile with only 12 pieces of medium and large LWM pieces per mile and 24 total LWM pieces per mile. A total of 367 wood jams was recorded in the assessment area; to classify as a jam, at least 3 qualifying pieces of LWM was required.

Fox and Bolton (2007) conducted instream large wood surveys in unmanaged streams across Washington State to help understand natural wood loading conditions. As part of their study, they compared their data to the National Marine Fisheries Service (NMFS) properly functioning conditions threshold (1996) that are based on sizes exceeding the “medium” size class used by the USFS (2020; ≥ 12 in diameter and at least 35 ft long). The Fox and Bolton (2007) 75th percentile of wood loading was 67.45 pieces per mile for unmanaged streams in eastside forests. For this Methow River habitat assessment, we chose the 75th percentile value to use as a comparison to the observed conditions, since this is believed to be a reasonable target for restoration of natural wood loading ranges across the landscape by Fox and Bolton (2007). Therefore, the “adequate” threshold for LWM in the Methow River is > 67.45 pieces per mile of medium and large size class wood, with additional woody debris available for long-term recruitment. There are 77 pieces of large LWM pieces per mile average across the whole assessment area. There are 129 pieces of medium LWM pieces per mile across the whole assessment area. Reach 1, Reaches 8 - 11, and Reach 16, do not maintain an “adequate” condition for LWM (Figure 4).

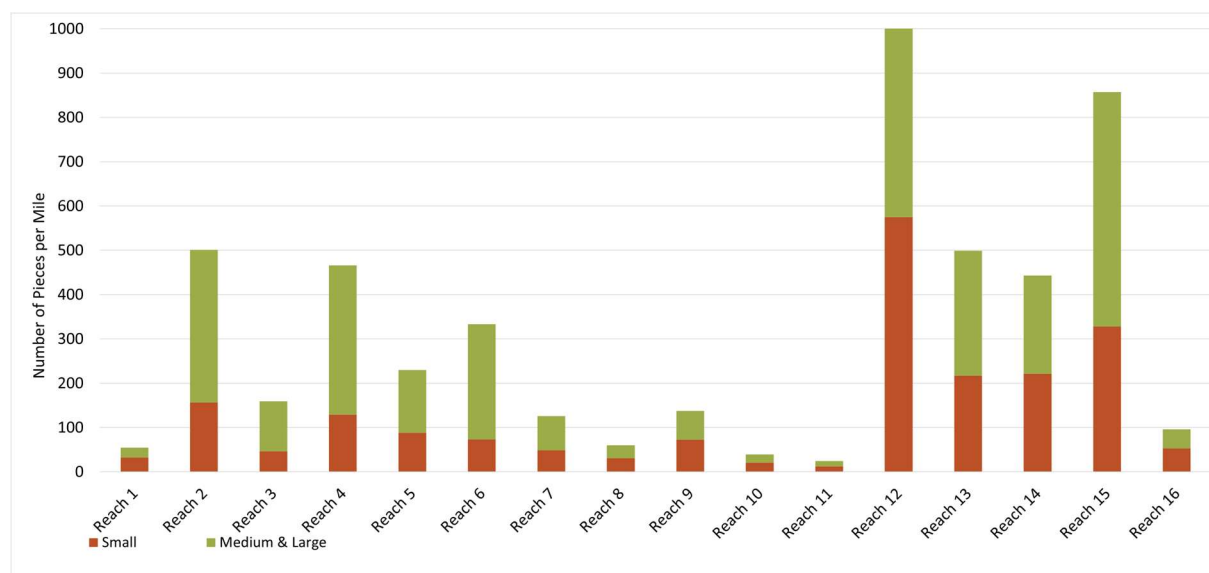


Figure 4. Summary of LWM pieces per mile recorded in each Methow River reach during the 2024 surveys, classified by small size class LWM and Medium and large combined size classes of LWM.

3.5 BANK INSTABILITY

Throughout the Methow River assessment area, irrigation infrastructure, residential development, roads, bridges, channel bank armoring, campgrounds and other anthropogenic features are present in the floodplain and along the channel banks. Many of these land use modifications have resulted in channel entrenchment, geomorphic simplification, and riparian/floodplain vegetation clearing and alterations. The extent of human-induced bank erosion and/or instability on both the left and right banks of each channel unit were documented during the field assessment.

The Methow River passes through the town of Winthrop and runs adjacent to SR-20 in Reaches 8 through 11, which had a correspondingly greater proportion of unstable banks than other reaches. Similarly, bank armoring, development, road crossings and vegetation clearing was more prevalent in Reach where the Methow flows through the town of Twisp. In Reach 4 and 5, bank armoring and decreased riparian vegetation are impacted as a result of the Methow Valley State Airport. Bank stability and riparian vegetation are impacted in Reach 6, Reach 13 and Reach 14 by agricultural development, private property and restoration efforts. Campgrounds, residential uses, and trails are present along the banks in Reach 16.

3.6 FISH PASSAGE BARRIERS

One anthropogenic structure was identified in the mainstem of the Methow River assessment area. The Foghorn diversion impoundment is a potential fish passage barrier at certain flows.

3.7 RIPARIAN CORRIDOR

Riparian vegetation was identified at select representative units throughout the assessment area. In total, 179 observations of riparian vegetation were recorded.

In the assessment area as a whole, the dominant (61.8%) overstory vegetation size was Small Tree (9.0-20.9-inch diameter at breast height [dbh]). Large Tree (21.0-31.9- inch dbh) was the next most dominant overstory vegetation size class, with 21.3% of the total observations. Overstory in the Sapling/Pole (5.0-8.9-inch dbh) size class composed 11% of the total, while Shrub/Seedling (0.6%; 1.0 -4.9-inch dbh) and No Vegetation (5.6%) composed the remaining observed units in the assessment area. Mature Trees (5.0-8.9-inch dbh) were present but infrequent in the assessment area and were not recorded as the dominant overstory size class in any units (Figure 5). Overstory species observed included Cottonwood (69%), with some Ponderosa Pine (12%), Douglas Fir (4%), Quaking Aspen (2%) and Willow (1%) observed as well. The overstory also included several units with Other/Unknown species or habitat units with no overstory present (Figure 6).

As shown in Figure 7, the dominant understory vegetation size class was Sapling/Pole (5.0-8.9-inch dbh), observed in 52% of recorded units, followed by Grassland/Forb (25%), No Vegetation (11%), Shrub/Seedling (1.0 -4.9-inch dbh; 10%), and Small Tree (9.0-20.9-inch dbh; 2%). Many recorded units didn't have any understory vegetation or had an understory consisting of grasses and non-woody vegetation, which wasn't typed out to the species level. For those units, a "Other/Unknown" classification was selected for the riparian understory species (Figure 8). Other riparian understory species recorded in the assessment area included Willow (26%), Alder (14%), Dogwood (14%), Cottonwood (7%), and Quaking Aspen (1%).

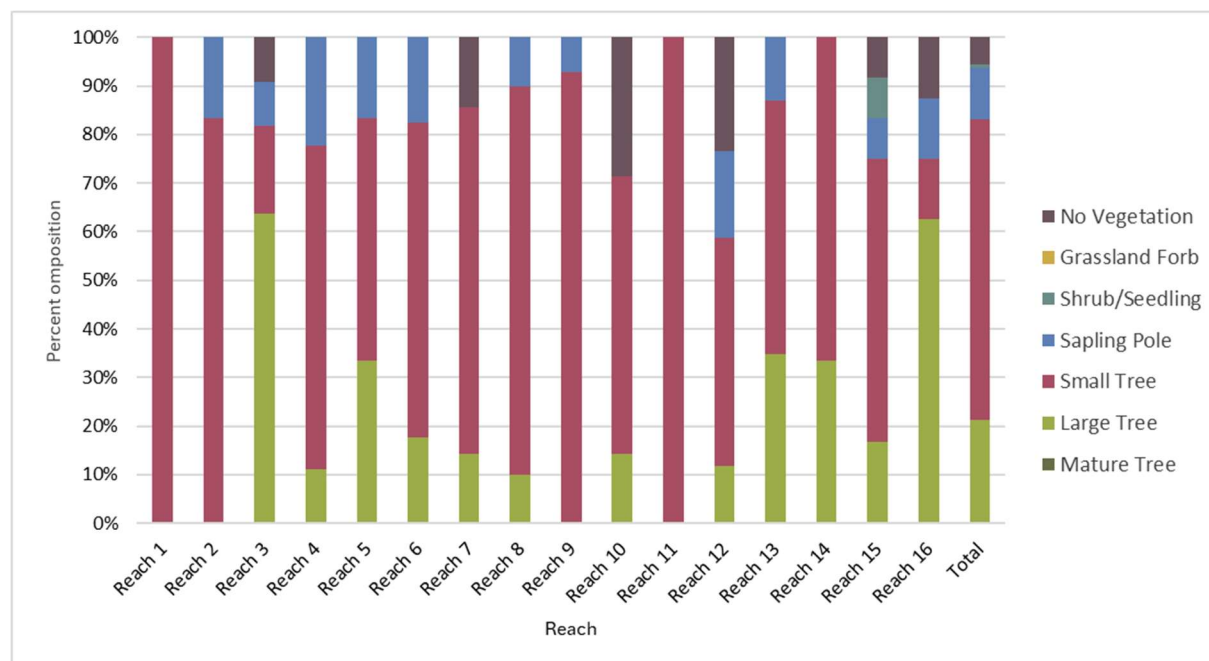


Figure 5. Percent composition of the dominant overstory size class for all units in which vegetation surveys were performed.

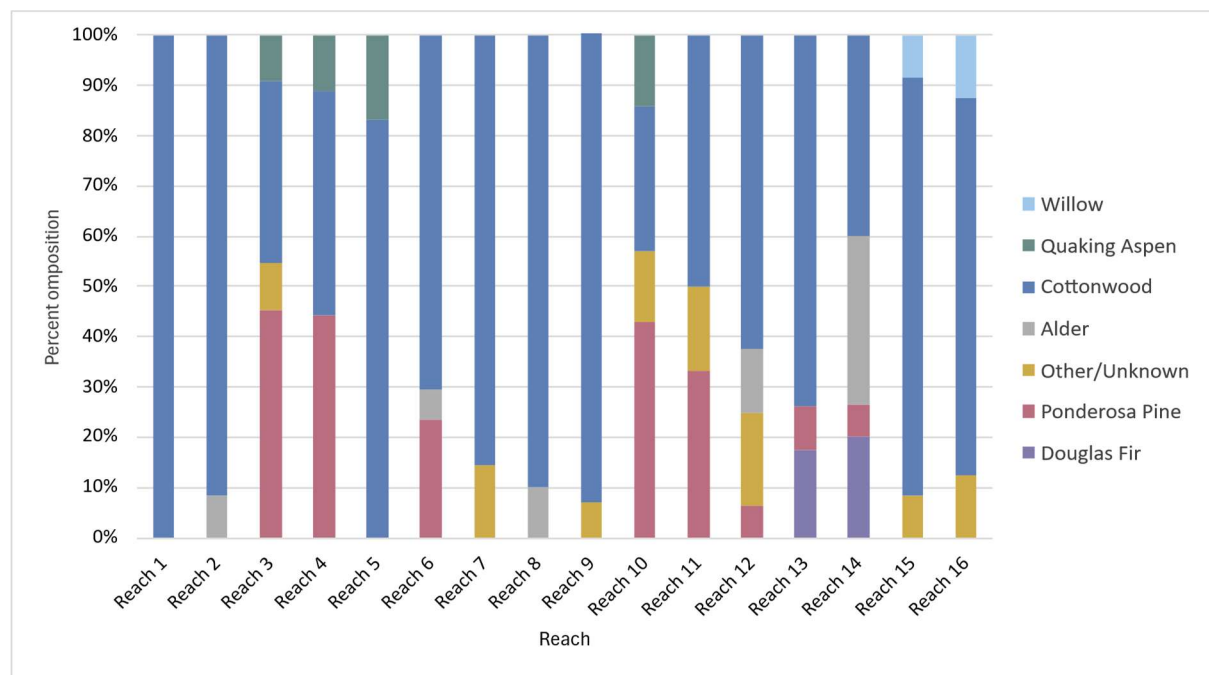


Figure 6. Percent composition of the dominant overstory species for all units in which vegetation surveys were performed.

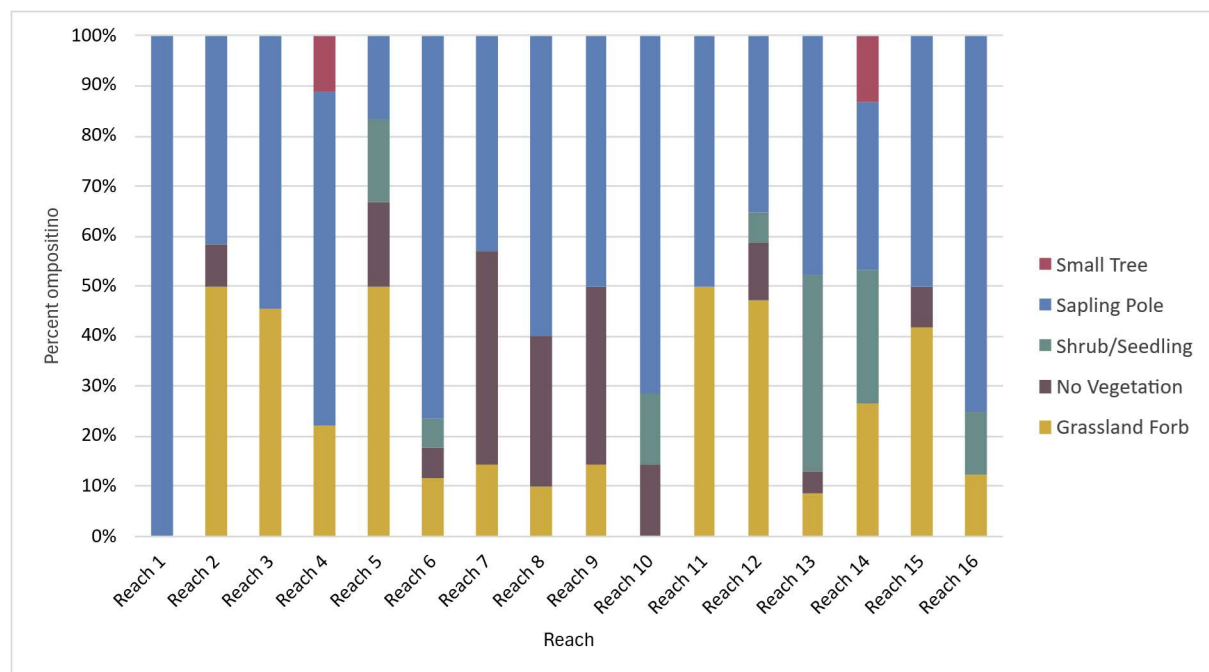


Figure 7. Percent composition of the dominant understory size class for all units in which vegetation surveys were performed.

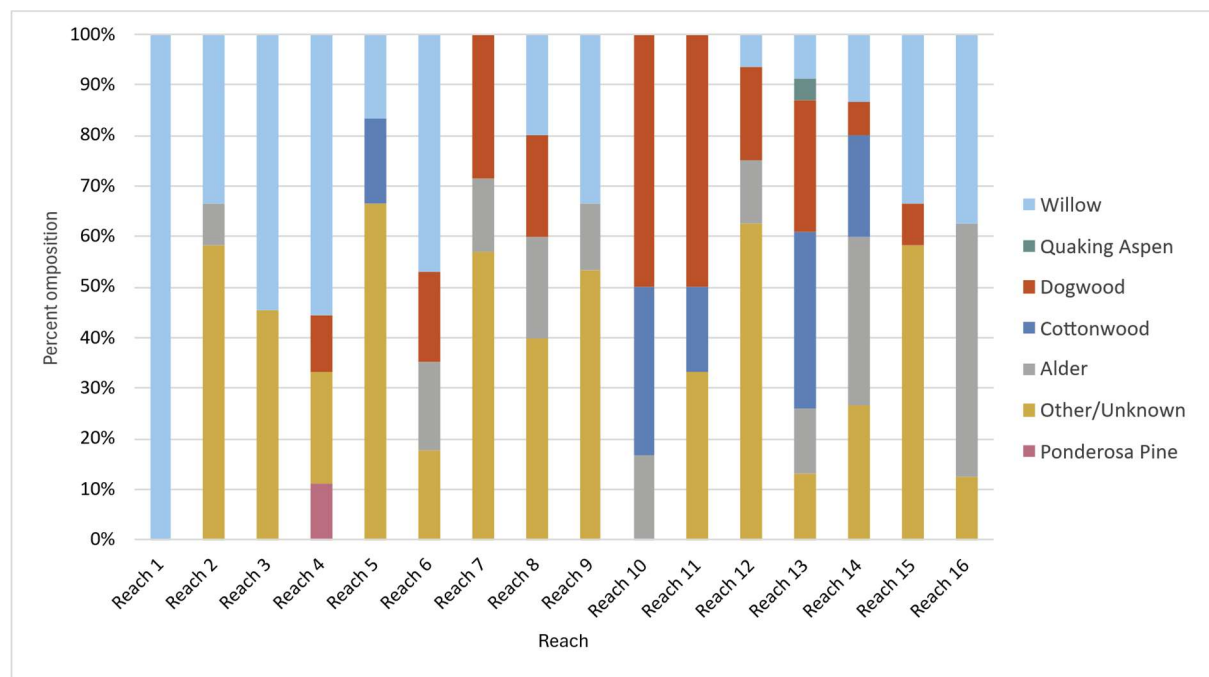


Figure 8. Percent composition of the dominant understory species for all units in which vegetation surveys were performed.

4 Comparison to Previous Reach Assessments

Numerous stream habitat surveys and reach assessment have been completed in the Methow River watershed over the past few decades (Table 2). Stream habitat surveys previously completed within the Methow River between RM 40.6 to RM 62.3 (this report's study area) include:

- 2008 Big Valley Reach Assessment (USBR, 2008a), RM 54.2 – 61
- 2010 Middle Methow Reach Assessment (USBR, 2010), RM 40.3 – RM 52.4
- 2011 Winthrop Area (W2) Assessment of Geomorphic and Ecologic Indicators (USBR, 2011), RM 50 – RM 55

A summary of the results from these surveys are provided in the sections below (Table 2). Many other studies have been conducted within the Methow River subbasin but do not, or do not significantly overlap with this current assessment, and are therefore not included in this comparison.

Table 2. Comparison of reaches used in this 2024 Methow River Reach Assessment to previous assessments.

2008 Big Valley Reach Assessment	2024 Methow River Reach Assessment
Wolf Creek to Hancock Springs (RM 54.2 – 61)	Reach 11 to Reach 15 (RM 54.5 – 61.7)
2010 Middle Methow Reach Assessment	2024 Methow River Reach Assessment
RM 40.3 and RM 52.4	Reach 1 to Reach 8 (RM 40.6 to RM 51.7)
2011 Winthrop (W2) Assessment of Geomorphic and Ecological Indicators	2024 Methow River Reach Assessment
M6 (RM 50 – RM 51.3 ¹)	Reach 8 (RM 50.3 – RM 51.7)
M7 (RM 51.3 – RM 52.9 ¹)	Reach 9 (RM 51.7 – RM 53.2)
M8 (RM 52.9 – RM 55 ¹)	Reach 10 (RM 53.2 – RM 54.5)

4.1 2008 BIG VALLEY REACH ASSESSMENT

The U.S. Bureau of Reclamation (USBR) conducted a reach assessment on the Methow River between Wolf Creek (RM 54.2) and Hancock Springs (RM 61) to identify potential project areas and sequence project implementation and monitoring efforts (USBR, 2008a). A habitat assessment was conducted by the Methow Valley Ranger (USFS) in October 2006 as part of the tasks completed in the reach assessment (USFS, 2006b). Methodology for the habitat assessment followed that of Hankin-Reeves Level-II habitat survey, USDA Forest Service Stream Inventory Handbook, 2006, Version 2.5, Pacific Northwest Region (USFS, 2006a) to measure channel unit composition and to quantify large woody material (LWM). The 2008 Big Valley Reach Assessment study area corresponds to Reach 11 - Reach 15 (RM 54.5 – RM 61.7) in this 2024 assessment (Table 2).

Habitat unit composition in the Big Valley Reach Assessment (USBR, 2008a) consisted of equal pools (39%) and riffles (39%), followed by side channels (15%) and glides (7%). Nine side channels were recorded (Table 3). In this 2024 assessment, habitat unit composition had similar pool composition (36%), but fewer turbulent fast water units (riffle; 21%) and more glide habitat (22%). The proportion of side channel habitat increased in these reaches to 21%, with substantial increase in the number of side channels recorded (47 side channels). These increases are most likely a result of different flow conditions

¹ River miles reported here are those reported in the 2011 Winthrop Assessment (USBR, 2011), which differ from the UCSRB river miles used throughout this 2024 Methow Assessment. Despite differences in reported river miles, the 2011 and 2024 reach extents are the same.

across the surveys and habitat restoration projects in this area. Approximately eight past projects and project areas have created or restored access to side channel habitats and improved channel habitat and channel complexity with large wood structures which may result in changes to channel habitat conditions.

Large wood frequency reported in 2008 was approximately 30 pieces of medium and large LWM per mile. LWM recorded included 54 pieces of small (>20 feet in length, > 6-inch diameter) LWM per mile, 24 pieces of medium (>35 feet in length, 12–20-inch diameter) LWM per mile, and 6 large (>35 feet in length, >20-inch diameter) LWM per mile. In this 2024 assessment, total LWM quantities for the same stretch of river were approximately 233 pieces of medium and large LWM per mile, a substantial increase. LWM recorded in this 2024 assessment included 211.4 pieces of small LWM per mile, 166.5 pieces of medium LWM per mile, and 37.2 pieces of large LWM per mile. LWM classification in both assessments used the same size classes. The discrepancy in the wood frequency between the two assessment is presumably associated with habitat restoration projects that included constructed LWM structures, specifically in the Big Valley project area which accounts for approximately 311 total pieces of LWM or 31.1 total pieces of LWM per mile.

In 2008, pool frequency was 8.8 pools per mile between RM 54.2 to RM 61. In this 2024 assessment, pool frequency averaged 4.3 pools per mile within the corresponding reaches. Residual pool depth in the 2008 habitat assessment measured 3.1 feet with an average maximum pool depth of 4.3 feet reported. In this 2024 assessment, the average residual pool depth was 2.7 feet with an average maximum pool depth of 3.8 feet, slightly less than that recorded in 2008. Discrepancy in measurements may be due to changes in channel morphology from restoration projects, or flow conditions at the time of the surveys were conducted. See Section 2.2 of the main report for a summary of habitat restoration projects within the assessment area.

Table 3. Key metrics compared between the 2024 Methow River Reach Assessment and the 2008 Big Valley Assessment area. Both assessments used the same USFS LWM size criteria.

2008 Big Valley Assessment, RM 54.2- 61		2024 Methow River Reach Assessment, RM 54.5- 61.7	
Habitat Unit Composition (percent of total area)		Habitat Unit Composition (percent of total area)	
Pool	39%	Pool	36%
Riffle	2%	Riffle	21%
Glide	7%	Glide	22%
Side Channel (as a % of main channel area)	15%	Side Channel	21%
Number of Side Channels	9	Number of Side Channels	47
Large Woody Material (per mile)		Large Woody Material (per mile)	
Medium & Large	30	Medium & Large	233
Large	6	Large	37.2
Medium	24	Medium	166.5
Small	54	Small	211.4
Pools		Pools	
Pools per mile	8.8	Pools per mile	4.3
Average Residual Depth	3.1	Average Residual Depth	2.7
Average Maximum Depth	4.3	Average Maximum Depth	3.8

4.2 2010 MIDDLE METHOW REACH ASSESSMENT

A habitat assessment was conducted in the Middle Methow River between RM 40.3 and RM 52.4 to evaluate instream habitat conditions (USBR, 2010). USFS Stream Inventory handbook (USFS, 2006a) methodologies were used for the assessment to identify and measure channel unit composition and to quantify LWM. The 2010 Middle Methow Reach Assessment study area corresponds to Reach 1 to Reach 8 (RM 40.6 to RM 51.7) in this 2024 assessment (Table 4).

Habitat unit composition in 2010 recorded pool habitat as the dominant habitat type (38.9%), followed by riffle (33.2%), run/glide (22.9%) and side channel (5%) habitat types (Table 4). In this assessment's 2024 survey, habitat unit composition was similar: pool (42%), glide (34%), riffle (18%), and side channel (6%). Riffle habitat composition is lower in this assessment and glide habitat higher than that assessed by USBR, likely a result of changes in hydrology and channel morphology, and habitat restoration actions. Approximately 20 past projects and project areas have created or restored access to side channel habitats, improved channel habitat and channel complexity with large wood structures and restored the riparian vegetation buffer which may result in changes to channel habitat.

