

Methow River Reach Assessment

Appendix C | Restoration Strategy

METHOW RIVER (RM 40.6 – 62.3)

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1 Restoration Strategy

1.1 INTRODUCTION

The Restoration Strategy uses field surveys, inventories, and analyses performed in the reach assessment and accompanying appendices (Appendix A: Habitat Assessment, Appendix B: Reach-based Ecosystem Indicators, and Appendix D: Hydraulic Modeling), as the technical basis for identifying and prioritizing restoration actions. This framework for developing a restoration strategy provides a direct linkage between the technical analyses, identified limiting factors, and the actions that are moved forward towards implementation. Restoration objectives (targets) are used to guide the development of appropriate restoration action types for the assessment area. The Segment-Scale Restoration Strategies (Section 1.4) present summarized and compiled information in table format for the six Methow segments comprised of the sixteen reaches in the assessment area. Conceptual maps and descriptions of the project opportunities for each segment are presented in Section 2. Project prioritization and ranking are provided in Section 3, as a table that lays out the targets, benefits, and costs scoring involved in prioritizing project opportunities for the restoration strategy and a description of the methods used for the ranking.

1.2 RESTORATION OBJECTIVES

Restoration objectives were developed for multiple ecological attributes, including instream habitat, off channel habitat, geomorphologic processes, and riparian function. These objectives are presented as restoration targets. They are made to be as quantifiable as possible at this stage (conceptual) of analysis. These target conditions are compared to existing conditions from the reach assessment. This highlights habitat deficiencies and the “gap” between target, potential, and existing conditions that needs to be filled to recover habitat.

Target conditions were developed using the Reach-Based Ecosystem Indicators (REI) targets (see Appendix B) as well as reference to site conditions and inference from local and regional studies. See the reach assessment main report and Appendix B for more information on the REI analysis.

1.3 ACTION TYPES

Recommended actions are categorized here into five action types. There are four restoration actions plus a conservation action. We use the term ‘restoration’ as a broad catch-all when we refer to actions; however, we acknowledge that many of the actions are not restoration in the true sense of the word and would be more appropriately labeled as “enhancement” or “creation.” We consider true restoration actions to be those that address root causes of impairments that aim to return the system close to its naturally functioning state. This is often not achievable, or advisable, due to past changes to the underlying processes or to impairments that are unlikely to change. An example of a true restoration project would be a project that fully removes a levee, returns the channel to its historical form, and replants the valley floor to restore natural floodplain inundation patterns. Enhancement measures are those that improve or rehabilitate habitat to the extent possible given existing impaired processes and anthropogenic constraints. Placement of large wood in an existing

pool to provide cover is an example of habitat enhancement. Creation projects are those that create new habitats that are currently lacking or that will not be created on their own in a reasonable timeframe given existing impairment. Excavation of a new perennial side-channel where one did not exist already is an example of a creation project. Action types are often combined, and each project typically incorporates numerous action types. The five action types are described below.

1. Riparian Restoration

Riparian restoration projects are recommended in areas where native riparian vegetation communities across floodplains and channel-adjacent terrace banks have been impacted by historical or current anthropogenic activities such that riparian function and connection with the stream are compromised. In the Methow River assessment area, most of the historically forested floodplains were logged in the past and the forests, where allowed to regenerate, are still recovering and maturing. In townships (Winthrop and Twisp) and along private property and infrastructure, riparian vegetation has been cleared (or impacted) for homes/buildings, agricultural purposes, utilities, roads and irrigation canals, or crossings. Restoration actions are focused on restoring native vegetation communities to reestablish natural stream-vegetation interactions (including supporting beaver), stream shading, nutrient exchange, ecologic diversity, long-term large wood recruitment, and wildfire resilience. Riparian restoration may also include the development or enhancement of wetlands or riparian function for off-channel features. Even though it is not always explicitly stated, riparian restoration is a recommended component of most restoration actions, particularly within the disturbance limits of the action.

Examples:

- ▶ Replanting native riparian vegetation and forests on floodplain surfaces.
- ▶ Replanting a forest buffer along a channel-adjacent terrace bank or hillslope.
- ▶ Installing vegetation in conjunction with or as floodplain roughness to vegetated developing islands and floodplains.