In 2010, large wood frequency in the Middle Methow was approximately 11.5 pieces of medium and large LWM per mile. Total LWM observed included 23.7 pieces of small (>20 feet in length, >6-inch diameter) LWM per mile, 9.3 pieces of medium (>35 feet in length, 12-inch to 20-inch diameter) LWM per mile, and 2.2 large (>35 feet in length, >20-inch diameter) LWM per mile. In this 2024 assessment, total LWM recorded for Reaches 1 - 8 was 181.4 pieces of medium and large LWM per mile, a substantial increase. Total LWM recorded in this 2024 assessment included 78.6 pieces of small LWM per mile, 94.5

pieces of medium LWM per mile, and 86.9 pieces of large LWM per mile. LWM classification in both assessments used the same size classes. The increase in the LWM frequency between the two assessments is presumably associated with habitat restoration projects that included constructed LWM structures. LWM in large wood structures between Reach 1 to Reach 8 recorded approximately 1,622 pieces of LWM which is equivalent to a frequency of 146.1 pieces of LWM per mile and 122.5 pieces of medium and large LWM per mile.

In 2010, 48 pools were observed between RM 40.3 to RM 52.4, for a pool frequency of 3.5 pools per mile. In 2024, 45 pools were observed but corresponded to a slightly higher pool frequency of 4.1 pools per mile within the corresponding reaches. Average residual pool depths in 2010 were 4.5 feet with an average maximum pool depth of 6.2 feet. In this assessment, the average residual pool depth was 3.6 feet with an average maximum depth of 5.2 feet recorded. Discrepancy in measurements may be due to changes in channel morphology, the implementation of restoration projects, or differing flow conditions at the time the surveys were conducted. See Section 2.2 of the main report for a summary of habitat restoration projects within the assessment area.

Table 4. Key metrics compared between the 2024 Methow River Reach Assessment and the 2010 Middle Methow Reach Assessment area. Both assessments used the same USFS LWM size criteria.

2010 Middle Methow Reach Assessment RM 40.3- 52.4		2024 Methow River Reach Assessment RM 40.6-51.7	
Habitat Unit Composition (percent of total area)		Habitat Unit Composition (percent of total area)	
Pool	38.9%	Pool	42%
Riffle	33.2%	Riffle	18%
Glide	22.9%	Glide	34%
Side Channel (as a % of main channel area)	5%	Side Channel	6%
Large Woody Material (per mile)		Large Woody Material (per mile)	
Medium & Large	11.5	Medium & Large	181.4
Large	2.2	Large	86.9
Medium	9.3	Medium	94.5
Small	23.7	Small	78.6
Pools		Pools	
Number of pools	48	Number of pools	45
Pools per mile	3.5	Pools per mile	4.1
Average Residual Depth	4.5	Average Residual Depth	3.6
Average Maximum Depth	6.2	Average Maximum Depth	5.2

4.3 2011 WINTHROP AREA (W2) ASSESSMENT OF GEOMORPHIC AND ECOLOGIC INDICATORS

The USBR conducted a reach assessment of the “W2 Reach” from Winthrop (RM 50) to Big Valley (RM 55¹) to identify potential habitat improvement projects and contribute to restoration effectiveness monitoring (USBR, 2011). Assessment methods used Beechie et al. (2010) and Rosgen (1996) channel type classifications.

The 2011 assessment was divided into three sections (Table 5):

- M6 (Chewuch River to Barkley Diversion Dam), RM 50 – RM 51.3², corresponding to Reach 8 (RM 50.3 – RM 51.7) in this assessment,
- M7 (Chewuch River to Wolf Creek), RM 51.3 – RM 52.9¹, corresponding to Reach 9 (RM 51.7 – RM 53.2) of this assessment, and
- M8 (Wolf Creek to Big Valley), RM 52.9 – RM 55¹, corresponding to Reach 10 (RM 53.2 – RM 54.5) of this assessment.

Geomorphic channel units in the 2011 assessment were defined by physical characteristics and hydraulic features, rather than specific delineations of habitat unit types and features. In the M6 section, USBR recorded a dominant channel unit type of run (also can be referred to as ‘glide’; 69%), followed by riffle and rapid (27%), pool (4%) and side channel (>1%). In Reach 8 of this 2024 assessment, the dominant habitat channel unit type was recorded glide (51%), followed by pools and riffles (24%, each), and side channel (2%). In the M7 section, USBR recorded a dominant channel unit type of run (40%), followed by side channel (25%), riffle and rapid (28%), and pool (7%). In this assessment, dominant habitat channel unit type in Reach 9 was recorded as riffle (34%), pool (42%), glide (22%) and side channel (2%). In the M8 section, USBR recorded a dominant channel unit type of run (65%), followed by riffle and rapid (32%), pool (3%) and side channel (<1%). In Reach 10 of this assessment, the dominant habitat channel unit type was recorded as glide (49%), followed by pool (25%), riffle (26%) and no side channels. Large woody material (LWM) and pool measurements in the 2011 W2 Assessment were based on data collected and reported by the 2010 Middle Methow Assessment (USFS, 2006b; USFS, 2009), described in Section 4.2 above. Differences in channel unit composition results between the 2011 W2 Assessment and this 2024 assessment can likely be attributed to the different assessment methodologies, as well as potential changes in channel morphology and flow conditions at the time of the surveys. The implementation of three restoration projects may have also influenced the channel unit composition results. See Section 2.2 of the main report for a summary of habitat restoration projects within the assessment area.

² River miles reported here are those reported in the 2011 Winthrop Assessment (USBR, 2011), which differ from the UCSRB river miles used throughout this 2024 Methow Assessment. Despite differences in reported river miles, the 2011 and 2024 reach extents are the same.

Table 5. Key metrics compared between the 2024 Methow River Reach Assessment and the 2011 Winthrop Area (W2) Assessment of Geomorphic and Ecologic Indicators M6-M8 Assessment area. Different methods to define habitat units were used: the 2011 W2 assessment methods used Beechie et al. (2010) and Rosgen (1996) channel type classifications while the 2024 assessment followed USFS Habitat Inventory Protocols (2020).

2011 Winthrop Area (W2) Assessment of Geomorphic and Ecologic Indicators	2024 Methow River Reach Assessment
M6 (RM 50-51.3 ¹)	Reach 8 (RM 50.3-51.7)
Habitat Unit Composition (percent of total area)	Habitat Unit Composition (percent of total area)
Pool 4%	Pool 24%
Riffle & Rapid 27%	Riffle 24%
Glide (Run) 69%	Glide 51%
Side Channel <1%	Side Channel 2%
M7 RM 51.3- 52.9 ¹)	Reach 9 (RM 51.7-53.2)
Habitat Unit Composition (percent of total area)	Habitat Unit Composition (percent of total area)
Pool 4%	Pool 42%
Riffle & Rapid 28%	Riffle 34%
Glide (Run) 69%	Glide 22%
Side Channel <1%	Side Channel 2%
M8 (RM 52.9-55 ¹)	Reach 10 (RM 53.2-54.5)
Habitat Unit Composition (percent of total area)	Habitat Unit Composition (percent of total area)
Pool 4%	Pool 25%
Riffle & Rapid 32%	Riffle 26%
Glide (Run) 69%	Glide 49%
Side Channel <1%	Side Channel 0%

5 Stream Habitat Reach Reports

5.1 REACH 1

Location: River mile 40.6 – 41.5

Total length: 0.9 mile

Survey date: October 29, 2024



Figure 9. Representative photo for Reach 1 of the Methow River.

5.1.1 Habitat Unit Composition

Reach 1 comprised of only pool and riffle habitat (Figure 11). No glides or side channels were observed in this reach. Channel gradient (0.21%) is the second lowest of all reaches. Anthropogenic features were extensive along both banks in the reach due to the channel flowing through the town of Twisp, Wa. Features included bank armoring, bridge infrastructure and access trails.

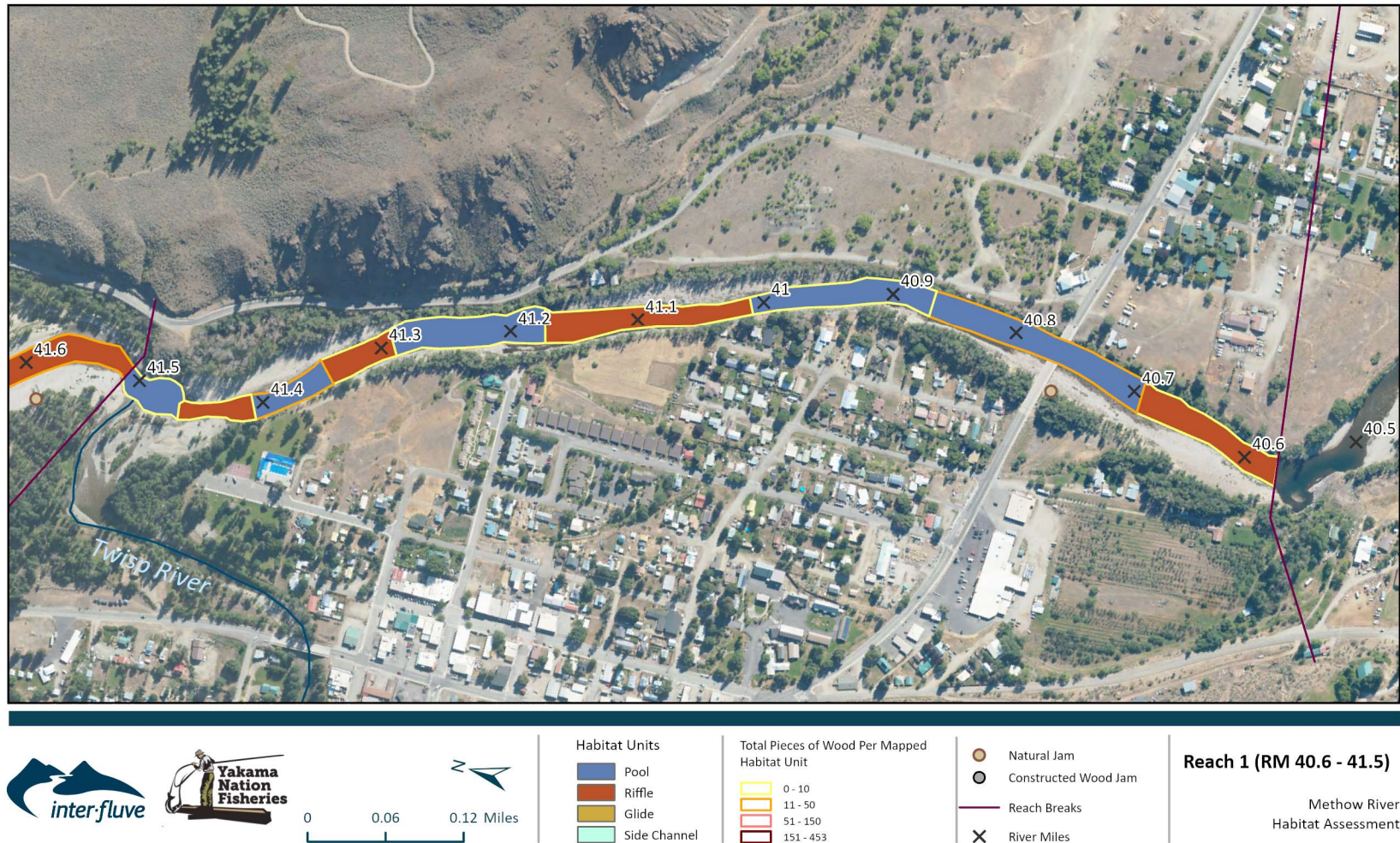


Figure 10. Map of the habitat unit composition and LWM in Reach 1 of the Methow River. LWM count includes pieces in jams.

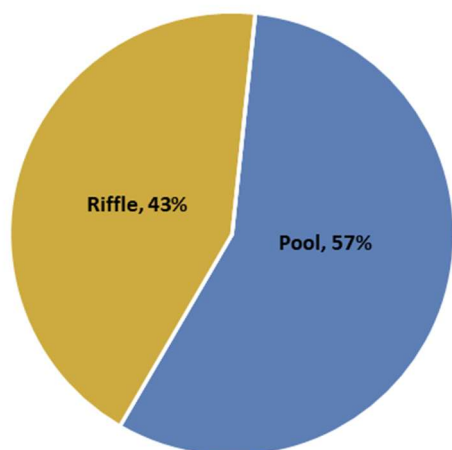


Figure 11. Stream habitat unit area composition of Reach 1.

5.1.2 Pools

Four pool habitat units were observed in Reach 1. All four pools (100%) had a residual depth less than three feet. Residual depth ranged from 1.5 feet to 2.7 feet, and averaged approximately 2.1 feet, which was less than the assessment area average of 3.3 feet. Mean pool spacing in Reach 1 was four pools per mile.

5.1.3 Side Channel Habitat

No side channels were observed in Reach 1.

5.1.4 Large Woody Material

A total of 49 pieces of LWM were recorded in Reach 1. This includes individual pieces and pieces recorded in jams. The frequency of LWM in the reach is approximately 54 pieces of LWM per mile and 22 pieces of medium and large LWM per mile. Three jams were observed in Reach 1 containing 8% of the recorded LWM within the reach (Table 6).

Table 6. LWM quantities in Reach 2.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	27	15	3	45
Number of Individual Pieces per Mile	30	20		50
Number of Pieces per Mile (including pieces in jams)	32	22		54
Number of jams	1			
Number of jams per mile	1			
Estimated Wood Count in Jams	4			

5.1.5 Riparian Corridor

Based on four observations of riparian vegetation in Reach 1, the dominant overstory class and species was Small Cottonwood trees (9.0-20.9-inch dbh; Figure 12). The understory was dominated (100%) by Willows in the Sapling/Pole (5.0-8.9-inch dbh) size class (Figure 13).

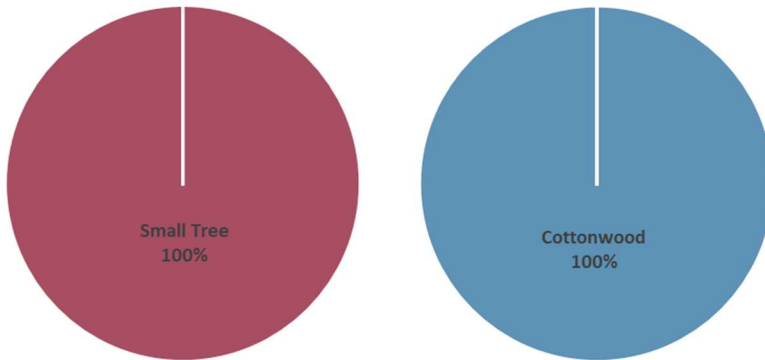


Figure 12. Dominant overstory riparian vegetation class and species, based on four surveyed units, within 100 feet of the Methow River by ocular estimate.

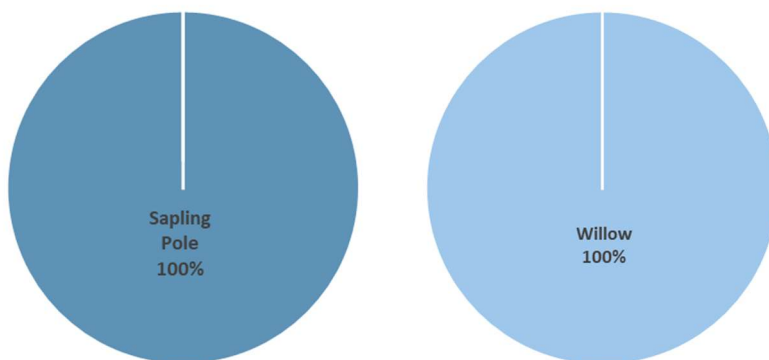


Figure 13. Dominant understory riparian vegetation class and species, based on four surveyed units, within 100 feet of the Methow River by ocular estimate.

5.2 REACH 2

Location: River mile 41.5 – 43.4

Total length: 1.9 miles

Survey Date: October 28 – October 29, 2024



Figure 14. Representative photo for Reach 2 of the Methow River.

5.2.1 Habitat Unit Composition

In Reach 2, the dominant habitat unit type was pool, comprising approximately half of the total reach area. Riffles and side channels were also observed in the reach (Figure 16). No glides were observed in this Reach as most units either contained residual depth (pool) or riffles. The upstream extent of this reach is the confluence with the Twisp River, north of the town of Twisp, WA. The town infrastructure, including roads and residential property is extensive along the right bank and both banks are intermittently armored with riprap. Active restoration projects occur within the side channels. One side channel was recorded in this reach and was observed to be a Gallery groundwater sourced channel. The channel gradient of Reach 2 is 0.30%, slightly higher than the assessment area average of 0.29%.

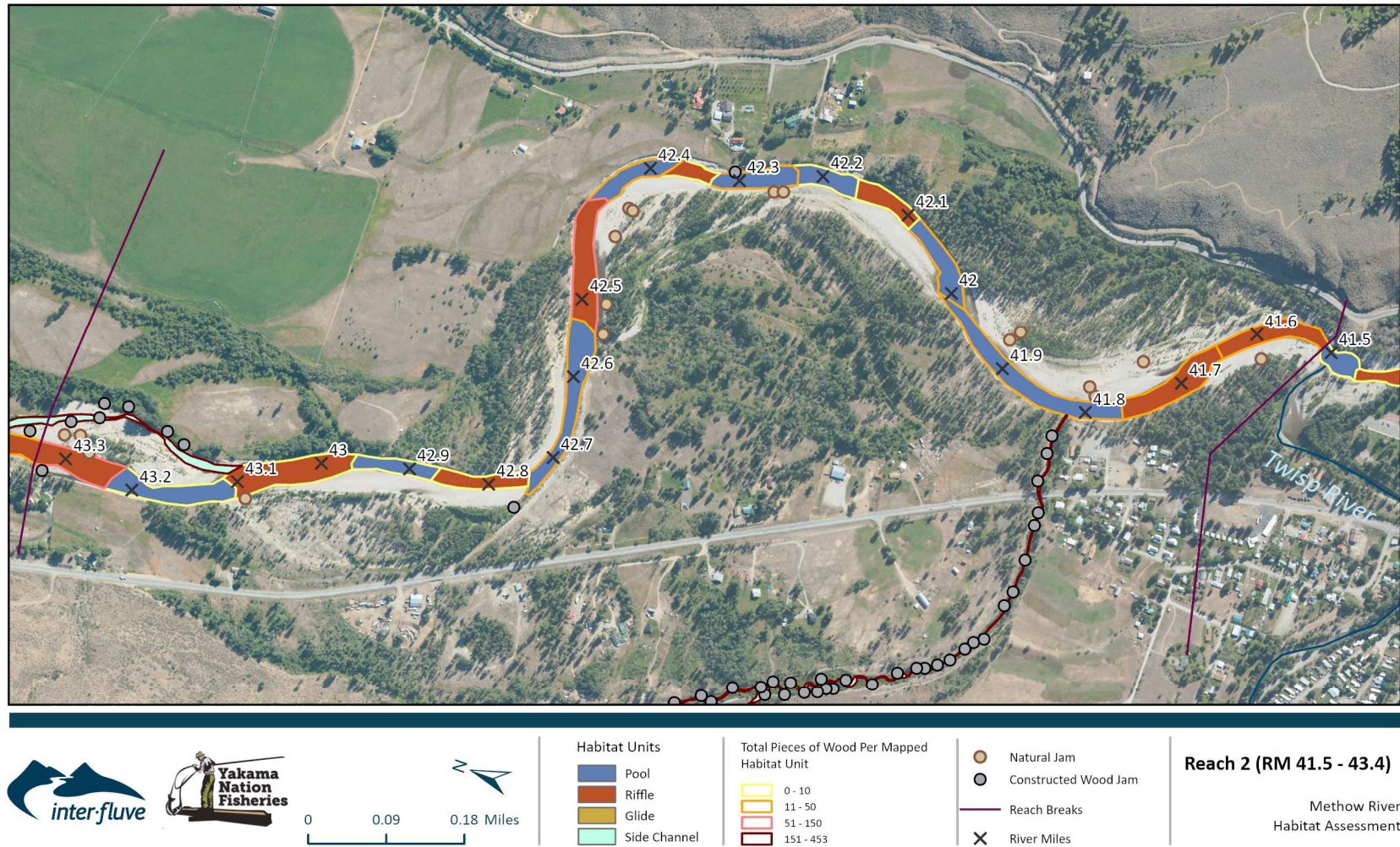


Figure 15. Map of the habitat unit composition and LWM in Reach 2 of the Methow River. LWM count includes pieces in jams.

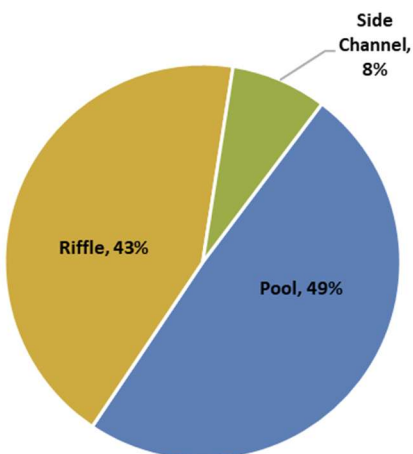


Figure 16. Stream habitat unit area composition of Reach 2.

5.2.2 Pools

Ten pools units were observed in Reach 2. Half had a residual pool depth less than three feet, the other 50% has a residual pool depth greater than three feet. Average residual pool depth was 4.0 feet and ranged from 1.7 feet to 12.8 feet. The very deep pool with a residual depth of 12.8 feet was located at the confluence of the Twisp River, where bedrock was exposed along the left bank. Pool frequency in Reach 2 was five pools per mile, equivalent to the assessment area average.

5.2.3 Side Channel Habitat

Two side channels were observed in Reach 2. The two side channels in this reach were constructed fish habitat improvement projects. A total of 598 LWM pieces (individual and pieces observed in jams) were recorded in the side channels and 35 jams were observed in the side channels (Table 7).

Table 7. Side channels observed in Reach 2.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 64	3,875	Slow	110	34	275
Side 63	1,590	Fast	6	8	207
<i>Total</i>	<i>5,465</i>		<i>116</i>		<i>482</i>

5.2.4 Large Woody Material

LWM counts were recorded in Reach 2, with a total of 952 pieces observed. This total includes individual pieces and LWM pieces observed in jams. This equates to 501 total pieces of LWM per mile and 345 medium and large LWM pieces per mile. A majority of the 60 jams recorded in Reach 2 were located in the side channels and contained approximately 73% of the total LWM pieces within the reach (Table 8).

Table 8. LWM quantities in Reach 2.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	101	83	30	214
Number of Individual pieces per mile	53	59		113
Total LWM per Mile (including pieces in jams)	156	345		501
Number of Jams	60			
Number of Jams per Mile	32			
Estimated Wood Count in Jams	738			

5.2.5 Riparian Corridor

A total of 12 observations of vegetation conditions were recorded in Reach 2. The dominant overstory in Reach 2 was Cottonwood in the Small Tree size class (9.0-20.9-inch dbh). Alders in the Sapling/Pole (5.0-8.9-inch dbh) comprised the remaining observed units (Figure 17). The dominant understory in Reach 2 was recorded as Grassland/Forb, followed by Willow and Alder in the Sapling/Pole size class (Figure 18).

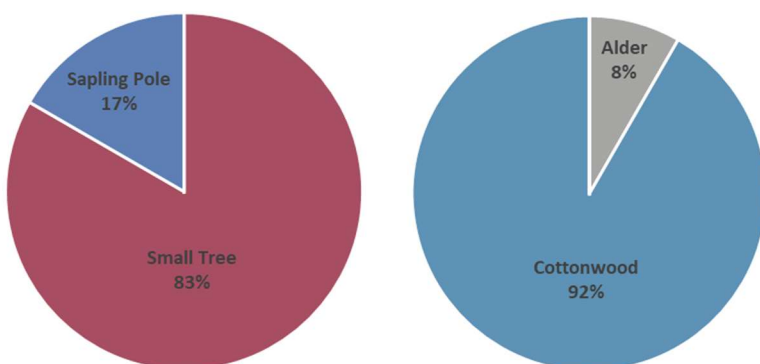


Figure 17. Dominant overstory riparian vegetation class and species, based on 12 units surveyed, within 100 feet of the Methow River by ocular estimate.

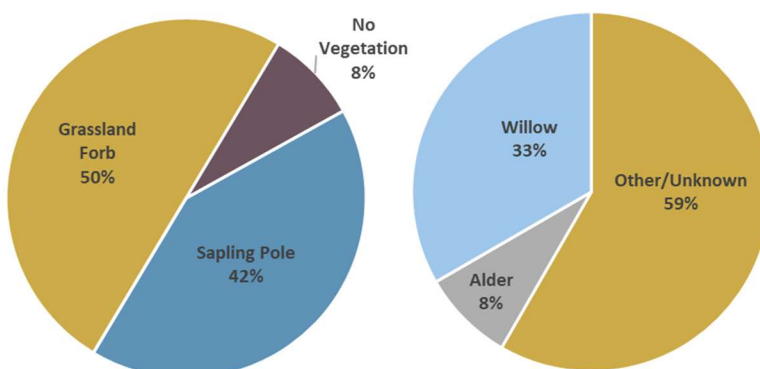


Figure 18. Dominant understory riparian vegetation class and species, based on 12 units surveyed, within 100 feet of the Methow River by ocular estimate.