2. Enhance Channel Complexity

Channel complexity enhancement actions are aimed at increasing quantity or improving the quality of existing channel habitat and geomorphology. This type of action is designed to improve the geomorphic complexity of the system, which in turn supports instream aquatic habitat conditions and builds system resiliency. Sections of the Methow River assessment area lack geomorphic and habitat complexity due to historical and modern anthropogenic impacts such as logging, floodplain grading, channel manipulations/relocations, infrastructure corridors, and channel clearing practices. Due to the removal of old-growth trees and persistent floodplain clearing for agriculture, infrastructure, and development, some areas are lacking a riparian forest completely and in some other areas the riparian and floodplain forests lack sufficiently sized trees to act as “key logs” that can influence and maintain channel complexity. Bank armoring and channel confinement (bridge crossings, levees, armored banks, induced incision) are other anthropogenic forcings that limited

natural lateral migration that would recruit large wood as well as initiate dynamic channel response, and thus sediment activation and storage (bar and floodplain development). Where active lateral processes occur in maturing forested areas and large wood jams develop, geomorphic complexity and habitat function notably increase. The Enhance Channel Complexity strategy includes a broad range of large wood installation types of varied sizes and purposes. Placement of a few stable habitat complexity boulders in existing large extended pools that otherwise have no cover or habitat complexity but do have recreation user safety concerns is another natural material enhancement treatment, where appropriate. Enhance Channel Complexity is recommended in the mainstem channel, side channels, and off-channel habitats throughout the assessment area. The recommendations include broad treatment types as well as site-specific actions. The structural elements (e.g., large wood or habitat boulders) included in these actions are placed in areas where they are expected to naturally accumulate and be maintained by stream hydrology and geomorphology. These actions can exhibit a wide range of intended functions, from helping to restore reach-scale geomorphic processes (e.g., apex jams to create split-flow channel conditions) to simply adding structural cover and complexity habitat (e.g., adding large wood to an existing pool).

Examples:

- ▶ Bank buried log jams replacing removed bank armor that enhance channel margin complexity and provide interim stability until streambank and riparian revegetation can mature and provide long-term stability.
- ▶ Installation of individual large wood pieces or jams for cover, pool scour, sediment sorting, and hydraulic complexity (e.g., high flow refuge for rearing juvenile fish).
- ▶ Installation of apex jam to promote scour, split-flow conditions, and create downstream mid-channel bar/island development or side-channel initiation.
- ▶ Addition of a few large stable boulders to a deep extended pool to provide sub-surface cover/hiding habitat and hydraulic complexity.

3. Side and Off-Channel Habitat Creation or Enhancement

Off-channel habitat creation or enhancement are prescribed where there is the potential to increase the quantity, quality, or connectivity of off-channel habitat (i.e. side channels, alcoves, groundwater-supported floodplain tributaries, wetlands). Off-channel habitat features provide important rearing and refugia areas for juvenile salmonids, including high flow refugia, temperature refugia, and highly productive feeding areas. These projects may include the activation or enhancement of existing habitat areas that have been disconnected or impaired via processes such as channel incision or floodplain alterations. In other cases, off-channel areas can be created via excavation and construction of features such as side channels or groundwater gallery channels. Off-Channel Habitat Creation or Enhancement is often paired with Enhance Channel Complexity actions.

Examples:

- ▶ Increase the degree of surface flow connectivity for an existing off-channel area such as groundwater-supported wetland or tributary that provides juvenile feeding and rearing habitat, flood refuge, or thermal refuge.
- ▶ Create new connected side channel or off-channel habitat via excavation.
- ▶ Reconnect side channel of off-channel habitat via inlet or partial excavation.
- ▶ Enhance geomorphic complexity in new or created off-channel habitat.

4. Floodplain Reconnection

Floodplain connectivity actions are those that increase the frequency, duration, or extent of hydrologic connection between the mainstem channel and the floodplain or that re-establish natural channel migration functions. Floodplain connectivity projects are typically located in areas where floodplains have been disconnected via channel incision/straightening (natural or induced), structural diversions, anthropogenic confinement such as undersized bridges or levees, or floodplain modifications that inhibit connectivity such as road prisms or hardened banks. Towns, infrastructure, an airport, and other existing development limit the extent and areas of potential floodplain reconnection actions throughout portions of the assessment area. As a result, Floodplain Reconnection can accompany Conservation Actions (i.e. easement, acquisition), where appropriate. This strategy includes a broad range of potential project types, including promotion of in-channel aggradation to combat trending incision, removal of constructed barriers such as channel levees to reengage existing floodplain surfaces and flow routes, and excavation to reactivate or reconnect abandoned channel sections or flow routes, especially those resulting from anthropogenic manipulations.

Examples:

- ▶ Remove or modify levees, bank armor, roads, or bridges to reestablish natural floodplain inundation and channel migration processes.
- ▶ Raise or promote aggradation of an incised channel.
- ▶ Excavate inlets to reconnect mainstem channel to existing floodplain channel scars.