5.3 REACH 3

Location: River mile 43.4 – 45.3

Total length: 1.9 miles

Survey Date: October 27 – October 28, 2024



Figure 19. Representative photo for Reach 3 of the Methow River.

5.3.1 Habitat Unit Composition

The habitat unit composition in Reach 3 included more fast-water units than Reaches 1 and 2, with nearly equal amounts of riffles and pools. Glides and two relatively long side channels were also recorded in the reach (Figure 21). The channel gradient in Reach 3 is 0.24%. The channel banks in this reach have been affected by anthropogenic features including bank armoring along the SR-20 road prism and land use modifications on private property.

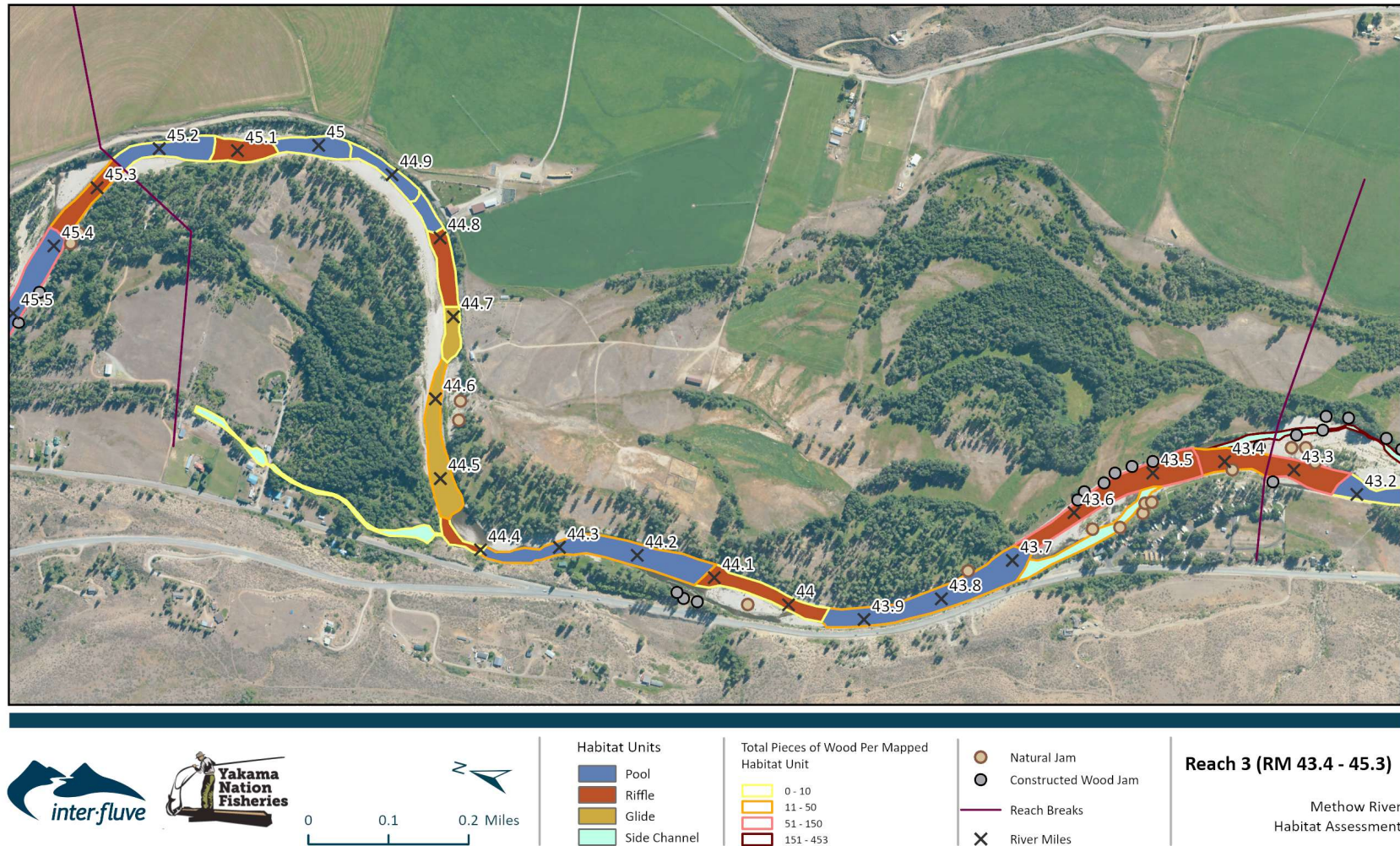


Figure 20. Map of the habitat unit composition and LWM in Reach 3 of the Methow River. LWM count includes pieces in jam.

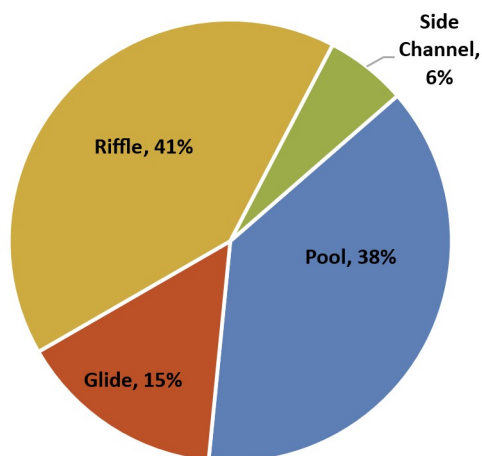


Figure 21. Stream habitat unit composition of Reach 3.

5.3.2 Pools

Reach 3 had four pools recorded. Given the length of the reach, that is approximately two pools per mile, which is less than the assessment area frequency (five pools/mile). The average residual pool depth was 5.2 feet in Reach 3, which was deeper than the assessment area average of 3.3 feet. Residual pool depths ranged from 1.9 feet to 13.4 feet. The very deep, long pool with a residual depth of 13.4 was constrained by bedrock outcrop along upstream extent of the right bank. Of the four pools, 50% had a residual pool depth greater than three feet.

5.3.3 Side Channel Habitat

In Reach 3, two side channels were recorded with a total combined length of 2,881 feet. The two side channels contained primarily slow-water habitat. One side channel (Side 61) did not have an observed inlet and is assumed backwatered from the main channel. A total of 24 pieces of LWM (individual and pieces observed in jams) were recorded in the side channels (Table 9).

Table 9. Side channels observed in Reach 3.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 62	983	Slow	8	2	12
Side 61	1,898	Slow	4	0	0
<i>Total</i>	<i>2,881</i>		<i>12</i>	<i>2</i>	<i>12</i>

5.3.4 Large Woody Material

A total of 303 pieces of LWM were recorded in Reach 3 (Table 10). This total includes individual pieces and pieces recorded in jams. This results in approximately 159 total LWM pieces per mile, and 113 medium and large LWM pieces per mile. Twenty-one jams were observed in this reach, for a frequency of roughly 11 jams per mile. Jams contained a majority of the LWM recorded in the reach (79%). Six constructed jams are located on the downstream extent of the left bank, RM 43.6), three constructed jams in the mid extent of Reach 3 on the right bank (RM 44.2) and three on the left bank at RM 43.55.

Table 10. LWM quantities in Reach 3.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	29	27	7	63
Number of Individual pieces per mile	15	18		33
Total LWM per Mile (including pieces in jams)	46	113		159
Number of Jams	21			
Number of Jams per Mile	11			
Estimated Wood Count in Jams	240			

5.3.5 Riparian Corridor

Based on 11 ocular assessments of riparian vegetation in Reach 3, the dominant overstory vegetation was Ponderosa Pine in the Large tree (21.0-31.9- inch dbh) size category. Some riparian vegetation in the Small Tree (9.0-20.9-inch dbh) and Sapling/Pole (5.0-8.9-inch dbh) size classes was observed, as well as units where no riparian vegetation was present. Cottonwood and Quaking Aspen were also recorded in the riparian vegetation zone (Figure 22). Reach 3 understory consisted of Willow species in the Sapling/Pole size class and Grassland/Forb (Figure 23).

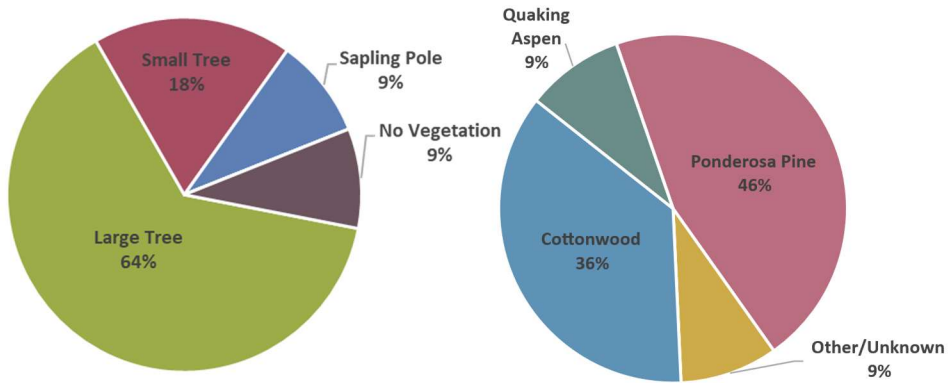


Figure 22. Dominant overstory riparian vegetation class and species, based on 11 units surveyed, within 100 feet of the Methow River by ocular estimate.



Figure 23. Dominant understory riparian vegetation class and species, based on 11 units surveyed, within 100 feet of the Methow River by ocular estimate.

5.4 REACH 4

Location: River mile 45.3-46.3

Total length: 1 mile

Survey Date: October 27, 2024



Figure 24. Representative photo of Reach 4 of the Methow River.

5.4.1 Habitat Unit Composition

The channel gradient in Reach 4 is 0.20%. Nearly half the total reach area was pool habitat (Figure 26). More side channel habitat was present in this reach than many others in the assessment area, with 20% of all habitat area recorded as side channel. Riffle composed a quarter of habitat units, and the remaining reach area was composed of side channel habitat and glides, respectively. A habitat restoration project including a constructed side channel with large wood structures and large wood structures within the main channel along the right bank is between RM 45.8 and 46.5.

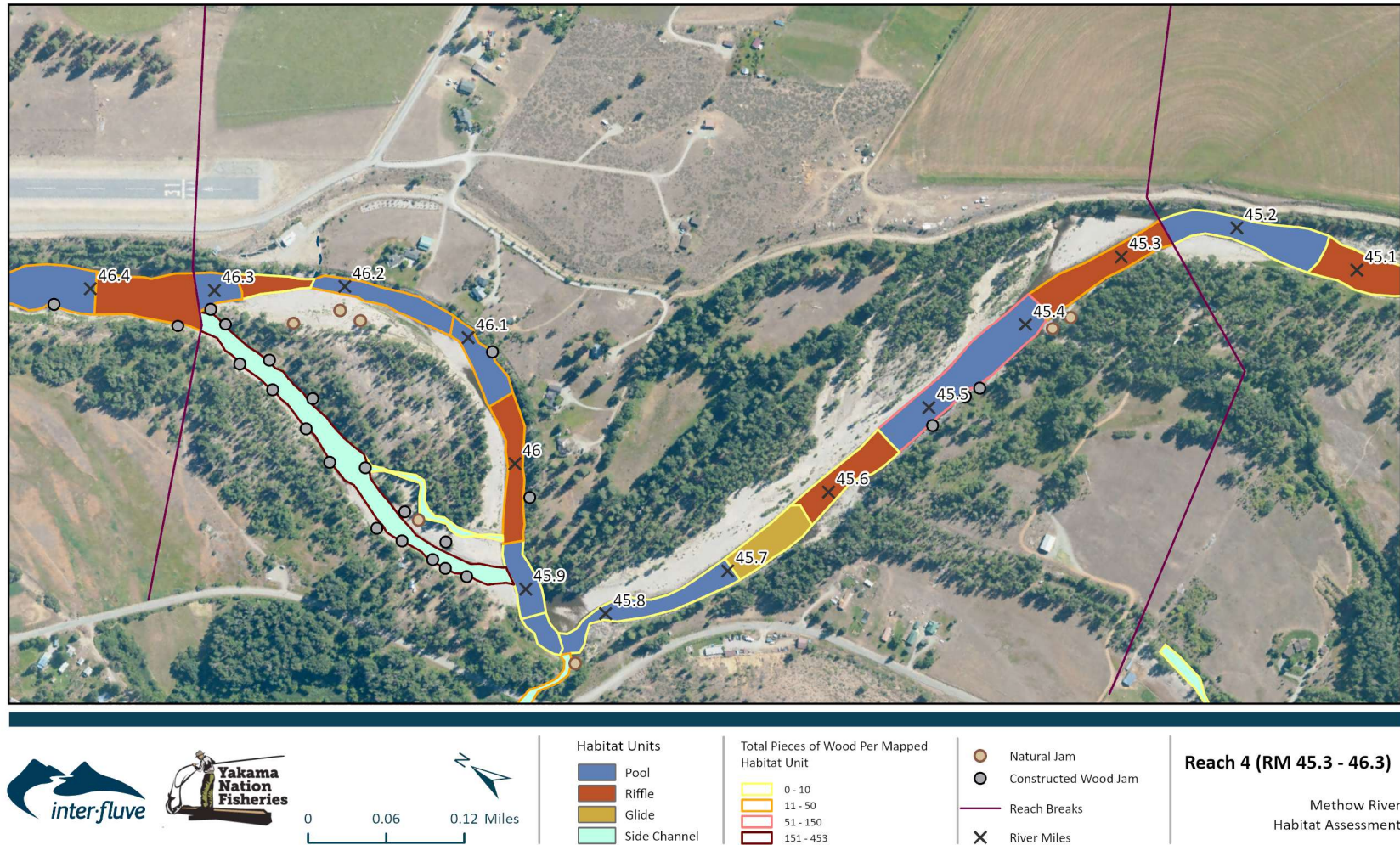


Figure 25. Map of the habitat unit composition and LWM in Reach 4 of the Methow River. LWM includes pieces in jams.

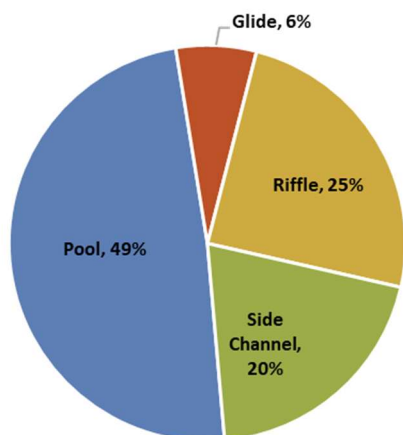


Figure 26. Stream habitat unit area composition of Reach 4.

5.4.2 Pools

Reach 4 had seven recorded pools, corresponding to a pool frequency of seven pools per mile. The average residual pool depth was 3.8 feet and ranged from 1.7 feet to 6.7 feet. Of the seven pools, 57% of pools had a residual pool depth greater three feet.

5.4.3 Side Channel Habitat

Three side channels were recorded in Reach 4. The total combined length of the side channels in Reach 4 was 5,814 feet. There were 175 total LWM pieces (including individual pieces and pieces found in jams) and 17 jams recorded in this reach (Table 11). The longest of these side channels (Side 59) was a fish habitat enhancement project and included 16 constructed wood jams. All other channels in this reach are naturally wetted.

Table 11. Side channels observed in Reach 4.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 58	691	Slow	4	0	0
Side 59	1,678	Fast	14	16	241
Side 60	488	Slow	9	1	7
<i>Total</i>	<i>2,856</i>		<i>27</i>	<i>17</i>	<i>148</i>

5.4.4 Large Woody Material

A total of 466 pieces of LWM were recorded in Reach 4 (combined individual pieces and pieces recorded in jams). This corresponds to approximately 466 LWM pieces per mile, and roughly 337 medium and large LWM pieces combined per mile. Twenty-seven jams were observed in this reach, equating to 27 jams per mile. The jams contained approximately 398 pieces, about 84% of LWM in the entire reach (Table 12). Of the total number of wood jams, 21 jams were constructed: 16 were within Side 60, two were along the right bank of the main channel (RM 45.8 and RM 46.5) and three were on the left bank near RM 45.5.

Table 12. LWM quantities in Reach 4.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	48	21	4	73
Number of Individual pieces per mile	48	25		73
Total LWM per Mile (including pieces in jams)	129	337		466
Number of Jams	27			
Number of Jams per Mile	27			
Estimated Wood Count in Jams	393			

5.4.5 Riparian Corridor

Riparian vegetation conditions were recorded in nine channel units in Reach 4. The overstory vegetation in Reach 4 consisted primarily of Ponderosa Pine and Cottonwoods in the Small Tree (9.0 - 20.9-inch dbh) size category, though some smaller (Sapling/Pole [9.0 - 20.9-inch dbh]) and larger (Large Tree [21.0 - 31.9-inch dbh]) vegetation size classes were observed (Figure 27 - Figure 28). Quaking Aspen was observed in the riparian zone of 10% of the surveyed units. A majority of the understory in Reach 4 were recorded as Willow or Dogwood species in the Sapling/Pole size class. Ponderosa Pine in the Small Trees (9.0 - 20.9-inch dbh) size category was also observed within the riparian zone.

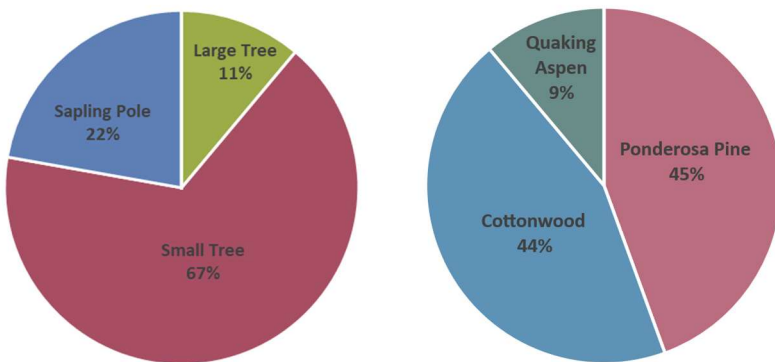


Figure 27. Dominant overstory riparian vegetation class and species, based on nine surveyed units, within 100 feet of the Methow River by ocular estimate.

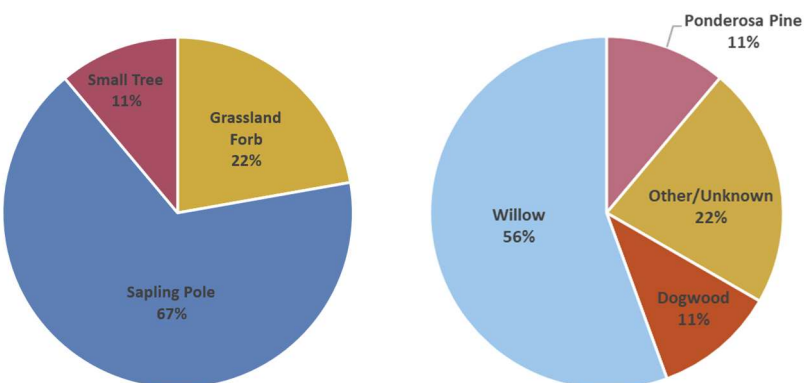


Figure 28. Dominant understory riparian vegetation class and species, based on nine surveyed units, within 100 feet of the Methow River by ocular estimate.

5.5 REACH 5

Location: River mile 46.3 – 47.4

Total length: 1.1 miles

Survey Date: October 26 - 27, 2024



Figure 29. Representative photo of Reach 5 of the Methow River.

5.5.1 Habitat Unit Composition

Reach 5 maintains a predominantly slow water channel unit composition, with a channel gradient of 0.26%. Riffle habitats are approximately one-third of the remaining habitat area, with a relatively small proportion of glides and side channel habitat rounding out the reach (Figure 31). Coho Salmon redds were identified (flagged in previous assessment by WDFW) at the downstream extent of a glide at approximately RM 47.2. The Methow Valley State Airport is present on the left bank in the downstream portion of the reach, and substantial bank armoring was present.

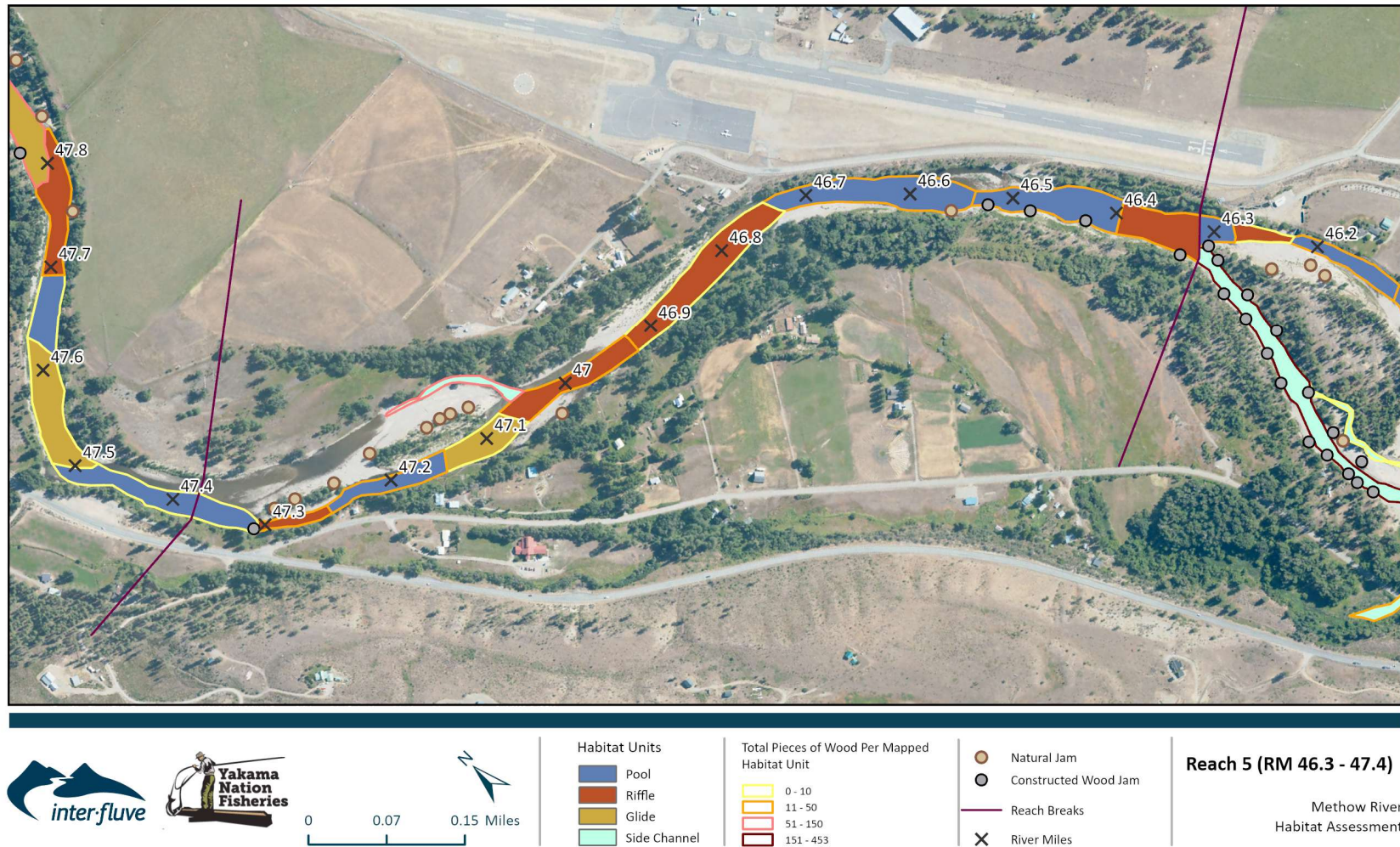


Figure 30. Map of the habitat unit composition and LWM in Reach 5 of the Methow River. LWM count includes pieces in jams.

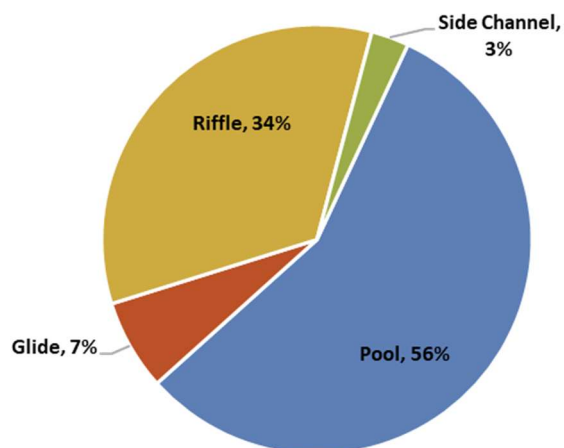


Figure 31. Stream habitat unit area composition of Reach 5.