5. Conservation

Conservation actions include such things as land acquisitions, easements, or other measures that provide enduring protection to channels, riparian zones, and floodplains. They are only identified where they would complement and/or increase restoration action potential, or where there is believed to be specific future risk of impairment. Sections of the assessment area is already within federal lands, state lands, municipal land, or managed for conservation through a few trusts and organizations such as the Methow Conservancy. However, a substantial portion of the valley bottom and existing floodplain within the assessment area is privately-owned. Working with landowners to

develop conservation easements within the riparian zones on their parcels, or to conduct riparian revegetation, would produce benefits in many areas. The size of private parcels ranges widely from several hundred acres to relatively small with narrow river-frontage. Depending on site conditions and restoration potential, strategic and opportunistic conservation agreements or acquisition of neighboring parcels may be necessary prior to project initiation. Additionally, securing conservation agreements (i.e., easement or acquisition) of currently undeveloped and well-functioning parcels can protect areas from future development impacts while safeguarding the benefits of in-tack riparian areas now and into the future. Nearly all the private lands located in the historical floodplain or on channel-adjacent terraces could be considered for conservation efforts. It is recognized that existing shorelines regulations, critical areas, and floodplain regulations do apply to many private parcels and as such, in theory, provide some protection within riparian buffers. This assessment does not include any type of land-use analysis such as looking at zoning patterns or the adequacy of local regulations. Instead, this assessment identifies conservation recommendations in the following situations: 1) private lands with high quality off-channel habitat or riparian contributions already, 2) restoration value, where long-term protection of the land would complement or increase the opportunity for restoration actions, and 3) where site or other observations indicate the area is likely to be encroached upon or developed, such as land clearing, road building, land subdivision, or undeveloped properties advertised for sale.

1.4 SEGMENT-SCALE RESTORATION STRATEGIES

Restoration strategy summary tables for each segment of the assessment area are provided below. The segment-scale restoration strategies identify existing ecological/geomorphic conditions, project objectives and recovery potential, a list of projects, and recommended restoration action types. The ecological function (Low, Moderate, or High) of each segment is characterized by the ratings that resulted from the REI (see Appendix B). The trajectory (decline, same, improve) is determined by evaluation of the modern geomorphic trends, related existing habitat conditions, and continued limitations such as infrastructure and land-use (see the main reach assessment report and the Habitat Assessment, Appendix A). The recovery potential (Low, Moderate, and High) is based on the potential for the site to recover functioning habitat and processes with implementation of restoration actions. To do so, the potential for the REI indicator ratings to improve via restoration actions is considered. The recovery potential rating considers known limitations to recovery that are unlikely to be eliminated as part of implementation of this restoration strategy, such as the presence of transportation and residential infrastructure that is unlikely to change.

1.4.1 Segment 1: Twisp (Reach 1) Restoration Strategy

Overall ecological function	Low
	<i>Segment 1: Twisp (Reach 1) received a low-moderate rating in the REI in terms of habitat access and condition. There were no fish passage barriers, however, the lack of channel complexity and incision has reduced the prevalence of spawning gravels. The amount of large wood material (LWM), quality pool habitat and off-channel habitat are severely lacking throughout the segment. Riparian conditions ranked low-moderate in the REI. High levels of human disturbance were observed in riparian areas, and large trees were absent from the 100-ft buffer, resulting in reduced riparian condition and function. Channel dynamics in Segment 1 ranked low-moderate in the REI. Anthropogenic development such as bank armoring, bridge crossings, levees, and likely historical channel trenching related to the town of Twisp, WA. results in continued disconnection with the historical floodplain and lateral confinement. In the downstream portion of this segment, the channel is also over-widened.</i>
Trajectory if no action taken	Decline
	<i>The town of Twisp, and the associated continued degradation due to persistent anthropogenic impacts on floodplain surfaces and large wood recruitment/retention processes, including the effects of channel incision, bank armoring, riparian vegetation clearing, and anthropogenic development, will continue to impact this segment. Substantial private landownership adjacent to the channel and in the floodplain increases potential for ecological decline trajectory without intervention.</i>
Recovery potential	Low
	<i>Projects address lack of large in-channel structure but have limited impact on recovery of root causes due to reach-scale floodplain development and lateral constrictions that are assumed to remain. Confinement, entrenchment, and simplification related to the town of Twisp and the modern associated infrastructure does not allow for restoration of root causes.</i>
Restoration objectives	Target conditions from REI
	<i>Target “Adequate” functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity
	<i>Actions include enhancement of channel complexity via LWM installation and/or boulder placements, and riparian restoration. Installation of bank-ballasted large wood structures can provide localized in-channel habitat uplift in an otherwise simplified reach. Placement of a few large boulders in existing large bedrock scour pools otherwise devoid of complexity may increase localized habitat complexity. Modification of anthropogenic features, such as bank riprap, should be considered wherever possible to improve channel condition, but may be limited due to proximity of roads and other infrastructure adjacent to the channel. Existing private land uses and infrastructure may limit overall recovery potential. Riparian restoration where banks have been cleared can support long-term recovery of LW processes. In-stream and riparian area treatments can be installed separately and provide localized habitat uplift.</i>
Project Areas & Prioritization	Twisp Town (Tier 3)

1.4.2 Segment 2: White Sugar (Reach 2) Restoration Strategy

Overall ecological function	Low
	<i>Segment 2: White Sugar (Reach 2) has moderate functional rating in the REI for habitat access and quality. There are no passage barriers and vertical channel stability is considered stable through the segment overall. Large wood material (LWM) meets criteria, but most of the wood was recorded in jams (both constructed and natural). Available sources of LWM recruitment are extremely limited. Off-channel habitat is limited to the constructed 1890's gallery channel and quality pool habitat is marginal. Few large trees are present within the 100-foot riparian buffer. Channel dynamics ranked moderate-low in the REI. A large portion of the floodplain has been disconnected by levee and bank-armoring for anthropogenic land uses such as agriculture, residential, highway, and roads. The bank armoring and levees severely limit natural lateral processes and floodplain connectivity.</i>
Trajectory if no action taken	Decline
	<i>Previous restoration has improved localized habitat in a few areas, though the channel remains simplified and most of the off-channel features and/or floodplains are disconnected or highly modified. Recreational use and infrastructure constraints are present and assumed to persist, which will continue to impact the long-term trajectory. Private landownership in much of the floodplain increases the risk of ecological decline.</i>
Recovery potential	Moderate
	<i>Segment 2 has moderate potential for uplift given past and planned projects and landownership. Currently proposed projects focus on adding large wood in targeted locations where it is absent, encouraging increased connectivity of floodplains and side-channel/off-channel habitat, and floodplain conservation through easement or acquisition. Substantial private landownership, infrastructure and recreational use constraints are assumed to limit the potential for addressing root causes.</i>
Restoration objectives	Target conditions from REI
	<i>Target "Adequate" functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity Side and Off-Channel Habitat Creation or Enhancement Floodplain Reconnection Conservation
	<i>Actions proposed in this segment include enhancement/improvement of channel complexity via large wood placements, the creation or enhancement of side channel habitats, floodplain reconnections via improved side channel engagement, groundwater channel enhancement and development, riparian revegetation, and conservation of targeted areas to support restoration efforts. Evaluation of the potential to replace armored banks with LW or integrate it into the armoring for improved conditions should be considered. The mainstem and off-channel projects aim to maximize habitat uplift potential in conjunction with, or as adaptive management to, previous or planned restoration actions in the segment and the consideration of existing infrastructure. Additional mainstem complexity, increased connectivity or reconnection of off-channel areas, and expansion of riparian revegetation will continue to improve long-term habitat and riparian conditions</i>
Project Areas & Prioritization	Sugar Channels (Tier 1) Eagle Rocks (Tier 3)

1.4.3 Segment 3: Mink (Reaches 3 - 5) Restoration Strategy

Overall ecological function	Moderate-Low
	<i>Segment 3: Mink (Reach 3-5) has a moderate to low functional rating in the REI for habitat access and quality. There are no passage barriers. Substrate is at risk due to reduced lateral processes. Large wood material (LWM) meets criteria, but a majority of wood was recorded in jams (both constructed and natural). Available sources of LWM recruitment are extremely limited due to anthropogenic riparian impacts and bank armoring. Off-channel habitat is not available in this segment and quality pool habitat was lacking. Few large trees are present within the 100-foot riparian buffer, and high levels of disturbance and clearing have reduced the condition and function of the riparian vegetation. Channel dynamics ranked moderate to low in the REI. A large portion of the floodplain has been cut off by infrastructure and development including agriculture, residential, highways and road, and constructed levees. Levees and bank armoring limit lateral processes. Sections of the channel are naturally confined on river right by bedrock and hillslopes in Reach 3 and 5.</i>
Trajectory if no action taken	Decline
	<i>Previous restoration has improved localized habitat in sections of Segment 3, though the channel remains simplified by anthropogenic features and most of the off-channel habitat and/or floodplains are disconnected or modified. Past modification to the irrigation diversion infrastructure in Reach 5 reduced Anthro impacts. Recreational use and infrastructure constraints are present and assumed to persist and will continue to impact the long-term trajectory. Private landownership in much of the floodplain increases the risk of ecological decline.</i>
Recovery potential	Moderate
	<i>Segment 3 has moderate potential for uplift considering past and planned projects, potential uplift, and landownership. Currently proposed projects focus on adding large wood in targeted locations where it is absent and encouraging increased connectivity of floodplains and side-channel/off-channel habitat. Substantial private landownership, infrastructure and recreational use constraints are assumed to limit the potential for addressing root causes.</i>
Restoration objectives	Target conditions from REI
	<i>Target “Adequate” functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity Side and Off-Channel Habitat Creation or Enhancement Floodplain Reconnection Conservation
	<i>Actions proposed in this segment include enhancement/improvement of channel complexity via LWM placements, the creation or enhancement of side channel habitats, floodplain reconnections via levee removal and side channel engagement, creating or enhancement of groundwater channel connectivity, riparian revegetation, and conservation of targeted areas to support restoration efforts. Several project areas, including Two Channels, and WDFW Floodplain, aim to maximize habitat uplift potential in conjunction with, or as adaptive management to, previous or planned restoration actions in the segment. WDFW Floodplain may also have groundwater-fed gallery channel development potential on the river-right floodplain that would connect at the downstream end to the mainstem channel. The Peace project area is a potential side channel development opportunity that may be able to offer perennial and at least part groundwater-supported off-channel habitat features. The Mink project area offers opportunities to uplift the quality of available habitat via side channel treatments while keeping a recreation-use route. Additional mainstem LW or boulders for habitat complexity, increased connectivity or reconnection of off-channel areas, and expansion of riparian revegetation will improve long-term habitat and riparian conditions.</i>
Project Areas & Prioritization	Peace (Tier 2) Two Channels (Tier 2) WDFW Floodplain (Tier 3) Mink (Tier 3)