5.5.2 Pools

Four pool units were observed in Reach 5. Of those four pools, 50% had residual pool depths less than three feet. Residual pool depths ranged from 2.1 feet to 4.3 feet. Pool frequency in Reach 5 was four pools per mile, slightly less than the assessment area average of five pools per mile.

5.5.3 Side Channel Habitat

One side channel was recorded in Reach 5 and provided primarily slow-water habitat. The total length of the side channel measured 726 feet. A total of 71 pieces of LWM (including individual pieces and pieces found in jams) were recorded in the side channel, 73% of the LWM was recorded in the five recorded jams (Table 13).

Table 13. Side channels observed in Reach 5.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 57	726	Slow	19	5	52
<i>Total</i>	<i>726</i>		<i>19</i>	<i>5</i>	<i>52</i>

5.5.4 Large Woody Material

In Reach 5, 253 pieces of LWM were recorded in total, including both individual pieces and pieces recorded in jams. This equates to approximately 230 total pieces of LWM per mile, and 142 pieces of medium and large LWM combined per mile. Fifteen jams were recorded, which contained 81% of all the LWM in the reach (Table 14).

Six constructed wood jams were recorded within the one side channel observed in this reach. Five constructed wood jams were recorded at the downstream extent of the reach (RM 46.5) on the right bank and one constructed wood jam recorded on the right bank at the upstream extent of the reach (RM 47.3) but is currently decomposing.

Table 14. LWM quantities in Reach 5.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	23	16	10	49
Number of Individual pieces per mile	21	24		45
Total LWM per Mile (including pieces in jams)	88	142		230
Number of Jams	15			
Number of Jams per Mile	14			
Estimated Wood Count in Jams	204			

5.5.5 Riparian Corridor

In Reach 5, six separate observations of riparian vegetation condition were made. The dominant overstory was recorded as half Small Tree (9.0 - 20.9-inch dbh), followed by Large Tree (21.0 - 31.9-inch dbh) and Sapling/Pole (5.0 - 8.9-inch dbh). Species observed in the overstory canopy included Cottonwood and Quaking Aspen (Figure 32). The dominant understory observed was Grassland/Forb, though some Willow and Cottonwood in the Shrub/Seedling (1.0 - 4.9-inch dbh) and Sapling/Pole (5.0 - 8.9-inch dbh) size classes were also observed (Figure 33).

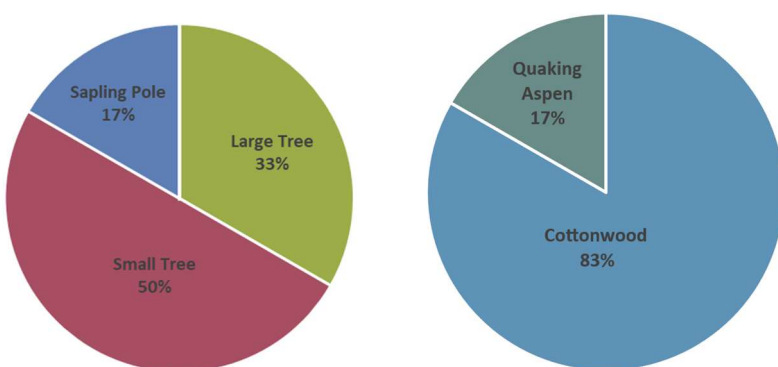


Figure 32. Dominant overstory riparian vegetation, based on six surveyed units, within 100 feet of the Methow River by ocular estimate.

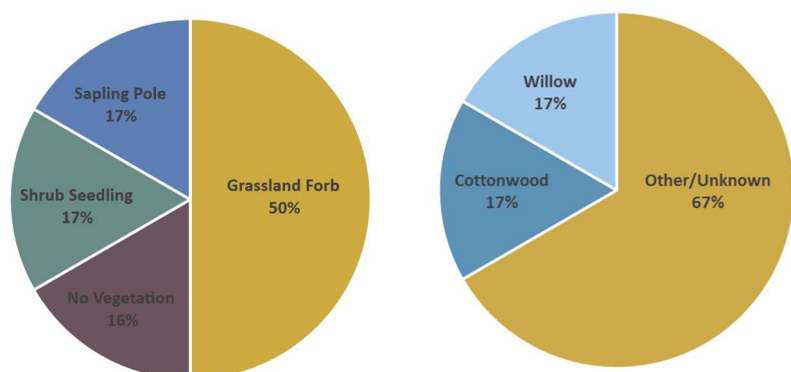


Figure 33. Dominant understory riparian vegetation, based on six surveyed units, within 100 feet of the Methow River by ocular estimate.

5.6 REACH 6

Location: River mile 47.4 – 49.4

Total length: 2 miles

Survey Date: October 25 - 26, 2024



Figure 34. Representative photo of Reach 6 of the Methow River.

5.6.1 Habitat Unit Composition

Reach 6 channel gradient is 0.28%, a slight increase from the previous reach. Fast water units, such as riffles and glides, consisted of a greater proportion of the total habitat area than in adjacent reaches. Pools and side channel units make up the remaining habitat area (Figure 36). Restoration projects were observed along the right bank between RMs 47.8 and 48 and within the constructed side channel (Side 54). Reach 6 ends at the confluence with Bear Creek on the left bank.

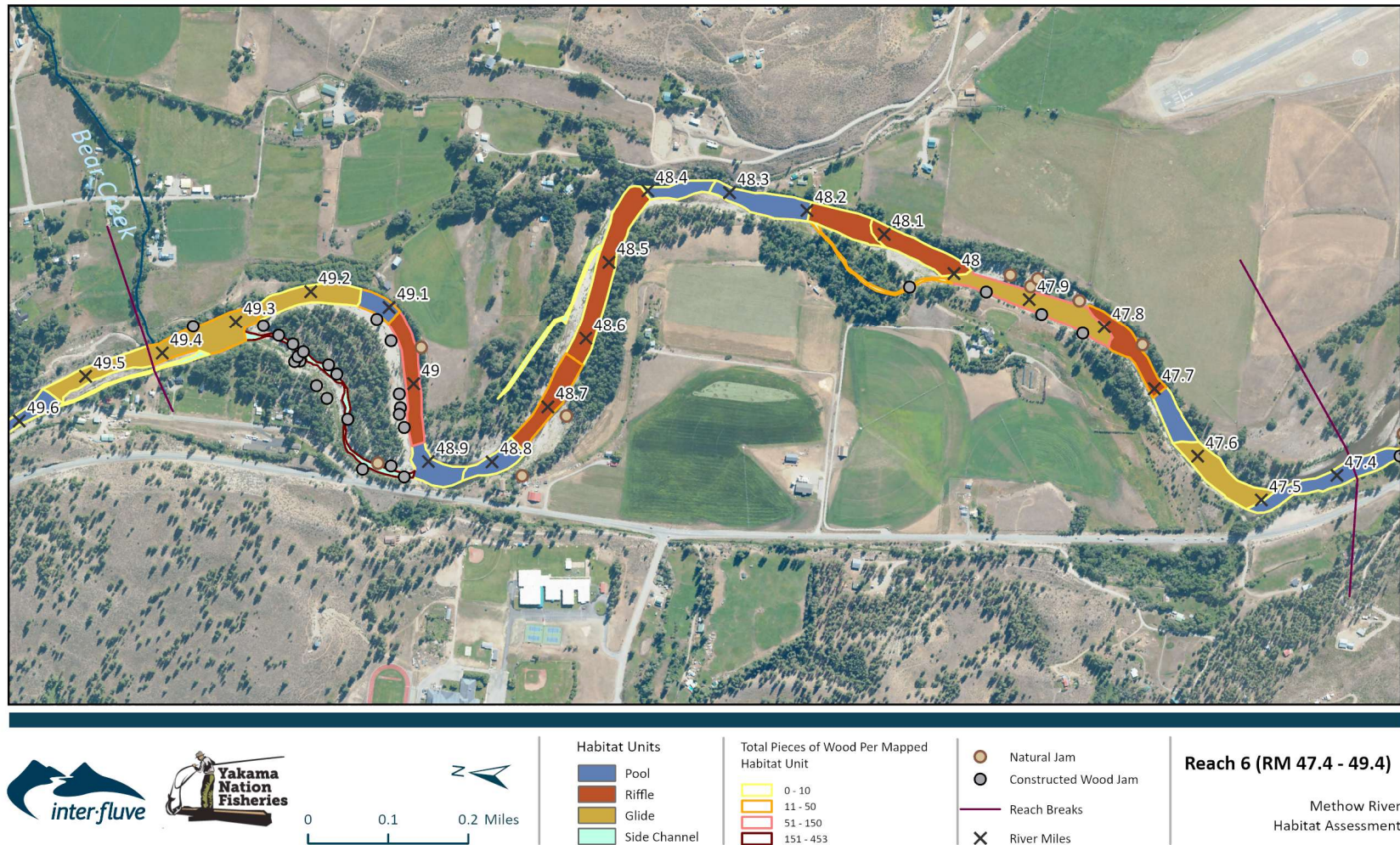


Figure 35. Map of the habitat unit composition and LWM in Reach 6 of the Methow River. LWM count includes pieces in jams.

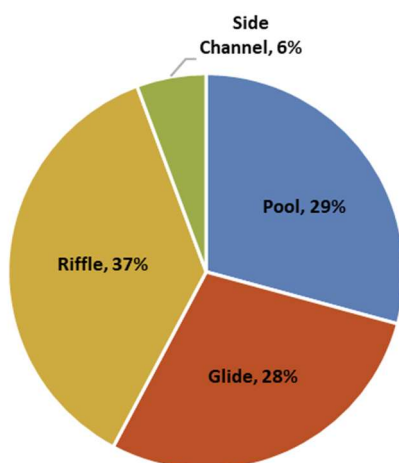


Figure 36. Stream habitat unit area composition of Reach 6.

5.6.2 Pools

Eight pools were observed in Reach 6. Of the eight pools, 50% had a residual pool depth greater than three feet. Residual pool depths in Reach 6 ranged from 1.3 feet to 8.9 feet, with an average of 4.0 feet. The deepest pool, recorded with a residual pool depth of 8.9 feet was recorded at a sharp bend in the river with bedrock along the right bank, near RM 48.8. Pool frequency was four pools per mile, same as the assessment area average.

5.6.3 Side Channel Habitat

Three side channels were recorded in Reach 6 and measured a combined length of 3,952 feet. Two side channels contained mostly slow-water units, and the remaining side channel consisted of faster-moving water (e.g., riffle and glide habitats within the side channel). A total of 321 pieces of LWM (including individual pieces and pieces found in jams) were recorded in the side channels, with a large majority (91%) of the LWM observed in the 17 recorded jams (Table 15). Sixteen of the 17 jams in Side 54. Of the 16 jams, 15 were constructed jams containing 87% of the total LWM recorded. The natural jam observed in Side 54 had evidence of beaver activity.

Table 15. Side channels observed in Reach 6.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 54	1,675	Slow	25	16	307
Side 55	1,182	Fast	0	0	0
Side 56	1,095	Slow	7	1	14
<i>Total</i>	<i>3,952</i>		<i>32</i>	<i>17</i>	<i>321</i>

5.6.4 Large Woody Material

A total of 667 pieces of LWM were recorded in Reach 6, including both individual pieces and pieces recorded in jams. This equates to approximately 334 total LWM pieces per mile and 261 medium and large LWM pieces per mile. Thirty-six jams were recorded in Reach 6 containing approximately 84% of all LWM within the reach (Table 16). A total of 25 constructed jams were recorded in this reach.

Table 16. LWM quantities in Reach 6.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	41	41	25	107
Number of Individual pieces per mile	21	33		54
Total LWM per Mile (including pieces in jams)	73	261		334
Number of Jams	36			
Number of Jams per Mile	18			
Estimated Wood Count in Jams	560			

5.6.5 Riparian Corridor

Riparian vegetation was documented in 17 channel units in Reach 6. Riparian vegetation in the overstory was mostly Cottonwoods in the Small Tree (9.0 - 20.9-inch dbh) size class (Figure 37). Sapling/Pole (5.0 - 8.9-inch dbh) and Large Tree (21.0 - 31.9-inch dbh) size classes, as well as Ponderosa Pine and Alder species, were also recorded in the riparian overstory. A large majority of the riparian understory was recorded as the Sapling/Pole (5.0 - 8.9-inch dbh) size class, comprised of Willow, Dogwood and Alder species (Figure 38). Other size classes observed in the understory were Shrub/Seedling (1.0 - 4.9-inch dbh), Grassland/Forb and No vegetation.

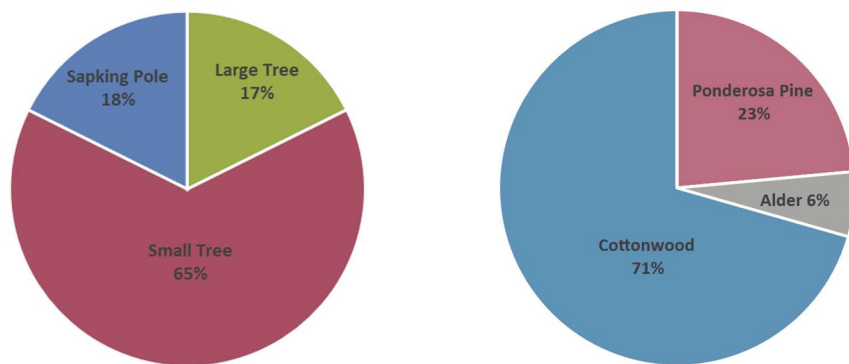


Figure 37. Dominant overstory riparian vegetation, based on 17 surveyed units, within 100 feet of the Methow River by ocular estimate.

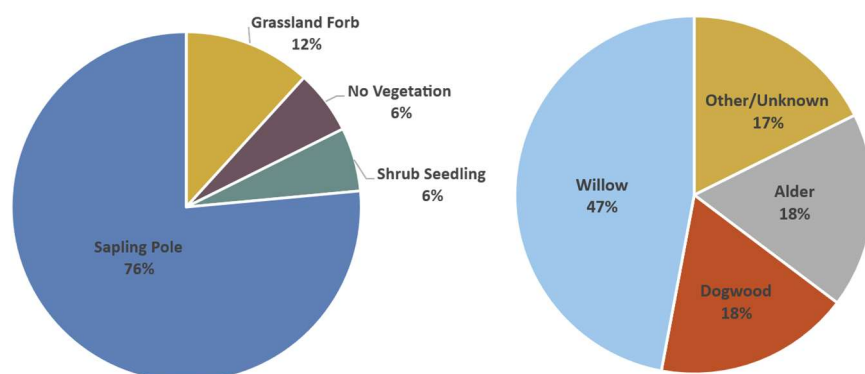


Figure 38. Dominant understory riparian vegetation, based on 17 surveyed units, within 100 feet of Icicle Creek by ocular estimate.

5.7 REACH 7

Location: River mile 49.4 – 50.3

Total length: 0.9 miles

Survey Date: October 24 – 25, 2024



Figure 39. Representative photo of Reach 7 of the Methow River.

5.7.1 Habitat Unit Composition

Reach 7 has a gradient of 0.31%. Over half the total reach area was pool habitat (Figure 41). More glide channel habitat was present in this reach than in the previous reaches. Riffles comprised of less than a tenth of the habitat unit area and the remaining reach area was composed of side channels. Restoration projects, including a revegetation project was observed along the upper and mid extent of the reach (RM 49.8 RM and 49.5).

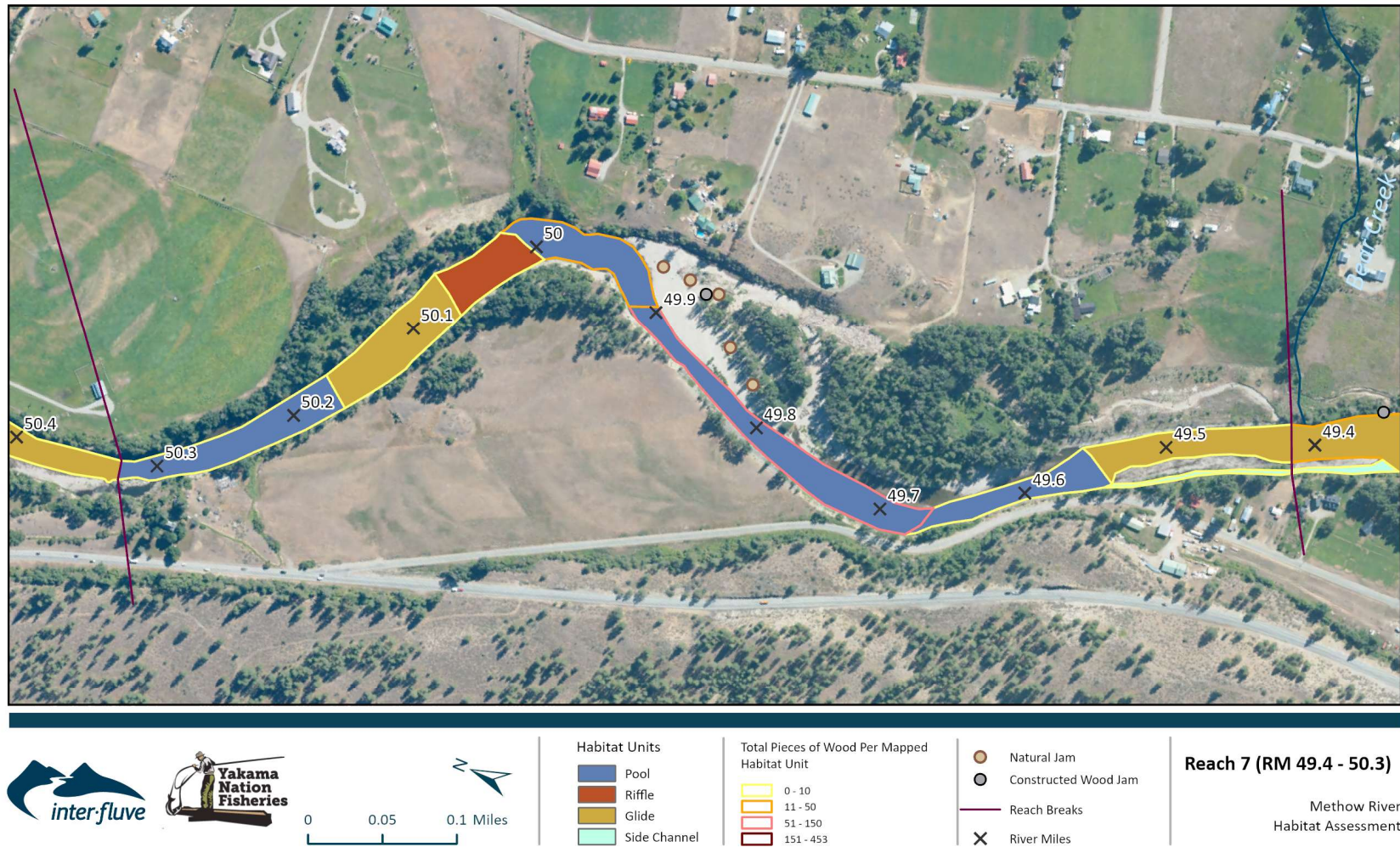


Figure 40. Map of the habitat unit composition and LWM in Reach 7 of the Methow River. LWM count includes pieces in jams.

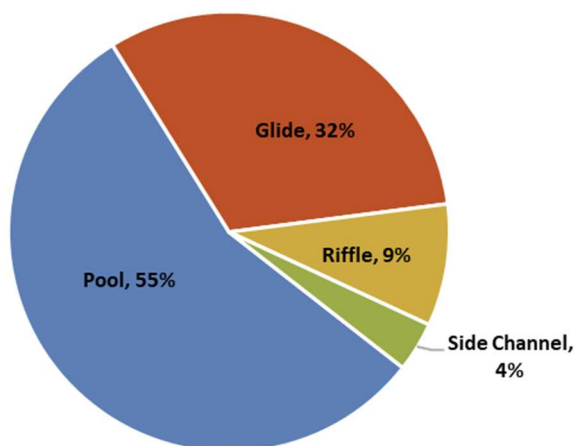


Figure 41. Stream habitat unit area composition of Reach 7.

5.7.2 Pools

A total of three pools were recorded in Reach 7 corresponding to approximately four pools per mile. The average residual pool depth was 4.2 feet, greater than the assessment area average of 3.3 feet. Residual pool depths ranged from 2.7 feet to 5.4 feet. Of the three pools, 66% of pools had a residual pool depth greater than three feet.

5.7.3 Side Channel Habitat

One side channel was recorded in Reach 7 with a channel length of 994 feet. The side channel was observed as a slow-water unit. A total of two pieces of LWM (one small piece and one large piece) were observed. No jams were recorded in the side channels (Table 17).

Table 17. Side channels observed in Reach 7.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 53	994	Slow	2	0	0
<i>Total</i>	<i>994</i>		<i>2</i>	<i>0</i>	<i>0</i>

5.7.4 Large Woody Material

A total of 103 pieces of LWM were recorded in Reach 7. This total includes individual pieces and pieces recorded in jams. This corresponds to 126 total LWM pieces per mile and 77 pieces of medium and large LWM per mile. Twenty-four jams were recorded containing 92 LWM pieces, about 95% of LWM in the entire reach (Table 18). Not included in the final jam count was 11 constructed jams that were observed to be part of a habitat enhancement project (RM 49.75). Due to their presence outside of the channel's bankfull, only one of the 11 jams were included in the final jam count.

Table 18. LWM quantities in Reach 7.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	10	8	3	21
Number of Individual pieces per mile	11	12		23
Total LWM per Mile (including pieces in jams)	49	77		126
Number of Jams	6			
Number of Jams per Mile	7			
Estimated Wood Count in Jams	92			

5.7.5 Riparian Corridor

In Reach 7, a total of seven observations of vegetative conditions were recorded. The dominant overstory in Reach 7 was Cottonwood in the Small Tree size class (9.0 - 20.9-inch dbh). Some Cottonwood in the Large Tree size class (21.0 - 31.9-inch dbh) was observed in the riparian zone, as well as some channels with no riparian vegetation present (Figure 42). The dominant understory consisted of Dogwood and Alder in the Sapling/Pole size class (5.0 - 8.9-inch dbh) with some Grassland/Forb and channel units with no vegetation (Figure 43).

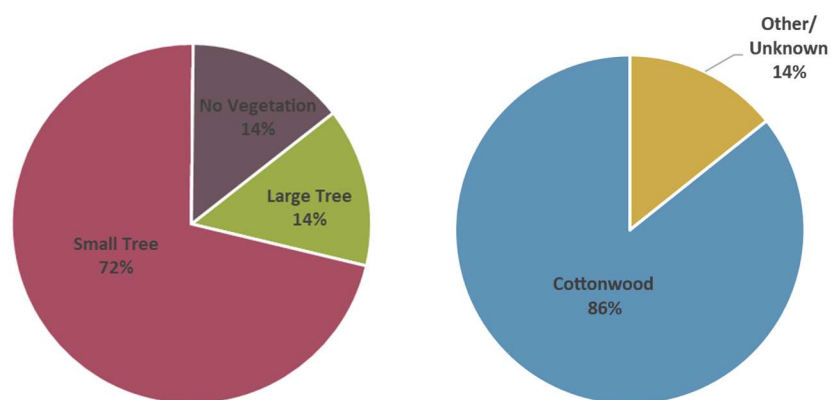


Figure 42. Dominant overstory riparian vegetation, based on seven surveyed units, within 100 feet of Icicle Creek by ocular estimate.

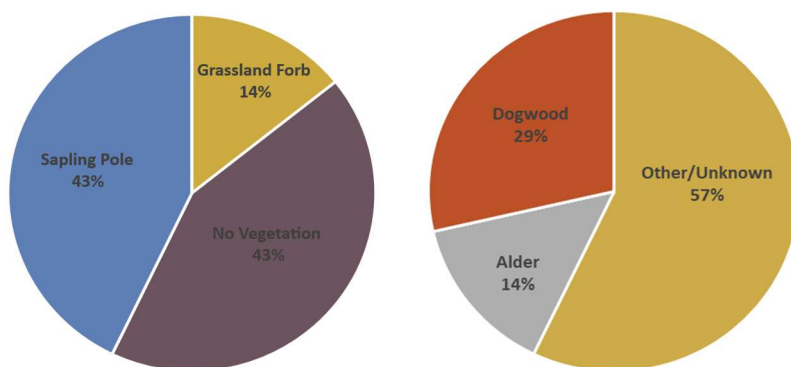


Figure 43. Dominant understory riparian vegetation, based on seven surveyed units, within 100 feet of Icicle Creek by ocular estimate.

5.8 REACH 8

Location: River mile 50.3 – 51.7

Total length: 1.4 miles

Survey Date: October 13, 2024



Figure 44. Representative photo of Reach 8 of the Methow River.