1.4.4 Segment 4: Bear (Reaches 6 - 7) Restoration Strategy

Overall ecological function	Low
	<i>Segment 4: Bear (Reach 6-7) has a low functional rating based on the REI indicators. There are no fish passage barriers in the segment. At risk substrate was observed both for localized sourcing issues and partial embeddedness. This segment lacks sufficient medium and large woody material per mile, and recruitment potential is extremely limited. The frequency of quality pool habitat is also limited. Off-channel habitat was rated moderate-low and is disconnected by incision and anthropogenic features. Riparian conditions in Segment 3 are low as a function of disturbance related to roads and agricultural/residential development that impairs the riparian buffer, and few large trees are present. Channel dynamics is ranked low-moderate in the REI. Floodplain connectivity and lateral migration have been reduced by infrastructure and development including bank armoring, bridges, and the SR 20 road prism. The channel is in a trend of partial entrenchment (continued disconnection from historic floodplain).</i>
Trajectory if no action taken	Decline
	<i>Persistent potential continued degradation due to persistent anthropogenic impacts on floodplain surfaces and large wood processes, including the effects of channel incision, bank armoring, riparian vegetation clearing, and anthropogenic development, are expected to continue. Previous restoration projects added large wood to the channel and attempted to reconnect/create side channel and tributary habitat. The Barkley Diversion point was moved to reduce impacts. The past projects added some localized habitat and ecological function in portions of the segment. Recreational use and infrastructure constraints are present and assumed to continue to impact the long-term trajectory. Private landownership in much of the floodplain increases the risk of ecological decline.</i>
Recovery potential	Moderate
	<i>Project actions address lack of large in-channel structure and loss of off-channel/floodplain habitat but are not able to fully address recovery of root causes of riparian condition and the large wood recruitment due to persistent anthropogenic features. Landownership is mixed and includes privately-owned parcels, as well as land owned and managed by MSRF, and Trout Unlimited.</i>
Restoration objectives	Target conditions from REI
	<i>Target “Adequate” functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity Side and Off-Channel Habitat Creation or Enhancement Floodplain Reconnection
	<i>Actions include enhancement/improvement of channel complexity via large wood placements, the creation or enhancement of side channel habitats, potential enhancement and improved connection of groundwater channels, riparian revegetation. Potential restoration actions in the 3R project area include mainstem channel habitat uplift opportunities, improved side channel and groundwater tributary connectivity and habitat function, and riparian bar and floodplain vegetation recovery. Identified project opportunities in the Whitefish project area are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed or planned features. The priority action for Barkley is to route additional flow into the existing side channel.</i>
Project Areas & Prioritization	3R (Tier 2) Whitefish (Tier 3) Barkley (Tier 3)

1.4.5 Segment 5: Winthrop (Reaches 8) Restoration Strategy

Overall ecological function	Low
	<i>Segment 5: Winthrop (Reach 8) has a low functional rating based on the REI indicators. There are no fish passage barriers in the segment. Substrate is At Risk due to marginal gravel retention and sourcing as well as partial embeddedness. This segment lacks sufficient medium and large woody material stats per mile, and recruitment potential is extremely limited. The frequency of quality pool habitat is unacceptable. Off-channel habitat is minimal, but that is due in part to natural conditions of the reach. Low ranked channel dynamics such as lateral processes, potential incision, and floodplain connectivity are partially related to natural conditions (river right terrace) but exaggerated by bank armoring and infrastructure. Riparian conditions in Segment 5 are ranked the lowest in the REI. A significant amount of disturbance related to the town of Winthrop, Highway 20, and agricultural/residential development impairs the riparian buffer and few large trees are present. The channel is partially entrenched and disconnected through the segment.</i>
Trajectory if no action taken	Decline
	<i>The Town of Winthrop and the associated infrastructure and development continue to negatively impact and degrade floodplain function, exaggerated confinement, connectivity potential downstream of the bridge, and large wood processes. Continued anthropogenic impacts include forced exaggerated entrenchment (maintained state of channel incision and confinement) via bank armoring, floodplain development, and channel crossings. Only one previous restoration project near the confluence with the Chewuch River added a few pieces of LWM and some riparian vegetation along a short section of the bank to enhance local habitat. The private landownership and the town of Winthrop infrastructure increase potential for ecological decline trajectory.</i>
Recovery potential	Low-Moderate
	<i>Project actions aim to improve the riparian corridor and increase the quantity of large in-channel wood structure for improved local habitat complexity potential, but are not able to fully address recovery of root causes of riparian condition and the large wood cycle due to persistent anthropogenic impacts. Landownership includes privately-owned parcels, as well as land owned and managed by the Town of Winthrop.</i>
Restoration objectives	Target conditions from REI
	<i>Target “Adequate” functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity
	<i>Actions include enhancement/improvement of channel complexity via large wood placements and riparian revegetation. At the upstream end of Segment 5, connectivity and habitat improvements to the Hatchery Canal outlet are part of the Hatchery project area discussed in Segment 6. The Riverside project, which is limited by infrastructure south of the Town of Winthrop, offers potential projects that include localized mainstem habitat uplift in highly simplified glide habitat.</i>
Project Areas & Prioritization	Riverside (Tier 3)

1.4.6 Segment 6: Hatchery (Reaches 9 – 10) Restoration Strategy

Overall ecological function	Low
	<i>Segment 6: Hatchery (Reaches 9-10) - Ecological function is rated low based on REI indicators. Although there are no fish passage barriers, riprap and a lack of in-channel complexity have reduced spawning gravel retention. Large wood material (LWM) quantities, quality pool habitat, and connectivity with the main channel are extremely lacking in this segment. Habitat quality is rated the lowest in the REI, a result of anthropogenic features including infrastructure from the town of Winthrop, WA, agricultural and residential development, constructed levees, and hatchery infrastructure – including the hatchery canal Foghorn diversion dam. Riparian conditions in Segment 6 ranked low in the REI. There are patches along the channel with large trees however, a large amount of disturbance and riparian clearing (from town infrastructure and other anthropogenic features) have reduced the riparian condition and function. Channel dynamics in Segment 6 ranked low-moderate in the REI. A large portion of the historical floodplain has been disconnected by levees, bank armoring and other infrastructure. These variables also limit lateral migration and promote/sustain entrenchment.</i>
Trajectory if no action taken	Decline
	<i>Past projects in Segment 6 focused on construction and improvements to the Foghorn Diversion. Planned projects propose side channel creation, LW installations, and inclusion of LW in bank armoring for improved habitat conditions. Persistent long-term degradation due to anthropogenic impacts to floodplain, channel, riparian zone, and large wood processes are assumed, if no action is taken. Anthropogenic confinement and channel entrenchment (maintained incision) have limited natural lateral migration and large wood processes. Landownership is a mix of private, state, federal, public utility district, and non-profit organizations (e.g., Methow Conservancy).</i>
Recovery potential	Moderate-Low
	<i>Project actions increase in-channel structure and large wood habitat, improve off-channel/floodplain habitat connectivity where available, side channel creation and connection improvements, and an option of removing the Foghorn diversion dam. Removal of the diversion would address a primary root cause of infrastructure limitations. However, other anthropogenic root causes of riparian condition and channel entrenchment/confinement due to persistent anthropogenic impacts are assumed to remain “as is” (e.g., roads, homes and recreation, hatchery canal).</i>
Restoration objectives	Target conditions from REI
	<i>Target “Adequate” functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity Side and Off-Channel Habitat Creation or Enhancement Floodplain Reconnection
	<i>The project areas are partially confined by floodplain terraces, levees, and armored banks. The channel lacks in both in-stream habitat complexity and connected off-channel habitat. In the Spring Creek project area, identified restoration actions include localized mainstem habitat uplift LW installations, side channel activation, native riparian vegetation establishment, and converting a high-flow route into a perennial side channel that intercepts and contributes to the existing Hatchery Canal channel at its downstream end. Lower Foghorn project opportunities include localized mainstem habitat uplift LW, side channel activation, and riparian native vegetation establishment. At Foghorn, identified restoration opportunities include localized mainstem habitat uplift (especially at existing pools and to armored banks), side channel activation, potential to remove or improve the Foghorn diversion dam should be evaluated, riparian vegetation and forest recovery, and evaluating the potential for a fish-passable side channel through the river-left narrow floodplain. Identified restoration opportunities in the Francis project area include bank armor removal and replacement with LW, side channel activation, and riparian native vegetation establishment.</i>
Project Areas & Prioritization	Spring Creek (Tier 2) Lower Foghorn (Tier 2) Foghorn (Tier 1) Francis (Tier 3)