5.8.1 Habitat Unit Composition

In Reach 8, glides compose over half the total reach area. This marks a transition from the downstream pool dominate reaches. Riffles and Pools each, comprise just under a quarter of the habitat surface area (Figure 46). One side channel was recorded. The channel gradient is 0.18%, the lowest gradient in the assessment area. The upper extent of this reach ends in the town of Winthrop WA., at the confluence with the Chewuch River. The channel banks have been affected by anthropogenic features including bank armoring along SR-20 road prism, historic bridge abutments, active walking and road bridges, and land use modifications on private property, parks and campgrounds.

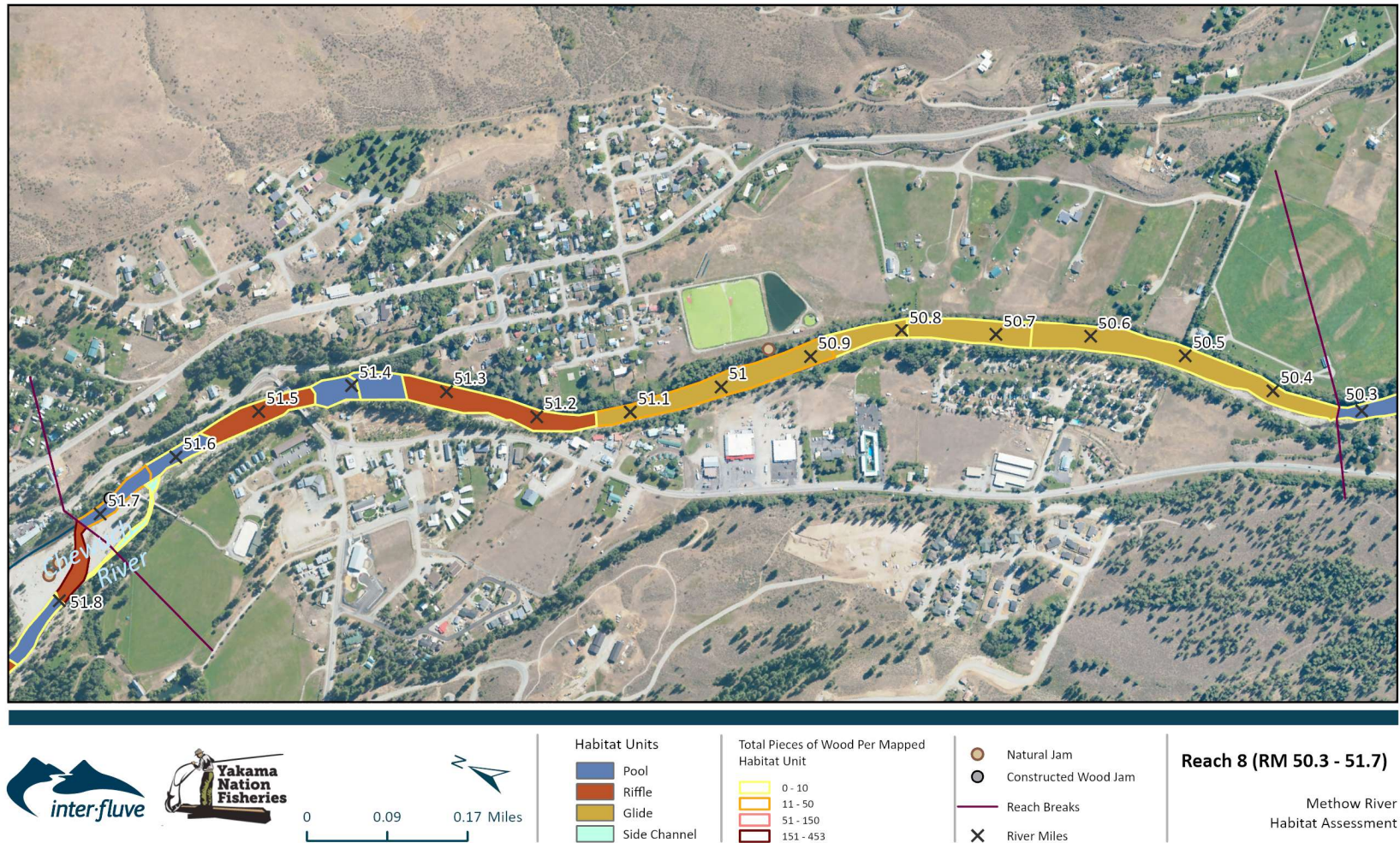


Figure 45. Map of the habitat unit composition and LWM in Reach 8 of the Methow River. LWM count includes pieces in jams.

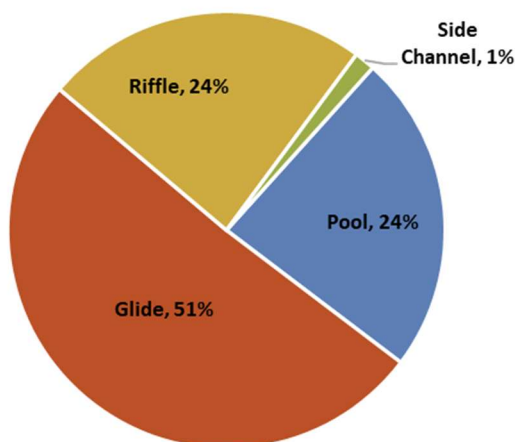


Figure 46. Habitat unit area composition for Reach 8.

5.8.2 Pools

Reach 8 had a total of five pools recorded. Pool frequency in this reach was four pools per mile, equivalent to the assessment area average. Of the pools, 20% of pools had a residual pool depth greater than three feet. Average residual pool depth was 2.8 feet, ranging from 2.3 feet to 3.3 feet. The average residual pool depth for the assessment area was 3. feet.

5.8.3 Side Channel Habitat

Reach 8 had one recorded side channel with a channel length of 703 feet. The side channel contained primarily fast-water habitat (e.g., riffle and glide habitat within the side channels), and contained two pieces of LWM (one small piece and one medium piece). No jams were recorded in the side channels (Table 19)

Table 19. Side channels observed in Reach 8.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 52	703	Fast	2	0	0
<i>Total</i>	<i>703</i>		<i>2</i>	<i>0</i>	<i>0</i>

5.8.4 Large Woody Material

Reach 8 had a total of 84 pieces of LWM. This total includes individual pieces and pieces recorded in jams. This corresponds to 60 total pieces of LWM per mile and 29 pieces of medium and large LWM per mile. Of the 84 pieces, 19% of the LWM was recorded in wood jams. Two wood jams were recorded in the reach, for a frequency of roughly one wood jams per mile (Table 20).

Table 20. LWM quantities in Reach 8.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	43	20	5	68
Number of Individual pieces per mile	31	18		49
Total LWM per Mile (including pieces in jams)	31	29		60
Number of Jams	2			
Number of Jams per Mile	1			
Estimated Wood Count in Jams	16			

5.8.5 Riparian Corridor

A total of ten observation of vegetation conditions were recorded in Reach 8. The dominant overstory was Cottonwood in the Small Tree size class (9.0 - 20.9-inch dbh). Alder in the Large Tree (21.0 - 31.9-inch dbh) and Sapling/Pole size classes (5.0 - 8.9-inch dbh) comprised the remaining observed units (Figure 47). The dominant understory was Willow, Dogwood and Alder in the Sapling/Pole size class. Grassland/Forb and channel units with no vegetation were recorded in this reach (Figure 48).

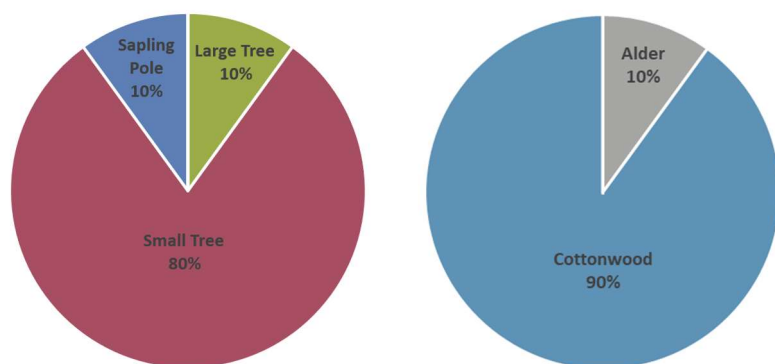


Figure 47. Dominant overstory riparian vegetation, based on ten surveyed units, within 100 feet of the Methow River by ocular estimate.

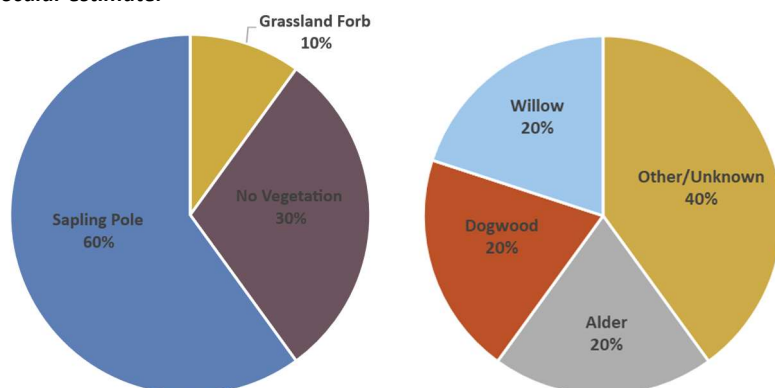


Figure 48. Dominant understory riparian vegetation, based on ten surveyed units, within 100 feet of the Methow River by ocular estimate.

5.9 REACH 9

Location: River mile 51.7 – 53.2

Total length: 1.5 miles

Survey Date: October 12 - 13, 2024



Figure 49. Representative photo of Reach 9 of the Methow River.

5.9.1 Habitat Unit Composition

Reach 9 had a channel gradient of 0.25. Majority of the channel unit composition in this reach was pools, followed by riffles and glides. One side channel was recorded (Figure 51). The downstream extent of this reach is in the town of Winthrop WA., at the confluence with the Chewuch River. The channel banks have been affected by anthropogenic features including residential development, road infrastructure, fish hatchery infrastructure and public access trails and bridges. The upstream extent of this reach is upstream of the Foghorn diversion impoundment.

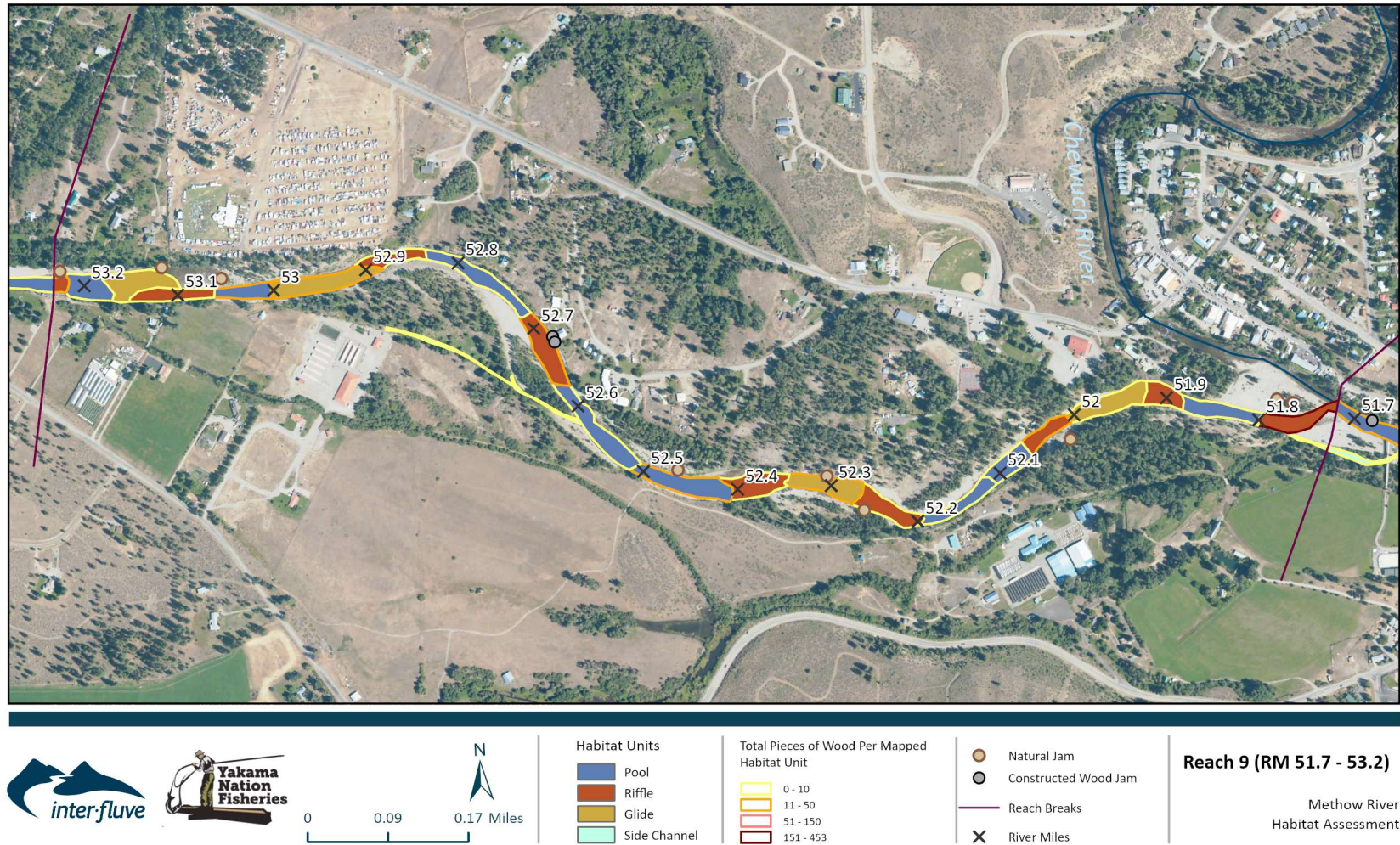


Figure 50. Map of the habitat unit composition and LWM in Reach 9 of the Methow River. LWM count includes pieces in jams.

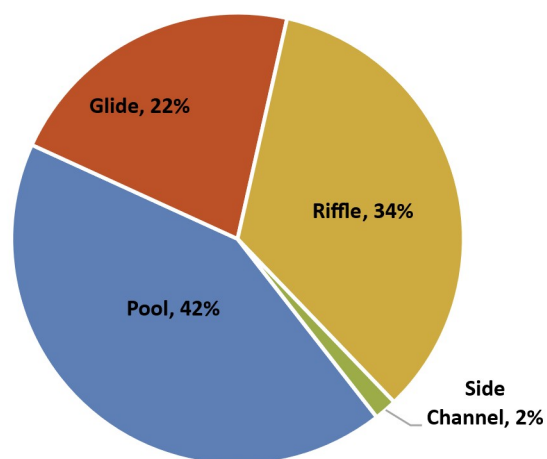


Figure 51. Stream habitat unit area composition for Reach 9.

5.9.2 Pools

Eight pools were recorded in Reach 9, corresponding to a pool frequency of five pools per mile. Average residual pool depth ranged from 1.1 feet to 13.7 feet, with an average of 3.8 feet. The very deep pool with a residual pool depth of 13.4 was recorded downstream of the Foghorn diversion. Of the eight pools, 38% of pools had a residual pool depth greater than three feet.

5.9.3 Side Channel Habitat

In Reach 9, one side channel was recorded with a total channel length of 1,208 feet. The side channel was observed to contain primarily fast-water habitat (e.g., riffle and glide habitat within the side channels). A total of four pieces of LWM (three small pieces and one medium pieces) was recorded. No jams were recorded (Table 21).

Table 21. Side channels observed in Reach 9.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 51	1,208	Fast	4	0	0
Total	1,208		4	0	0

5.9.4 Large Woody Material

A total of 206 pieces of LWM were recorded in Reach 9 (Table 22). This total includes individual pieces and pieces recorded in jams. This results in approximately 137 total LWM pieces per mile, and 65 medium and large LWM pieces per mile. Eleven jams were recorded within this reach, equating to a frequency of approximately seven jams per mile and containing almost 49% of the total LWM (Table 22). Two constructed jams were observed along the left bank near River Run Inn (RM 52.75).

Table 22. LWM quantities in Reach 9.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	62	33	11	106
Number of Individual pieces per mile	41	29		71
Total LWM per Mile (including pieces in jams)	73	65		137
Number of Jams	11			
Number of Jams per Mile	7			
Estimated Wood Count in Jams	100			

5.9.5 Riparian Corridor

Based on 15 ocular assessments of riparian vegetation in Reach 9, the dominant overstory was comprised of Cottonwood in the Small Tree (9.0 - 20.9-inch dbh) and Sapling/Pole (5.0 - 8.9-inch dbh) size classes (Figure 52). The dominant understory was Willow and Alder in the Sapling/Pole size class. Grassland/Forb and channel units with no vegetation was also observed in the riparian vegetation zone (Figure 53).

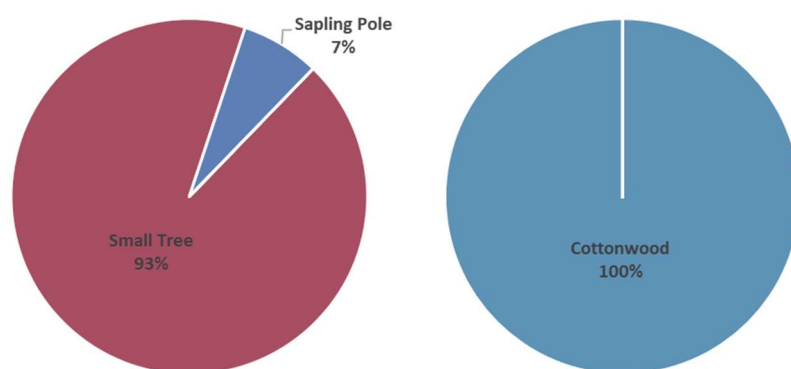


Figure 52. Dominant overstory riparian vegetation, based on 15 surveyed units, within 100 feet of the Methow River by ocular estimate.

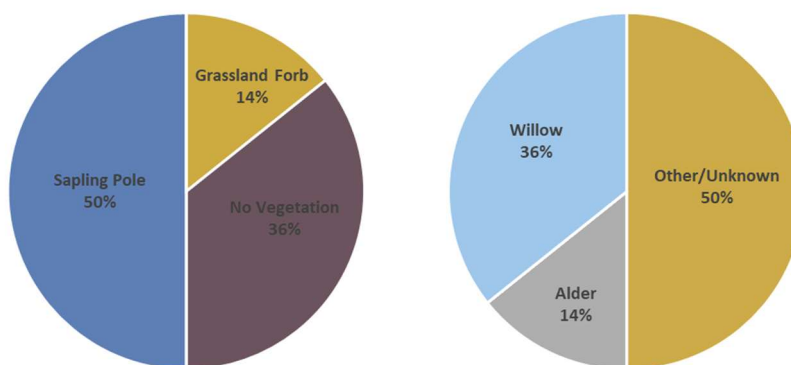


Figure 53. Dominant understory riparian vegetation, based on 15 surveyed units, within 100 feet of the Methow River by ocular estimate.

5.10 REACH 10

Location: River mile 53.2 – 54.5

Total length: 1.3 miles

Survey Date: October 12, 2024



Figure 54. Representative photo of Reach 10 of the Methow River.

5.10.1 Habitat Unit Composition

Reach 10 was composed of primarily glide habitat units, followed by riffles and pools. No side channels were recorded (Figure 56). The channel gradient is approximately 0.52%, the highest in the assessment area. due to high rates of entrenchment due to anthropogenic effects and partial natural confinement. Anthropogenic features affecting the channel banks included residential and agricultural infrastructure and bank armoring along SR-20's road prism. The upstream extent of this reach is the confluence with Wolf Creek.

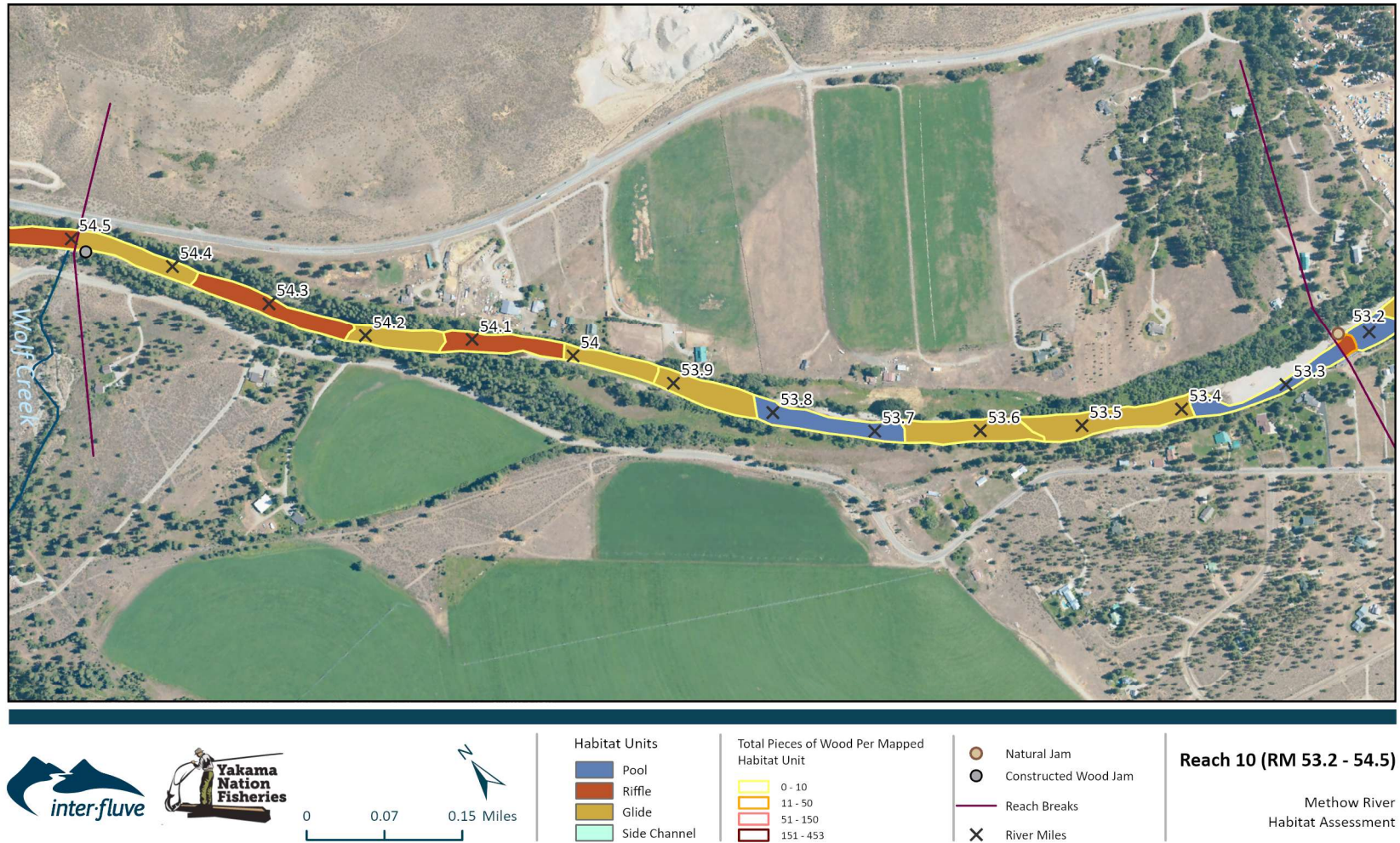


Figure 55. Map of the habitat unit composition and LWM in Reach 10 of the Methow River. LWM count includes pieces in jams.

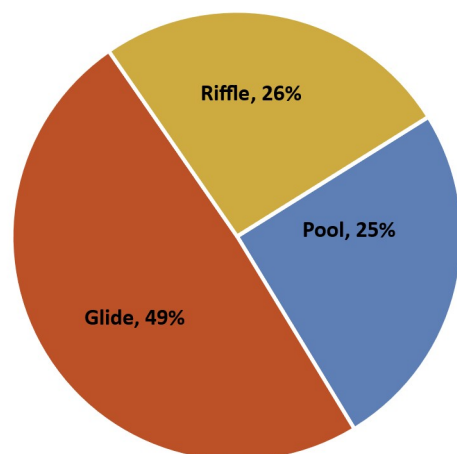


Figure 56. Stream habitat unit area composition of Reach 10.

5.10.2 Pools

Two pools were recorded in Reach 10, corresponding to a pool frequency of approximately two pools per mile. Of the two pools, 50% had a residual pool depth greater than three feet. Residual pool depth ranged from 2.0 feet to 5.0 feet with an average residual pool depth of 3.5 feet.

5.10.3 Side Channel Habitat

No side channels were recorded in Reach 10.

5.10.4 Large Woody Material

A total of 51 pieces of LWM was recorded in Reach 10. This total includes individual pieces and pieces recorded in jams. This corresponds to approximately 39 total LWM pieces per mile and 18 medium and large LWM pieces per mile (Table 23). One jam was recorded in this reach containing 8% of the total LWM pieces. The jam was constructed and embedded in the right bank downstream of Wolf Creek's confluence with the Methow River (RM 54.5).

Table 23. LWM quantities of Reach 10.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	23	15	9	47
Number of Individual pieces per mile	18	18		36
Total LWM per Mile (including pieces in jams)	21	18		39
Number of Jams	1			
Number of Jams per Mile	1			
Estimated Wood Count in Jams	4			

5.10.5 Riparian Corridor

In Reach 10, seven observations of vegetation conditions were recorded. The dominant overstory size class in this reach was Ponderosa Pine in the Small Tree (9.0 - 20.9-inch dbh) and Large tree (21.0 - 31.9-

inch dbh) size classes. Cottonwood and Quaking Aspen in the Small Tree and Large Tree size classes were also observed in the riparian vegetation zone; the remaining channel units was observed with no (Figure 57). The dominant understory was mainly Dogwood, followed by Cottonwood and Alder in the Shrub/Seedling (1.0 - 4.9-inch dbh) and Sapling/Pole (5.0 - 8.9-inch dbh) size classes. The remaining channel units was observed with no vegetation (Figure 57).

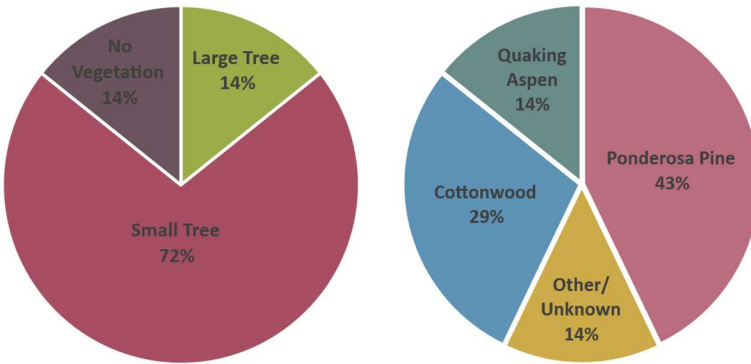
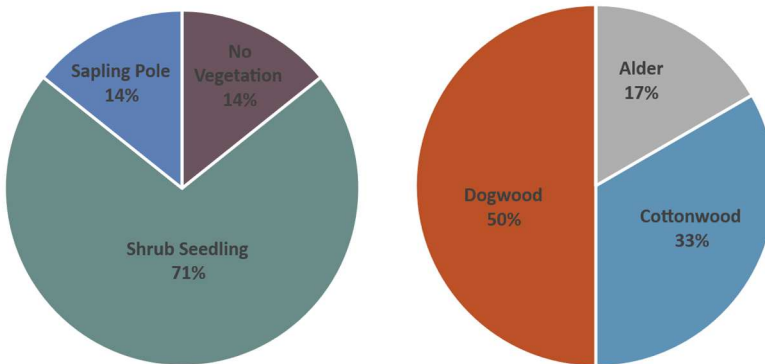


Figure 57. Dominant overstory riparian vegetation, based on seven surveyed units, within 100 feet of the Methow River by ocular estimate.



5.11 REACH 11

Location: River mile 54.5 – 55.4

Total length: 0.9 mile

Survey Date: October 10 – 12, 2024



Figure 58. Representative photo of Reach 11 of the Methow River.

5.11.1 Habitat Unit Composition

Reach 11 had a channel gradient of 0.38%. Fast water units (riffles and glide units) comprised approximately 87% of channel unit area Reach 11. Riffles comprised most of the reach, followed by glides then pool units. No side channels were recorded in this reach (Figure 60). Anthropogenic features affecting the channel banks included Residential and agricultural infrastructure and bank armoring along SR-20's road prism.

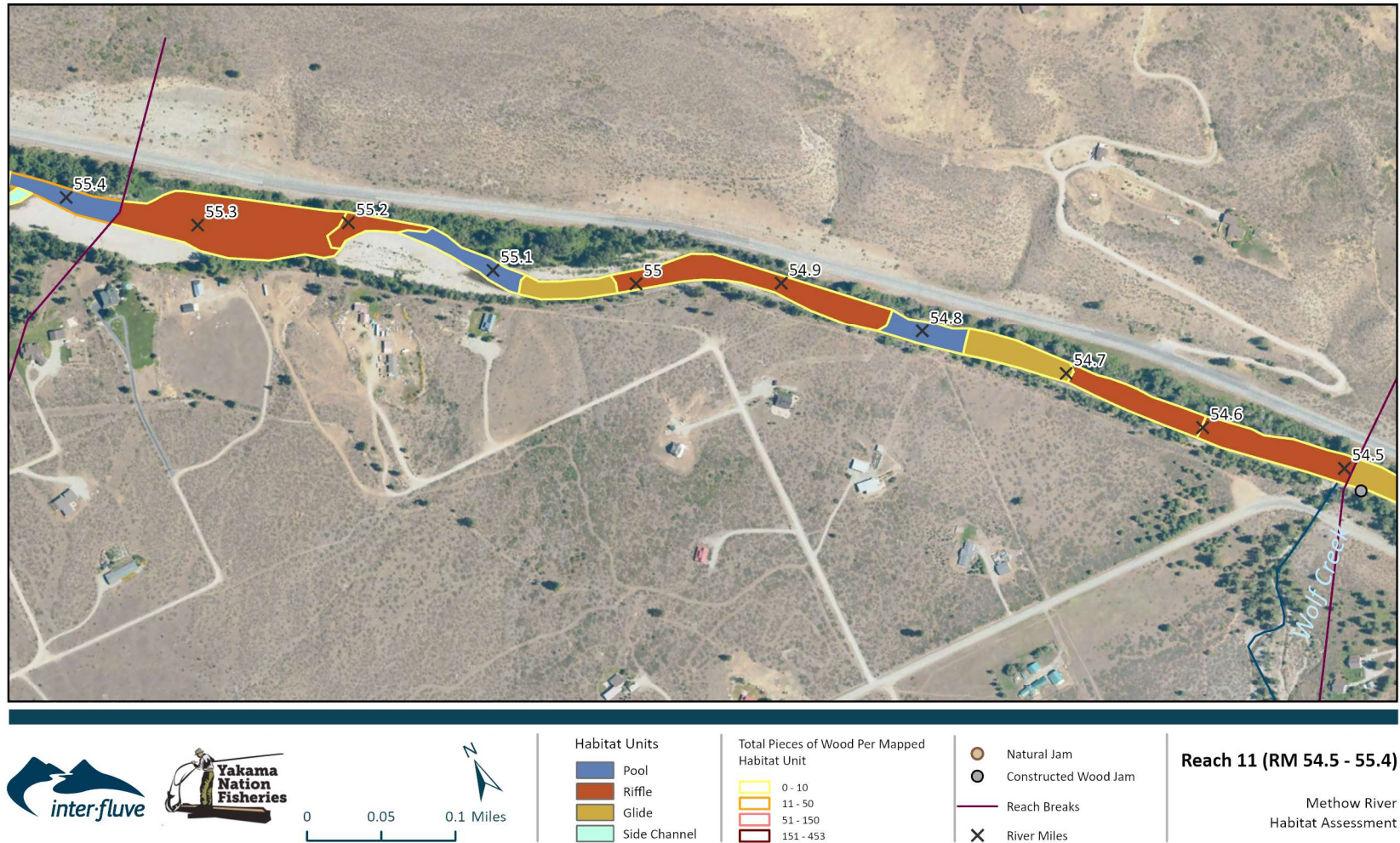


Figure 59. Map of the habitat unit composition and LWM in Reach 11 of the Methow River. LWM count includes pieces in jams.

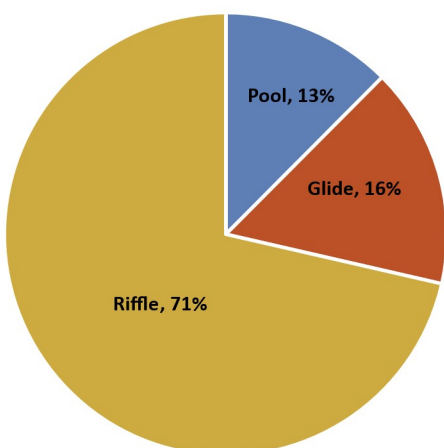


Figure 60. Stream habitat unit area composition of Reach 11.

5.11.2 Pools

Two pools were recorded in Reach 11, resulting in an approximate pool frequency of two pools per mile. The average residual pool depth was 1.3 feet and ranged from 1.0 feet to 1.6 feet. All pools (100%) in this reach had residual depth less than three feet.

5.11.3 Side Channel Habitat

No side channels were recorded in Reach 10.

5.11.4 Large Woody Material

Reach 11 had the least amount of total LWM within the assessment area, containing 22 total LWM pieces. No jams were recorded in this reach. The frequency of LWM was approximately 24 total LWM pieces per mile, and 12 medium and large LWM pieces (Table 24).

Table 24. LWM quantities of Reach 11.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	11	10	1	22
Number of Individual pieces per mile	12	12		24
Total LWM per Mile (including pieces in jams)	12	12		24
Number of Jams	0			
Number of Jams per Mile	0			
Estimated Wood Count in Jams	0			

5.11.5 Riparian Corridor

A total of six observations of vegetative conditions were recorded in Reach 11. The dominant overstory was Cottonwood and Ponderosa Pine in the Small Tree size class (9.0 - 20.9-inch dbh (Figure 61)). The remaining channel units were observed with no vegetation. The dominant understory was comprised of

mainly Dogwood, followed by Cottonwood in the Sapling /Pole size class (5.0 - 8.9-inch dbh and Grassland/Forb (Figure 62).

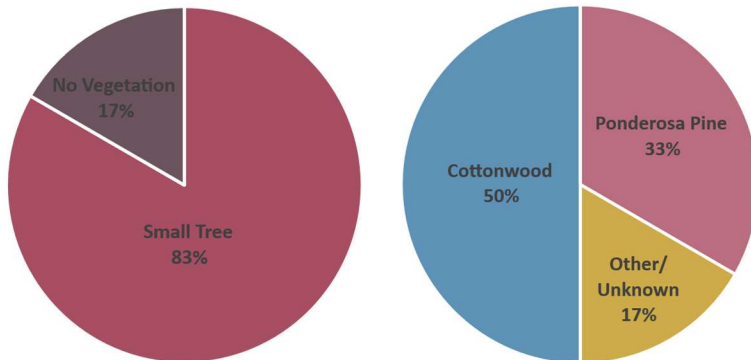


Figure 61. Dominant overstory riparian vegetation, based on six surveyed units, within 100 feet of the Methow River by ocular estimate.

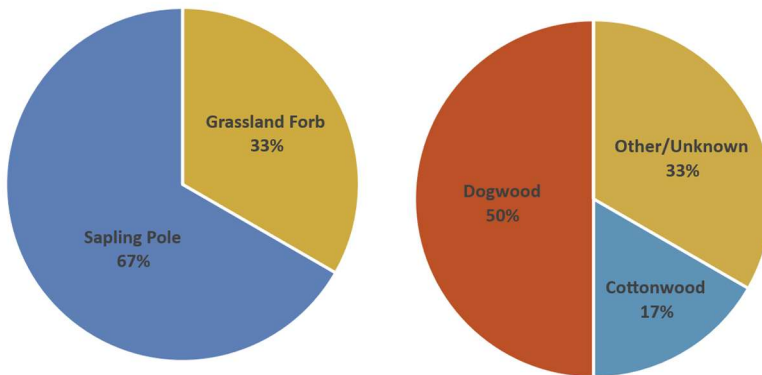


Figure 62. Dominant understory riparian vegetation, based on six surveyed units, within 100 feet of the Methow River by ocular estimate.

5.12 REACH 12

Location: River mile 55.4 – 57.1

Total length: 1.7 miles

Survey Date: October 8 - 10, 2024



Figure 63. Representative photo of Reach 12 of the Methow River.

5.12.1 Habitat Unit Composition

In Reach 12, side channels comprised almost a third of the channel unit area. Most of the side channels were sourced from hyporheic flow and/or floodplain tributaries. Beaver activity was extensive within the side channels. In the mainstem, pool habitats were frequent, consisting of a third of the reach area. Glides and riffles made up the remainder of the habitat area, at 21% and 18%, respectively (Figure 65). Channel gradient in Reach 12 was 0.27%. Reach 12 marks a shift in channel dynamics; floodplain connectivity and channel migration increase, as well as the diversity of riparian vegetation composition. Due to the presence of salmon redds and beaver activity, some data is based on ocular estimates from the crew walking along the banks. Additionally, in this reach split flow conditions driven by large wood contributions, produce complex geomorphic and habitat functions.

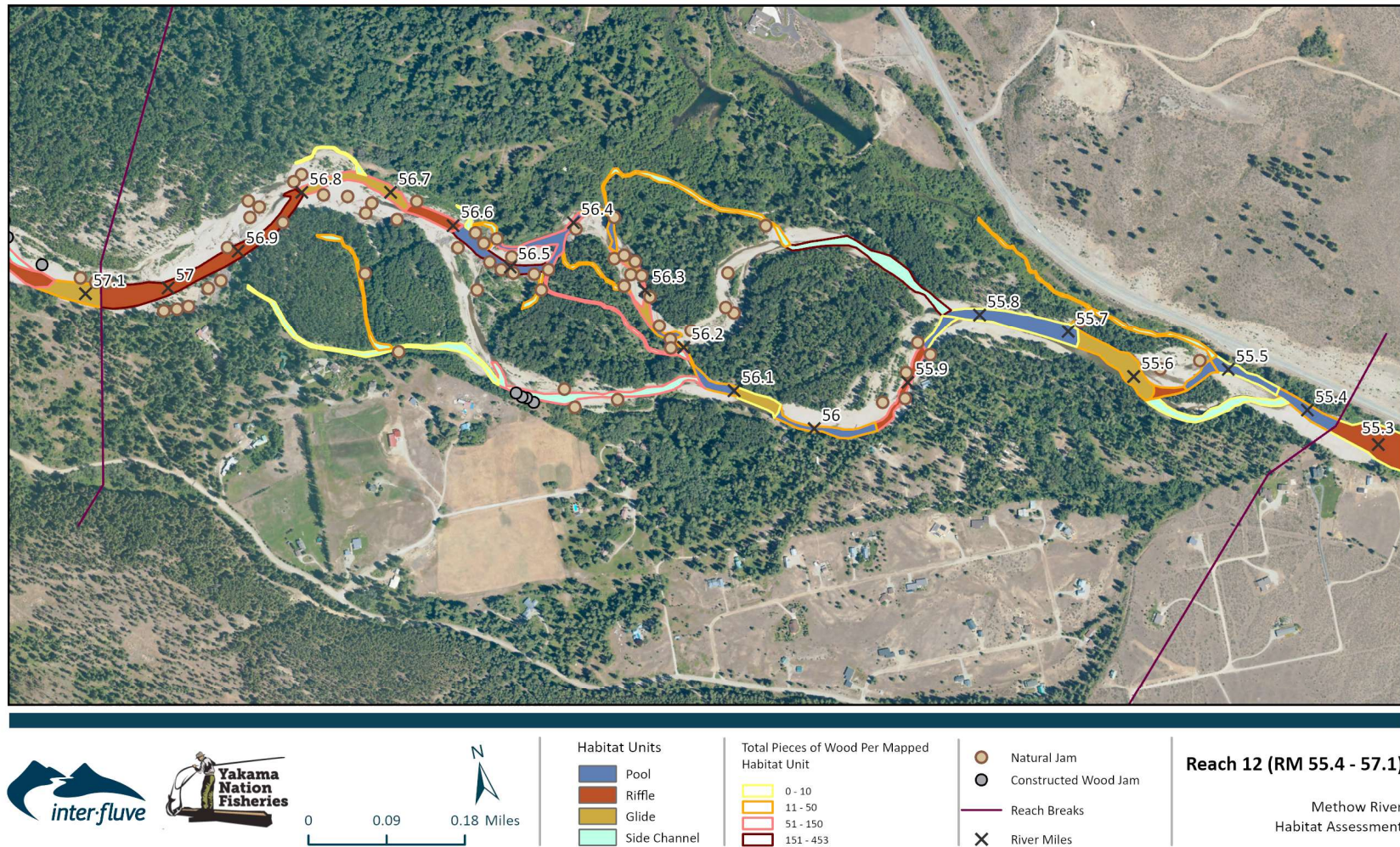


Figure 64. Map of the habitat unit composition and LWM in Reach 12 of the Methow River. LWM count includes pieces in jams.

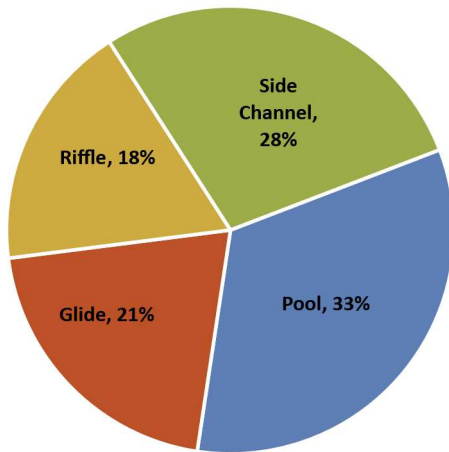


Figure 65. Habitat unit area composition of Reach 12.

5.12.2 Pools

Ten pools were recorded in Reach 12, with an average residual pool depth of approximately three feet. Residual pool depth ranged from 1.8 feet to 4.5 feet. Of the ten pools, 40% of pools had a residual pool depth greater than three feet. Pool frequency in this reach was approximately six pools per mile, greater than the assessment area average of five pools per mile.

5.12.3 Side Channel Habitat

The most side channels were recorded in Reach 12. A total of 14 side channels were recorded (Table 25). Most side channels were observed as primarily slow-water habitat, and only four side channels observed as primarily fast-water habitat (e.g., riffle and glide habitat within the side channels). A total of 551 total LWM (individual and pieces observed in jams), and 20 jams were recorded in the side channels. A single jam recorded approximately 190 LWM (Side 46).

Table 25. Side channels observed in Reach 12.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 37	506	Slow	5	0	0
Side 38	175	Slow	0	0	0
Side 39	291	Slow	0	1	12
Side 40	257	Slow	0	2	28
Side 41	545	Slow	35	1	5
Side 42	1368	Slow	0	9	106
Side 43	1,776	Slow	1	1	8
Side 44	916	Slow	9	1	11
Side 45	1,113	Fast	45	1	6
Side 46	1,117	Fast	14	3	203
Side 47	1,464	Fast	2	1	12
Side 48	979	Fast	0	1	36
Side 49	906	Slow	6	0	0
Side 50	861	Slow	7	0	0
<i>Total</i>	<i>12,276</i>		<i>124</i>	<i>20</i>	<i>427</i>

5.12.4 Large Woody Material

Reach 12 had the most LWM pieces accounting for approximately 25% total LWM within the assessment area (including both individual pieces and LWM pieces observed in jams). A total of 1,812 LWM was recorded in the reach. This total includes individual pieces and pieces recorded in jams. This equates to approximately 1,066 total LWM per mile and 491 medium and large LWM per mile. Sixty-one jams were recorded in the reach, accounting for 85% of the total LWM (Table 26). All jams within this reach were naturally occurring, not constructed.

Table 26. LWM quantities in Reach 12.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	154	92	33	279
Number of Individual pieces per mile	91	74		164
Total LWM per Mile (including pieces in jams)	575	491		1066
Number of Jams	61			
Number of Jams per Mile	36			
Estimated Wood Count in Jams	1,533			

5.12.5 Riparian Corridor

Riparian vegetation conditions were recorded in sixteen channel units in Reach 12. The overstory consisted primarily of Cottonwood in the Small Tree size class (9.0 - 20.9-inch dbh), though some smaller (Sapling pole [5.0 - 8.9-inch dbh]) and larger (Large Tree [21.0 - 31.9-inch dbh]) vegetation size classes were observed. Alder and Ponderosa Pine was observed in the riparian vegetation zone, as well as channel units with no vegetation (Figure 66). The understory was primarily composed of Grassland/Forb

and Dogwood, Alder and Willow in the Sapling/Pole size class (5.0 - 8.9-inch dbh). No vegetation was observed in some channel units (Figure 67).

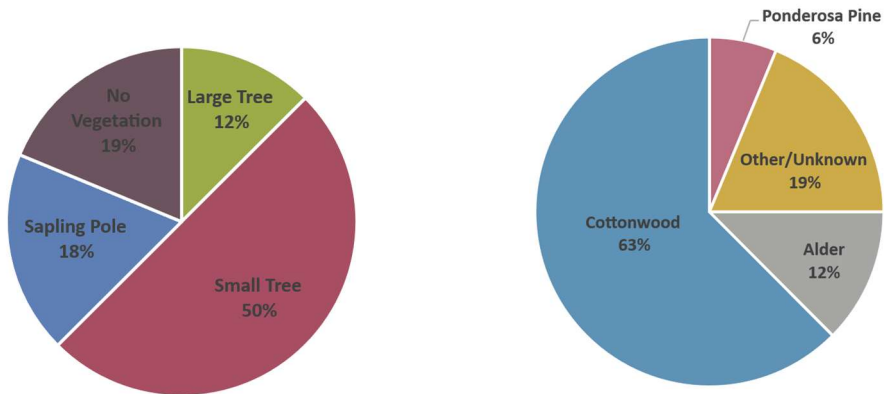


Figure 66. Dominant overstory riparian vegetation, based on 16 surveyed units, within 100 feet of the Methow river by ocular estimate.

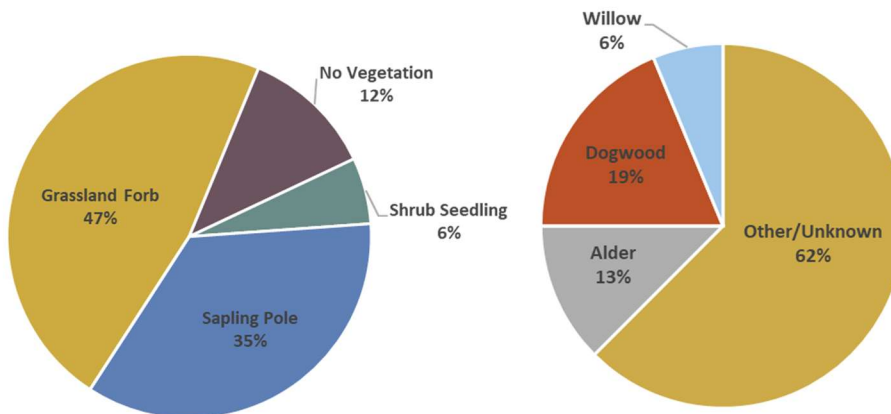


Figure 67. Dominant understory riparian vegetation, based on 16 surveyed units, within 100 feet of the Methow river by ocular estimate.

5.13 REACH 13

Location: River mile 57.1 – 59.3

Total length: 2.2 miles

Survey Date: September 29 and October 8, 2024



Figure 68. Representative photo of Reach 13 of the Methow River.

5.13.1 Habitat Unit Composition

Reach 13 is the longest reach in the assessment area, at approximately 2.2 miles. The channel gradient was 0.35%. Pools were the primary channel unit type comprising approximately 40% of the total reach area, followed by side channels then fast water units (Figure 70). Similar to Reach 12, many side channels in this reach were sourced from hyporheic flow and/or floodplain tributaries. They also contained high beaver activity.