1.4.7 Segment 7: Wolf (Reaches 11) Restoration Strategy

Overall ecological function	Low
	<i>Segment 7: Wolf (Reach 11) - Ecological function is rated low based on REI indicators. Although there are no fish passage barriers, riprap and a lack of in-channel structure have exaggerated natural entrenchment trends on river right along the toe of the Wolf Creek fan. The lack of in-channel complexity has reduced spawning gravels retention. Large wood quantities, quality pool habitat and connectivity with the main channel are extremely lacking in this segment. Habitat quality is rated as very lowest in the REI, a result of anthropogenic features including state highway 20, agricultural, and residential development. Riparian conditions in Segment 7 ranked low-moderate in the REI. There are areas with large trees, however, large amounts of disturbance and riparian clearing have reduced the riparian condition and function. Channel dynamics in Segment 7 (Reach 10) ranked low-moderate in the REI due to prevalent bank armoring and levees associated with roads and home development that limit lateral migration and exaggerate conditions of entrenchment (maintained condition of incision and floodplain disconnection).</i>
Trajectory if no action taken	Decline
	<i>The exaggerated entrenchment of the channel as a result of anthropogenic confinements limits natural lateral migration processes that result in floodplain development and large wood recruitment processes. Landownership is a mix of private, state, federal, public utility district, and non-profit organizations (e.g., Methow Conservancy).</i>
Recovery potential	Low-Moderate
	<i>Project actions address lack of large in-channel structure and improve off-channel/floodplain habitat connectivity potential, where available. However, they are expected to have limited impact on recovery of root causes of riparian condition and channel entrenchment/confinement due to persistent anthropogenic impacts that are assumed to remain (e.g., roads, homes and recreation).</i>
Restoration objectives	Target conditions from REI
	<i>Target “Adequate” functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity
	<i>Identified restoration opportunities in the Wolf Fan project area include localized mainstem habitat uplift via bank-buried LW installation, Wolf Creek outlet fan uplift, enhanced bar development and split flow maintenance at the upstream end, and riparian vegetation and forest recovery.</i>
Project Areas & Prioritization	Wolf Fan (Tier 3)

1.4.8 Segment 8: Lower Big Valley (Reaches 12 - 13) Restoration Strategy

Overall ecological function	Moderate
	<i>Segment 8: Lower Big Valley (Reaches 12 -13) - Ecological function is moderate. There are no complete fish passage barriers, and substrate conditions are adequate throughout the segment. Off-channel habitat and quality pool habitat are available. Large wood material (LWM) is adequate, as is recruitment potential. Past restoration efforts have added large wood for localized habitat quality uplift and large wood and bank stabilization barbs. Riparian conditions ranked moderate in the REI. There are few large trees and high levels of clearing were observed in patches. This segment has low levels of human disturbance. Channel dynamics are adequate and ranked high. Floodplain connectivity and lateral migration occur at or near natural conditions. No measurable trend of incision or aggradation beyond natural fluctuations were observed.</i>
Trajectory if no action taken	Maintain
	<i>Currently, the channel offers relatively moderate to high-quality habitat conditions. Mainstem channel has complexity, but riparian forest age is lacking structure and a mature canopy. Thus, recruited large wood and jams are relatively temporary. Groundwater supported off-channel habitat is a valuable resource in the Big Valley reaches. Private landownership adjacent to the channel and in the floodplain increases potential for ecological decline trajectory without conservation measures.</i>
Recovery potential	Moderate-High
	<i>Segment 8 offers relatively high potential for recovery, overtime. Groundwater supported off-channel habitat is a valuable resource. Areas that host groundwater floodplain tributaries or off-channel features should be prioritized for conservation, preservation, and as a climate resiliency resource. Landownership is a mix of public/state-owned and private lands. If left to mature overtime (decades), the riparian forest is expected to eventually provide effective large wood contributions to the channel.</i>
Restoration objectives	Target conditions from REI
	<i>Target “Adequate” functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity Side and Off-Channel Habitat Creation or Enhancement Floodplain Reconnection Conservation
	<i>Restoration actions are expected to maximize uplift and encourage dynamic response in this segment. Identified restoration opportunities in the Lodge project area include mainstem LW habitat uplift and geomorphic complexity structure, and side channel activation. In conjunction with Upper Lodge, notable uplift to floodplain tributary habitat and contributions are possible. The identified restoration actions within the Lucky (Lower and Upper) project areas are intended to enhance existing channel processes to uplift and maximize geomorphic function and habitat complexity throughout the project area. The Lower Big 1 identified project opportunities here are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed features, some as adaptive management actions post-project implementation and channel response. In the Lower Big 2 project area, several groundwater-supported floodplain tributary and side channels occur but with sometimes impaired connectivity to the mainstem channel. Identified restoration opportunities include the additional of large wood to the mainstem and side channels, activation of perennial side channels, creating perennial connection to existing groundwater-supported off-channel habitat, and some revegetation effort – all to maximize habitat uplift and geomorphic complexity in the project area.</i>
Project Areas & Prioritization	Lodge (Tier 1) Upper Lodge (Floodplain) (Tier 1) Lower Lucky (Tier 1) Upper Lucky (Tier 1) Lower Big 1 (Tier 1) Lower Big 2 (Tier 1)