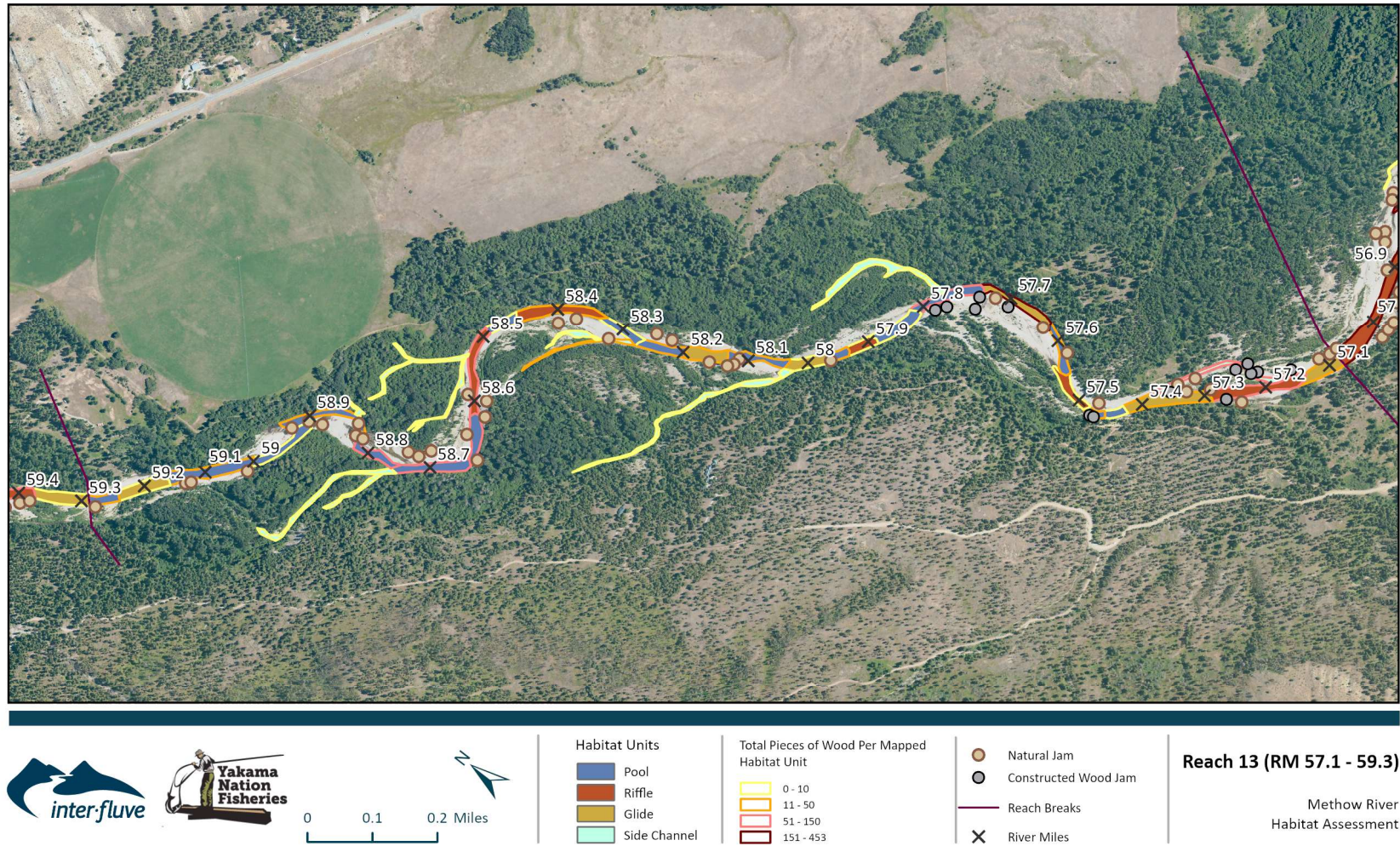


Figure 69. Map of the habitat unit composition and LWM in Reach 13 of the Methow River. LWM count includes pieces in jams.

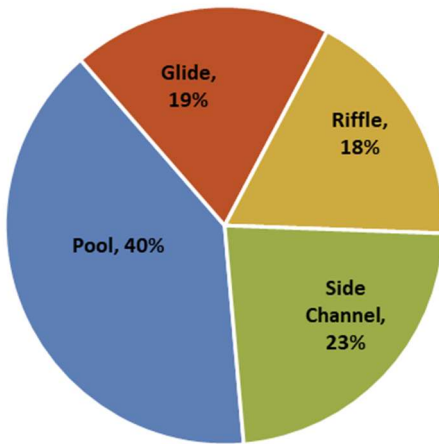


Figure 70. Stream habitat unit area composition of Reach 13.

5.13.2 Pools

A total of 17 pools were recorded in Reach 13. The average residual pool depth in the reach was 2.7 feet and ranged from 0.6 feet and 5.3 feet. Of the 17 pools, 29% had residual pool depths greater than 3 feet. The pool frequency in this reach was eight pools per mile.

5.13.3 Side Channel Habitat

Twelve side channels were recorded in Reach 13. One side channel contained mostly fast-water habitat (e.g., riffle and glide habitat within the side channels), while the rest of the side channels were primarily slow-water. A total of 139 LWM (including individual pieces and pieces found in jams) was observed in the side channels, Of the total count, 55% of LWM pieces were observed in the seven recorded jams (Table 27).

Table 27. Side channels observed in Reach 13.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 26	146	Slow	2	0	0
Side 27	526	Slow	10	0	0
Side 28	1,336	Slow	9	0	0
Side 29	115	Slow	4	0	0
Side 30	782	Slow	6	0	0
Side 31	984	Slow	4	0	0
Side 32	933	Slow	6	1	5
Side 33	465	Slow	1	0	0
Side 34	2,003	Slow	0	0	0
Side 35	1,272	Slow	0	0	0
Side 36	1,075	Fast	11	6	71
<i>Total</i>	<i>9,637</i>		<i>63</i>	<i>7</i>	<i>76</i>

5.13.4 Large Woody Material

A total of 1,098 pieces of LWM was recorded in Reach 13. This total includes individual pieces and pieces recorded in jams. This results in approximately 499 total LWM pieces per mile, and 282 medium and large LWM pieces per mile (Table 28). Fifty-four jams were recorded in this reach, a frequency of approximately 25 jams per mile. Of the 54 jams, 13 jams were constructed as part of habitat enhancement projects between RM 57.25 and RM 57.75.

Table 28. LWM quantities in Reach 13.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	141	77	26	244
Number of Individual pieces per mile	64	47		111
Total LWM per Mile (including pieces in jams)	217	282		499
Number of Jams	54			
Number of Jams per Mile	25			
Estimated Wood Count in Jams	854			

5.13.5 Riparian Corridor

Riparian vegetation conditions were recorded in 23 channel units in Reach 13. The overstory was mainly Cottonwood in the Small Tree size class (9.0 - 20.9-inch dbh), though some smaller (Sapling pole [5.0 - 8.9-inch dbh]) and larger (Large tree [21.0 - 31.9-inch dbh]) vegetative size classes were observed (Figure 71). The understory was recorded as mainly Cottonwood, Dogwood and Alder in the Sapling/Pole and Shrub/Seedling (1.0 - 4.9-inch dbh), followed by Willow and Quaking Aspen in the same size classes. Grassland forb and channel units with no vegetation was observed in the riparian vegetative zone (Figure 72).

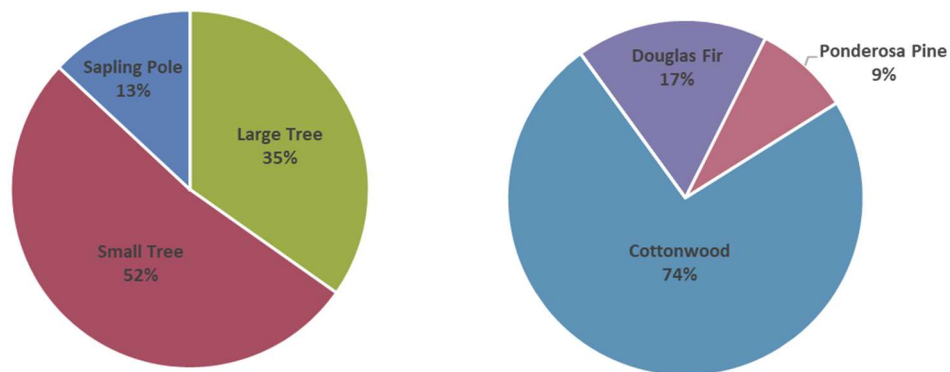


Figure 71. Dominant overstory riparian vegetation, based on 23 surveyed units, within 100 feet of the Methow River by ocular estimate.

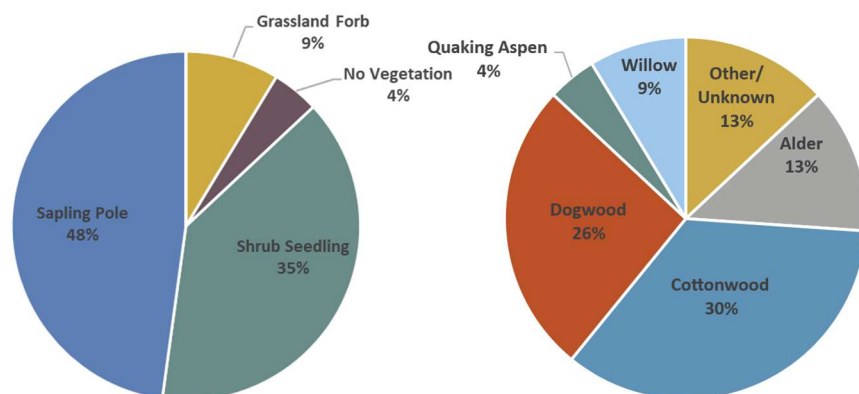


Figure 72. Dominant understory riparian vegetation, based on 23 surveyed units, within 100 feet of the Methow River by ocular estimate.

5.14 REACH 14

Location: River mile 59.3 – 60.6

Total length: 1.3 miles

Survey Date: September 28 – 29, 2024



Figure 73. Representative photo of Reach 14 of the Methow River.

5.14.1 Habitat Unit Composition

Reach 14 was primarily glide channel unit types, followed by pools, side channels and riffles (Figure 75). The channel gradient in this reach was approximately 0.39%. Due to the presence of salmon redds in many channel units, same data is based on ocular estimates from the survey crew walking along the bank. Restoration projects (RM 59.7) occurred on the right bank and included three constructed jams and bank armoring. Similar to the previous two reaches, side channels comprise a significant amount of the reach area (21%) and many were sourced from hyporheic flow and/or floodplain tributaries.

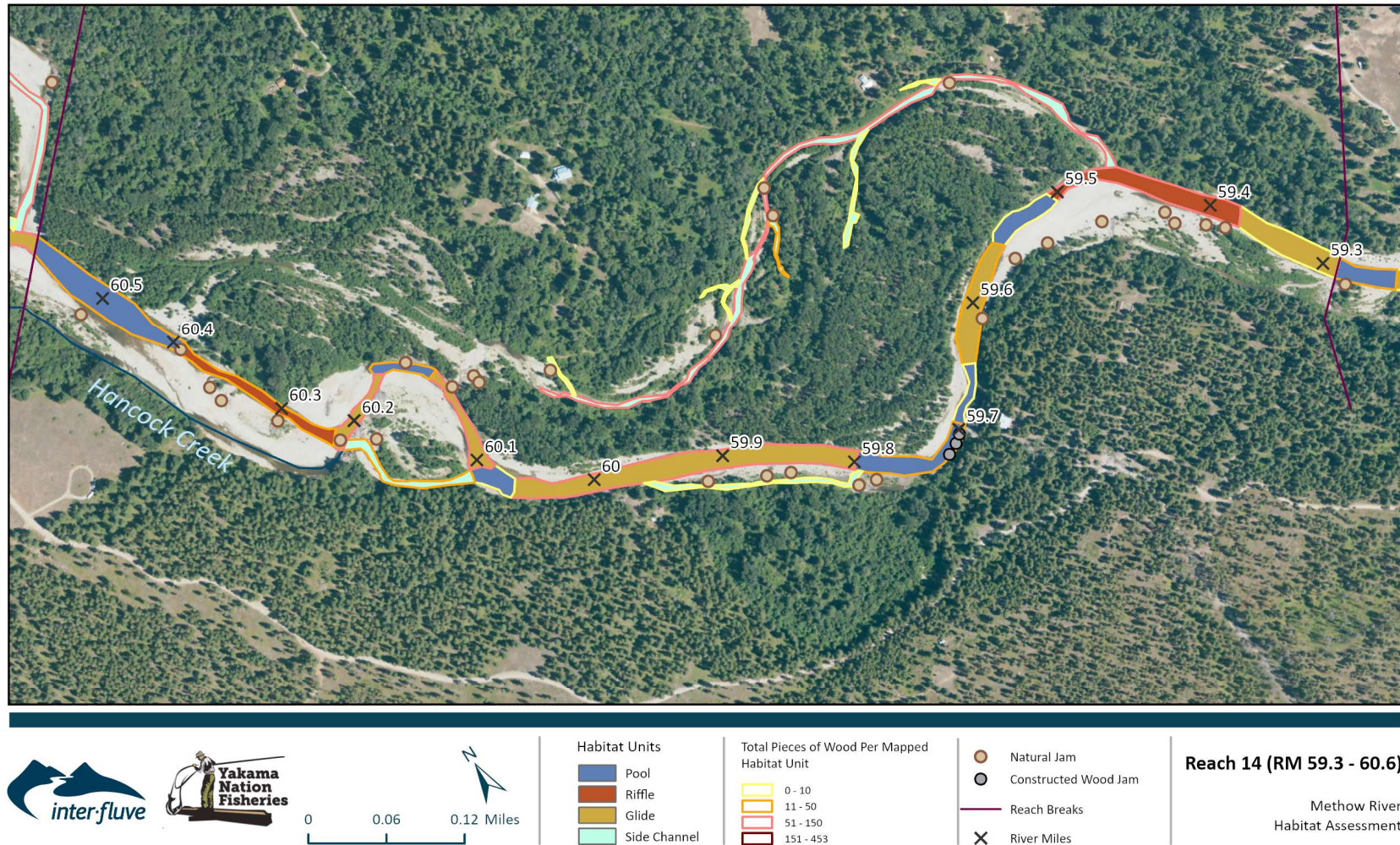


Figure 74. Map of the habitat unit composition and LWM in Reach 14 of the Methow River. LWM count includes pieces in jams.

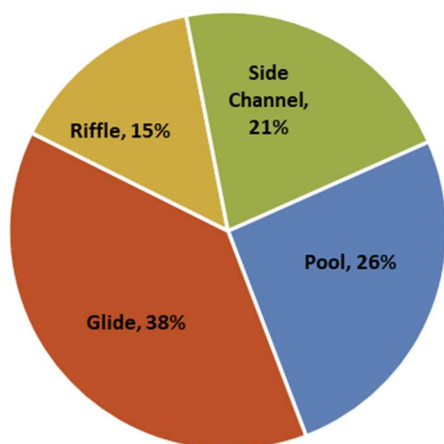


Figure 75. Stream habitat unit area composition of Reach 14.

5.14.2 Pools

In Reach 14, six pools were recorded. Of the six pools, 67% had residual pool depths greater than three feet. The average residual pool depth was 3.4 feet and ranged from 1.7 feet to 5.3 feet. Pools frequency in the reach was approximately five pool per mile.

5.14.3 Side Channel Habitat

Ten side channels were recorded in Reach 14. All channels were observed as primarily slow-water habitat and many of which sourced from hyporheic flow. A total of 135 LWM (including individual pieces and pieces found in jams) was recorded in the side channels. Approximately, 70% of the total LWM was observed in jams. Eight jams were recorded in the side channels (Table 29).

Table 29. Side channels observed in Reach 14.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 16	600	Slow	4	1	30
Side 17	892	Slow	3	0	0
Side 18	184	Slow	3	1	7
Side 19	124	Slow	1	0	0
Side 20	173	Slow	0	0	0
Side 21	255	Slow	0	1	16
Side 22	311	Slow	1	0	0
Side 23	465	Slow	0	0	0
Side 24	137	Slow	0	0	0
Side 25	3,238	Slow	28	5	42
Total	63,78		40	8	95

5.14.4 Large Woody Material

A total of 576 pieces of LWM was recorded in Reach 14. This total includes individual pieces and pieces recorded in jams. This results in 443 total LWM pieces per mile, and 222 medium and large LWM per

mile. Thirty-two jams were recorded in the reach, equating to a frequency of approximately 25 jams per mile and 81% of the total wood count (Table 30). Three jams were observed to be constructed.

Table 30. LWM quantities in Reach 14.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	61	37	14	112
Number of Individual pieces per mile	47	39		86
Total LWM per Mile (including pieces in jams)	222	222		443
Number of Jams	32			
Number of Jams per Mile	25			
Estimated Wood Count in Jams	464			

5.14.5 Riparian Corridor

Riparian vegetation conditions were recorded in 15 channel units in Reach 14. The overstory consisted primarily of Cottonwood and Alder in the Small Tree size class (9.0 - 20.9-inch dbh. Douglas Fir and Ponderosa Pine in the Large Tree size class (21.0 - 31.9-inch dbh) was observed in the riparian vegetation zone (Figure 76). The understory was mainly Alder or Cottonwood in the Sapling/Pole (5.0 - 8.9-inch dbh) and Shrub/Seedling (1.0 - 4.9-inch dbh) size classes, though some Alder were observed in the Small Tree size class. Willow, Dogwood and Grassland/Forb were observed in the riparian vegetative zone (Figure 77).

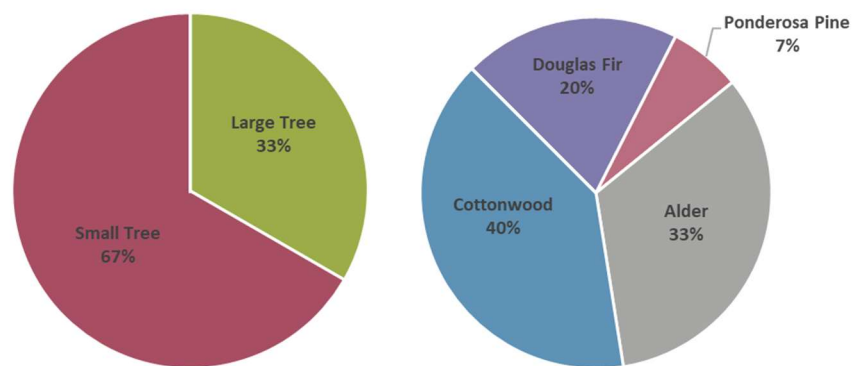


Figure 76. Dominant overstory riparian vegetation, based on 15 surveyed units, within 100 feet of the Methow River by ocular estimate.

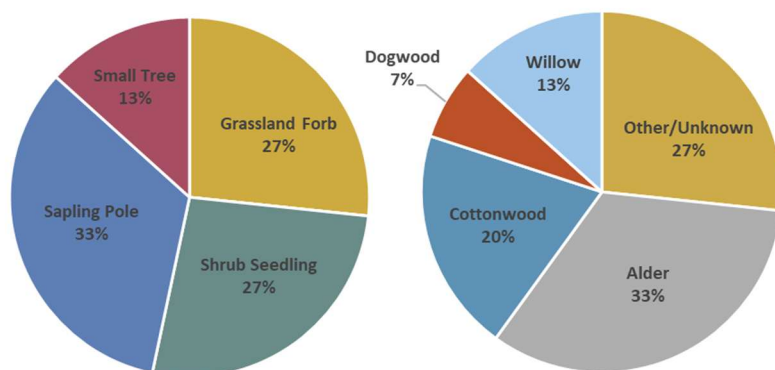


Figure 77. Dominant understory riparian vegetation, based on 15 surveyed units, within 100 feet of the Methow River by ocular estimate.

5.15 REACH 15

Location: River mile 60.6 – 61.7

Total length: 1.1 miles

Survey Date: September 28, 2024



Figure 78. Representative photo of Reach 15 of the Methow River.

5.15.1 Habitat Unit Composition

In Reach 15, pools comprise over half of the habitat unit composition. Less fast water habitat (riffles and glides) is present in this reach. Twelve side channels were observed in the reach and comprise of over 30% of the reach. (Figure 80). Due to the presence of salmon redds, data is based on ocular estimates from the survey crew walking along the banks. Previously constructed habitat enhancement projects were observed which included an enhanced gallery channel with large wood structures and revegetation, and along the right bank at RM 61.15 where a large wood structure was placed. An avulsion was observed between RM 61 and RM 60.65, where the main channel no longer flows in its historic pathway. Channel gradient in this reach is .34%.

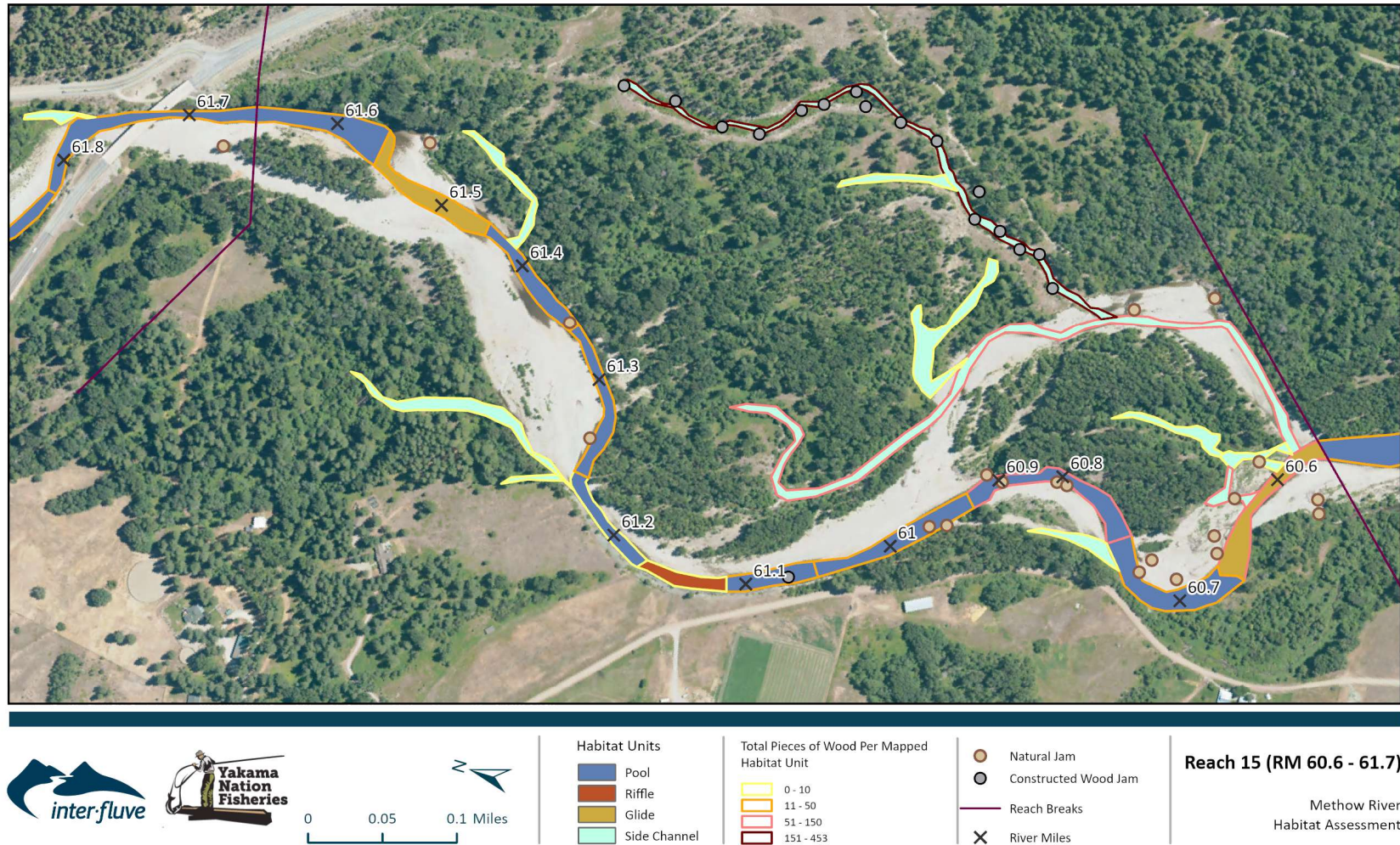


Figure 79. Map of the habitat unit composition and LWM in Reach 15 of the Methow River. LWM count includes pieces in jams.

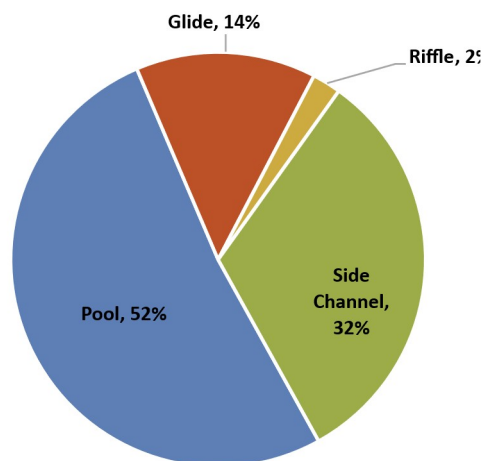


Figure 80. Stream habitat unit area composition of Reach 15.

5.15.2 Pools

Reach 15 had eight pools recorded, corresponding to seven pools per mile. The average residual pool depth was 3.3 feet and ranged from 3.2 feet to 4.4 feet. Of the eight pools, 63% of pools had a residual pool depth greater than three feet.

5.15.3 Side Channel Habitat

Twelve side channels were recorded in Reach 15, with a combined total length of 8,990 feet. All of the side channels were observed as primarily slow-water habitats. A total of 601 total LWM (including individual pieces and pieces observed in jams) was recorded in the side channels with 90% of the total LWM recorded in jams (Table 31). Twenty jams were recorded in the side channels. Side 14 was previously constructed fish habitat enhancement project and contained 16 constructed jams which accounted for 74% of the total LWM recorded in the side channels.

Table 31. Side channels observed in Reach 15.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 4	521	Slow	5	0	0
Side 5	931	Slow	3	0	0
Side 6	188	Slow	0	0	0
Side 7	304	Slow	3	0	0
Side 8	225	Slow	4	1	50
Side 9	397	Slow	0	0	0
Side 10	217	Slow	0	1	10
Side 11	110	Slow	0	0	0
Side 12	704	Slow	0	0	0
Side 13	382	Slow	0	0	0
Side 14	2,187	Slow	11	16	442
Side 15	2,824	Slow	34	2	39
<i>Total</i>	<i>8,990</i>		<i>60</i>	<i>20</i>	<i>541</i>

5.15.4 Large Woody Material

A total of 943 pieces of LWM were recorded in Reach 15. This total includes individual pieces and pieces recorded in jams (Table 32). This corresponds to approximately 857 total LWM pieces per mile, and 529 medium and large LWM pieces per mile. Thirty-eight jams were recorded in this reach, equating to a frequency of approximately 35 jams per mile and 85% of the total wood count (Table 32). Out of the 38 jams, 17 jams were constructed and 16 of those jams recorded in a single side channel (Side 14).

Table 32. LWM quantities in Reach 15.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	88	45	11	144
Number of Individual pieces per mile	80	51		131
Total LWM per Mile (including pieces in jams)	328	529		857
Number of Jams	38			
Number of Jams per Mile	35			
Estimated Wood Count in Jams	799			

5.15.5 Riparian Corridor

Riparian vegetation conditions were recorded in twelve channel units in Reach 15. The overstory was composed of Cottonwood or Willow in the Small Tree size class (9.0 - 20.9-inch dbh), though smaller (Sapling/Pole [5.0 - 8.9-inch dbh] and Shrub/Seedling [1.0 - 4.9-inch dbh]) and larger (Large Tree [21.0 - 31.9-inch dbh]) was observed. The remaining channel units recorded no vegetation (Figure 81). The understory was comprised of Willow and Dogwood in the Sapling/Pole size class. Grassland/Forb and channel units with no vegetation composed the remaining recorded observations (Figure 82).

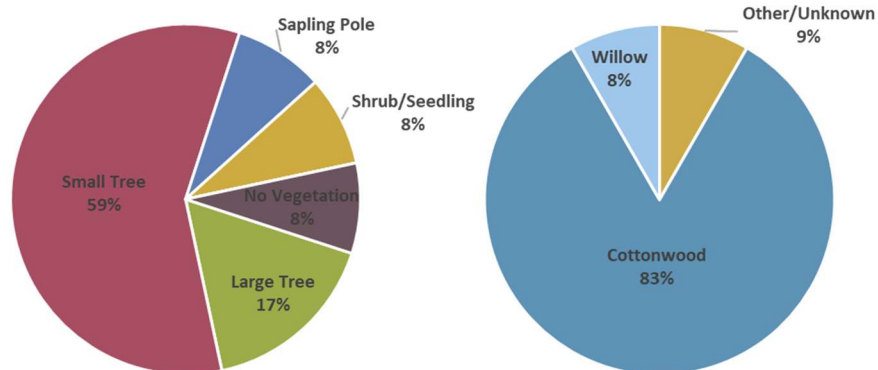


Figure 81. Dominant overstory riparian vegetation, based on 12 surveyed units, within 100 feet of the Methow River by ocular estimate.

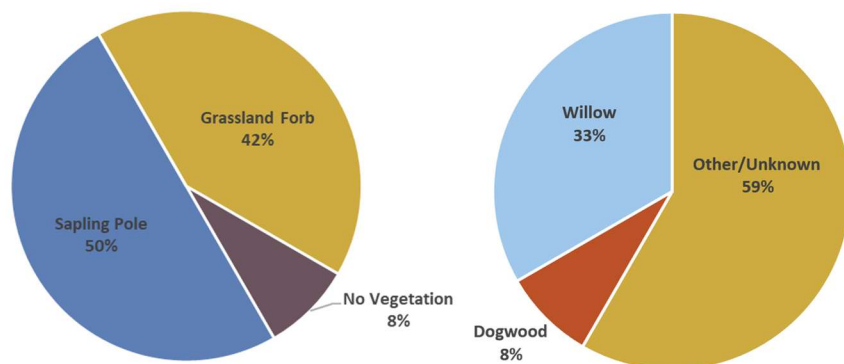


Figure 82. Dominant understory riparian vegetation, based on 12 surveyed units, within 100 feet of the Methow River by ocular estimate.

5.16 REACH 16

Location: River mile 61.7 – 62.3

Total length: 0.6 miles

Survey Date: September 14 – 15, 2024



Figure 83. *Representative photo of Reach 16 of the Methow River.*

5.16.1 Habitat Unit Composition

Reach 16 was the shortest reach in the assessment area with a reach length of 0.5 miles. The channel gradient in this reach was 0.32%. About half the total reach area was glide habitat. Less side channels were present in this reach, and the remaining habitat area recorded was primarily pools with few riffle units observed. (Figure 85). Due to the presence of salmon redds, some data is based on ocular estimates from the survey crew walking along the banks. The downstream extent of the reach was located slightly downstream of the Weeman Bridge, with road, bridge and water diversion infrastructure affecting the channel banks at this location (RM 61.7)

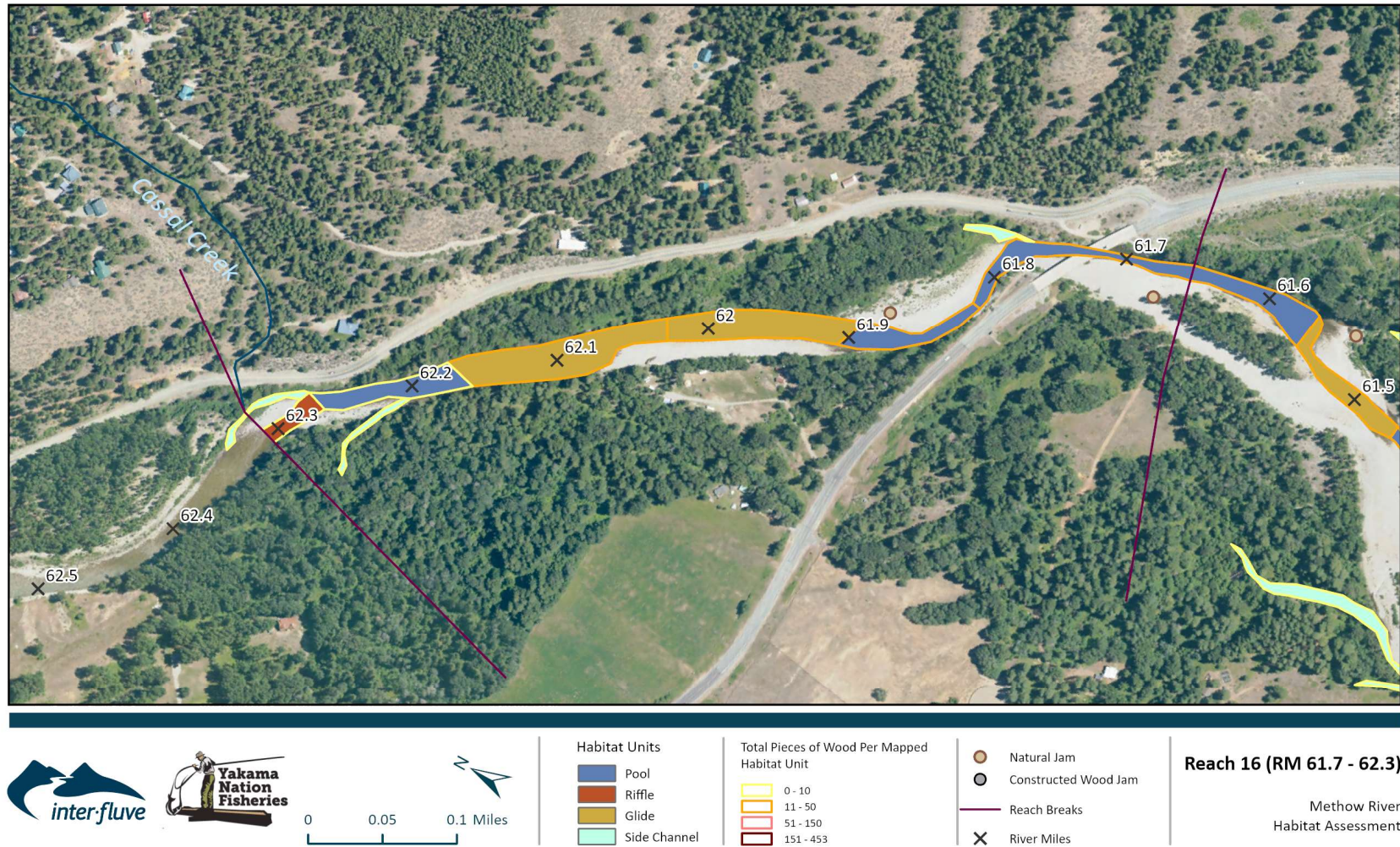


Figure 84. Map of the habitat unit composition and LWM in Reach 16 of the Methow River. LWM count includes pieces in jams.

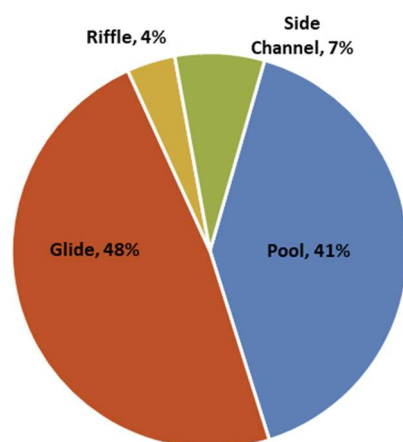


Figure 85. Stream habitat unit area composition of Reach 16.

5.16.2 Pools

Three pools were recorded in Reach 16. Pool frequency in this reach was approximately five pools per mile. The average residual pool depth was 2.9 feet and ranged from 1.8 feet to 4.2 feet. Of the three pools, 33% had a residual pool depth greater than three feet.

5.16.3 Side Channel Habitat

Three side channels were recorded in Reach 16 with a total combined channel length of 960 feet. One side channel was observed to be primarily fast-water habitat (e.g., riffle and glide habitat within the side channels). A total of four LWM pieces were recorded in the side channels. No jams were recorded (Table 33).

Table 33. Side channels observed in Reach 16.

Location	Length (ft)	Dominant Unit Type	Wood Count	Jam Count	Wood Count in Jams
Side 1	357	Fast	1	0	0
Side 2	373	Slow	3	0	0
Side 3	230	Slow	0	0	0
<i>Total</i>	<i>960</i>		<i>4</i>	<i>0</i>	<i>0</i>

5.16.4 Large Woody Material

A total of 58 pieces of LWM was recorded in Reach 16. This total includes individual pieces and pieces recorded in jams. This corresponds to approximately 97 LWM pieces per mile and 43 medium and large LWM pieces per mile. Two jams were recorded in the reach that contained approximately 33% of the total LWM (Table 34).

Table 34. LWM quantities in Reach 16.

	Small (6 in x 20 ft)	Medium (12 in x 35 ft)	Large (20in x 35 ft)	Total
Number of Individual Pieces	24	12	3	39
Number of Individual pieces per mile	40	25		65
Total LWM per Mile (including pieces in jams)	53	43		97
Number of Jams	2			
Number of Jams per Mile	3			
Estimated Wood Count in Jams	19			

5.16.5 Riparian Corridor

Eight channel units in Reach 16 recorded observations in riparian vegetation conditions. The overstory was composed of mainly Cottonwood in the Large Tree (21.0 - 31.9-inch dbh) and Small Tree (9.0 - 20.9-inch dbh) size classes. Willow in the Sapling/Pole size class (5.0 - 8.9-inch dbh) and channel units with no vegetation was observed in the riparian vegetation zone (Figure 86). The understory was mainly Alder or Willow in the Sapling/Pole and Shrub/Seedling (1.0 - 4.9-inch dbh) size class, followed by Grassland/Forb (Figure 87)

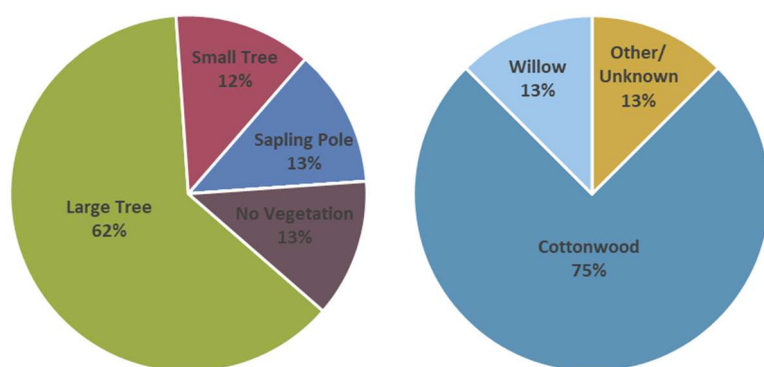


Figure 86. Dominant overstory riparian vegetation, based on eight surveyed units, within 100 feet of the Methow River by ocular estimate.

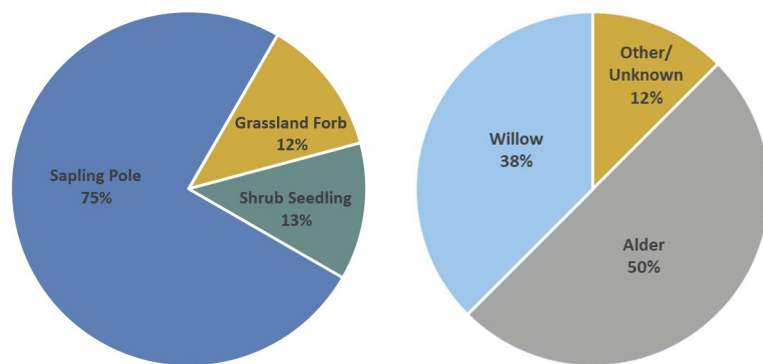


Figure 87. Dominant understory riparian vegetation, based on eight surveyed units, within 100 feet of the Methow River by ocular estimate.

5.17 SUMMARY DATA

Table 35 Summary of all the data collected for the 2024 Habitat Assessment on the Methow River.

Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	All
Reach Mileage	0.9	1.9	1.9	1	1.1	2	0.9	1.4	1.5	1.3	0.9	1.7	2.2	1.3	1.1	0.6	21.7
Stream Gradient (%)	0.21%	0.30%	0.24%	0.20%	0.26%	0.28%	0.31%	0.18%	0.25%	0.52%	0.38%	0.27%	0.35%	0.39%	0.34%	0.32%	0.29%
Average Wetted Width																	
Pool																	
Mean	119	107	99	100	164	119	107	106	94	93	55	52	61	57	52	55	90
Median	123	100	85	100	163	123	95	90	90	93	55	45	60	50	50	40	80
St. Dev	19	20	32	20	29	30	32	30	23	8	5	21	9	19	12	25	37
Glide																	
Mean	0	0	123	140	135	134	120	115	95	107	93	98	98	62	55	85	87
Median	0	0	123	140	135	135	120	113	98	113	80	80	78	60	55	85	95
St. Dev	0	0	018	0	0	10	30	114	6	12	13	27	12	20	0	0	29
Riffle																	
Mean	105	111	120	101	114	123	120	140	88	103	68	58	65	48	30	45	90
Median	115	103	120	104	100	138	120	140	88	100	73	60	65	48	30	45	100
St. Dev	29	20	43	21	46	24	0	0	8	5	19	13	13	13	0	0	34
Side Channel																	
Mean	0	18	33	38	10	17	10	10	10	0	0	17	16	10	9	5	13
Median	0	18	33	10	10	16	10	10	10	0	0	15	20	7	4	5	10
St. Dev	0	3	23	44	0	6	0	0	0	0	0	7	8	7	8	4	14
Water Depth (ft)																	
Pool Maximum Depth																	
Mean	4.4	5.5	6.8	5.0	4.8	5.4	5.3	4.4	5.0	4.3	2.9	3.9	3.7	4.5	3.9	3.9	4.6
Median	4.5	4.5	4.3	4.5	4.8	4.8	5.5	4.5	3.3	4.3	2.9	3.8	3.5	4.5	3.8	3.2	4.0
St. Dev	0.5	3.3	4.8	1.7	1.0	2.3	1.4	0.3	3.9	1.8	.01	.09	.09	1.4	0.7	1.5	2.3
Pool Residual Depth																	
Mean	2.1	4.0	5.2	3.8	3.2	4.0	4.2	2.8	3.8	3.5	1.3	3.0	2.7	3.4	3.3	2.9	3.3
Median	2.0	3.1	2.8	3.0	3.1	2.1	4.6	2.9	2.3	3.5	1.3	2.8	2.5	3.2	3.2	2.6	2.9
St. Dev	0.6	3.1	2.7	1.7	0.8	2.5	1.1	0.4	3.9	1.5	0.3	0.9	1.1	1.2	0.7	1.0	2.2

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Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	All
Riffle/Glide Average Depth																	
Mean	2.0	1.9	1.9	1.6	2.1	2.0	1.8	1.6	1.5	1.3	1.6	1.3	1.7	1.4	1.8	1.3	1.7
Median	2.1	1.9	1.9	1.6	1.8	1.9	1.7	1.5	1.4	1.2	1.6	1.2	1.8	1.5	1.8	1.1	1.6
St. Dev	0.4	0.2	0.4	0.4	0.5	0.4	0.5	0.4	0.6	0.3	0.3	0.5	0.4	0.3	0.4	0.2	0.5
Bankfull Characteristics																	
Width (ft)																	
Mean	226	238	204	206	206	197	189	187	176	130	122	174	140	131	156	156	178
Median	199	229	204	206	235	202	191	176	176	130	213	174	140	133	156	156	177
St. Dev	46	35	26	15	42	36	12	24	9	8	3	19	5	15	0	0	45
Average Depth (ft)																	
Maximum Depth	7.0	8.0	6.0	6.4	5.6	7.3	7.1	6.5	9.0	6.2	7.1	6.3	7.1	6.3	5.6	4.4	9.0
Minimum Depth	1.2	1.4	1.8	1.8	.03	0.7	3.7	1.4	1.0	1.3	0.0	1.2	1.1	0.0	0.0	3.2	0.0
Mean	4.0	3.6	4.6	4.2	3.9	5.1	5.2	4.7	4.0	5.0	2.5	3.7	4.0	3.5	2.4	3.9	4.2
St. Dev	1.7	2.5	.09	1.4	1.6	1.7	0.7	1.3	1.7	2.5	2.6	0.0	1.4	1.6	2.0	0.4	1.6
Maximum Depth (ft)																	
Mean	5.8	6.8	5.8	5.6	5.5	6.7	6.4	6.1	7.0	6.0	4.4	6.0	6.1	5.3	5.6	4.4	5.9
St. Dev	1.2	0.7	0.3	0.9	0.2	0.6	0.5	0.3	2.0	0.2	2.6	0.4	0.9	0.7	0.0	0.0	0.6
Width: Depth Ratio																	
Mean	57.5	59.2	66.7	68.5	61.6	67.3	72.2	81.2	67.2	89.1	49.8	56.4	44.7	48.9	26.2	60.9	61.5
Flood Prone Width																	
Mean	238	497	243	401	289	295	269	218	434	221	205	1,088	830	955	1,163	399	443
Median	216	526	231	330	245	243	232	212	259	185	215	1,165	732	880	1,204	331	454
St. Dev	58	193	51	240	95	151	120	47	376	77	65	472	476	459	432	143	45
Habitat Area (%)																	
Pool (%)	57	49	38	49	56	29	56	24	42	25	13	28	40	26	52	41	40
Glide (%)	0	0	15	7	7	29	32	51	22	49	34	17	19	38	14	48	22
Riffle (%)	43	43	40	25	34	37	9	24	34	25	53	22	18	15	2	4	30
Side Channel (%)	0	8	9	20	3	6	4	2	2	0	0	32	23	21	43	7	9
Pools																	
Pools per Mile	4	5	2	7	4	4	3	4	5	2	2	6	8	5	7	5	5
Residual Depth (no. of pools)																	

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Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	All
pools < 3ft	4	5	2	3	2	3	1	4	5	1	2	6	12	2	3	2	57
Pools 3-6 ft	0	4	1	3	2	3	2	1	2	1	0	4	5	4	5	1	38
Pool 6 < ft	0	1	1	1	0	2	0	0	1	0	0	0	0	0	0	0	6
Riffle: Pool Ratio	1	0.9	1.2	0.6	1	0.8	0.3	0.4	1.1	1.0	2.5	0.4	0.3	0.3	0.1	0.6	0.6
Mean Pool Spacing (Bankfull channel widths per pool)	5.3	4.2	12.3	3.7	7.0	6.7	8.4	7.9	5.6	24.4	19.5	5.2	4.9	8.7	4.7	5.6	6.3
Large Woody Material																	
Total Number of LWM (not including LWM in jams)																	
Small	27	101	29	48	23	41	10	3	62	23	11	154	141	61	88	24	120
Medium	15	83	27	21	16	41	8	20	33	15	10	92	77	37	45	12	1,594
Large	3	30	7	4	10	25	3	5	11	9	1	33	26	14	11	3	862
Large and Medium	18	113	34	25	36	66	11	25	44	24	11	125	103	51	56	15	2,456
Total	45	214	63	73	49	107	21	68	06	47	22	279	244	112	144	39	2,576
Number of LWM/Mile (not including LWM in jams)																	
Small	30	53	15	48	21	21	11	31	41	18	12	91	64	47	80	40	6
Medium	17	44	14	21	15	21	9	14	22	12	11	54	35	28	41	20	73
Large	3	16	4	4	9	13	3	4	7	7	1	19	12	11	10	5	40
Large and Medium	20	59	18	25	24	33	12	18	29	18	12	74	47	39	51	25	113
Total	50	113	33	73	45	54	23	49	71	36	24	164	111	86	131	65	119
Jams																	
Total Jams	1	60	21	27	15	36	6	2	11	1	0	61	54	32	38	2	367
Jams per Mile	1	29	10	23	13	16	5	1	6	1	0	31	22	21	32	3	15
Small in Jam	2	196	59	8	74	105	34	0	47	4	0	823	336	227	273	8	2,261
Medium in Jam	2	292	88	174	61	161	33	7	41	0	0	529	337	165	373	8	2,263
Large in Jam	0	250	93	138	69	294	25	9	12	0	0	181	181	72	153	3	1,477
Total Wood in Jam	4	738	240	393	204	560	92	16	100	4	0	1,533	854	464	799	19	6,001
Unstable Banks																	
Percent Reach length (both banks)	17%	4%	11%	12%	6%	5%	8%	16%	17%	13%	23%	3%	2%	1%	2%	11%	7%
Vegetation (% of sampled units in 100-ft wide zone; average between both banks)																	
Dominant Overstory Class																	

APPENDIX A: METHOW RIVER REACH ASSESSMENT - HABITAT ASSESSMENT

Reach	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	All
Mature Trees	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large Trees	0	0	64	11	33	18	14	10	0	14	0	13	35	33	17	63	21
Small Trees	100	83	18	67	50	65	71	80	93	71	83	50	52	67	58	13	62
Sapling Pole	0	17	9	22	17	18	0	10	7	0	0	19	13	0	8	13	11
Shrub/Seedling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	1
Grassland/Forb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
No Vegetation	0	0	9	0	0	0	14	0	7	14	17	19	0	0	8	13	6
Overstory Species Composition																	
Douglas Fir	0	0	0	0	0	0	0	0	0	0	0	0	17	20	0	0	4
Ponderosa Pine	0	0	45	44	0	24	0	0	0	43	33	6	9	7	0	0	12
Other/Uknown	0	0	9	0	0	0	14	0	0	14	17	19	0	0	8	13	6
Alder	0	8	0	0	0	6	0	10	0	0	0	13	0	33	0	0	6
Cottonwood	100	92	36	44	83	71	86	90	100	29	50	63	74	40	83	75	69
Quaking Aspen	0	0	9	11	17	0	0	0	0	14	0	0	0	0	0	0	2
Willow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	13	1
Dominant Understory Class																	
Grassland/Forb	0	50	45	22	50	12	14	10	13	0	33	50	9	27	42	13	25
No Vegetation	0	8	0	0	17	6	43	30	40	14	0	13	4	0	8	0	11
Shrub/Seedling	0	0	0	0	17	6	0	0	47	71	0	6	39	27	0	13	10
Sapling Pole	100	42	55	67	17	76	43	60	0	14	67	38	48	33	50	75	52
Small Tree	0	0	0	11	0	0	0	0	0	0	0	0	0	13	0	0	2
Understory Species Composition																	
Ponderosa	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	1
Other	0	58	45	22	67	18	57	40	53	0	33	63	13	27	58	13	37
Alder	0	8	0	0	0	18	14	20	13	17	0	13	13	33	0	50	14
Dogwood	0	0	0	11	0	18	29	20	0	50	50	19	26	7	8	0	14
Cottonwood	0	0	0	0	17	0	0	0	0	33	17	0	35	20	0	0	7
Quaking Aspen	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1
Willow	100	33	55	56	17	47	0	20	33	0	0	6	9	13	33	38	26

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