1.4.9 Segment 9: Mid Big Valley (Reaches 14 - 16) Restoration Strategy

Overall ecological function	Moderate
	<i>Segment 9: Mid Big Valley (Reaches 14-16) - Ecological function is moderate, overall. There are no fish passage barriers and substrate conditions are adequate throughout the segment. Reaches 14-15 have an adequate amount of large wood material (LWM) and Reach 16 LWM does not meet minimum criteria. Some off-channel habitat is connected and available. Quality pool habitat is present in Reach 15 but, in Reach 14 and Reach 16 pool habitat is extremely limited. The riparian conditions in Segment 9 ranked moderate-low in the REI. Large trees exist in the riparian zone, but not at levels they would have historically. This is due to high levels of disturbance and vegetation clearing historically in all reaches and persisting in Reaches 15-16. Potential recruitment is available in the downstream portion of the segment. Channel dynamics are ranked low-high in this segment, depending on proximity to the Weeman Bridge and its associated confinement. Floodplain connectivity and lateral migration are at or near natural conditions in Reach 14 and most of 15 but limited by the under-sized Weeman Bridge/Hwy 20 crossing at the break between Reaches 15-16 and bank armoring and remnant levees in Reaches 15-16.</i>
Trajectory if no action taken	Maintain-Decline
	<i>Although the lower portion of the segment (Reach 14) has moderate-high ecological conditions currently, some confinement and floodplain disconnection due to roads, bank armoring, and a bridge (Weeman Bridge) will likely remain and continue to impact geomorphic and large wood processes. Continued growth of riparian and floodplain vegetation will help to reduce further degradation over time but private landownership adjacent to the channel and in the floodplain increases potential for ecological decline trajectory without conservation.</i>
Recovery potential	Moderate-High
	<i>This segment has low (Reach 14), moderate (Reach 15) and high (Reach 16) potential for recovery. Where available, conservation or enhancement of groundwater supported off-channel habitat is highly valuable. Actions may improve habitat complexity and quality but are not expected to fully address the root causes, especially in Reaches 15-16 due to the roads and bridges that are expected to remain. Landownership is a mix of state-managed public lands, Methow Salmon Recovery Foundation-managed parcels, and several privately-owned properties.</i>
Restoration objectives	Target conditions from REI
	<i>Target "Adequate" functional rating criteria as described in the Reach-based Ecosystem Indicators (REI), provided in Appendix B.</i>
Action Types	Riparian Restoration Enhance Channel Complexity Side and Off-Channel Habitat Creation or Enhancement Floodplain Reconnection Conservation
	<i>In the Grizzly project area, some active lateral processes and large wood recruitment are already occurring, resulting in downstream jam development and wide active bars. Identified restoration opportunities include the additional of large wood to the mainstem and side channels, activation of perennial side channels, and creating perennial connection to existing groundwater-supported off-channel habitat. In the Mid Big project area, identified restoration opportunities aim to work with, and enhance, previously implemented or planned restoration projects. Recommended actions include the addition of large wood to the mainstem and side channels, activation of perennial side channels, creating perennial connections to existing groundwater-supported off-channel habitat, and bank-top revegetation efforts. The Cassal project area is confined and entrenched at the downstream end by Weeman Bridge and State Route 20. Identified restoration opportunities include localized mainstem habitat uplift, side channel activation, and replacing the existing Highway 20 bridge (Weeman Bridge) crossing with a longer-spanning bridge to reduce confinement and improve side channel activation potential with passage under Hwy 20 to reconnect the river right floodplain and wetlands.</i>
Project Areas & Prioritization	Grizzly (Tier 1) Mid Big (Tier 1) Cassal (Tier 2)

2 Project Opportunities

2.1 PROJECT IDENTIFICATION AND EVALUATION APPROACH

Projects were identified through field surveys and analysis performed in the reach assessment and consultation with practitioners in the area. A map of the identified project areas is provided in Figure 1. A suite of the project elements that are believed to best achieve target conditions and address fish habitat limiting factors are included for each project area. The projects represent an initial first step; it is expected that projects will be modified once project-specific surveys, analysis, and stakeholder coordination are performed. Project descriptions and conceptual maps are provided below. Project prioritization was performed to rank the projects into three priority tiers. Prioritization occurred by subjecting the projects to a set of scoring criteria. These criteria are based on several factors, including how well projects address the “gap” between existing and target conditions, species use/potential use of the area, and whether or not projects address root causes of impairments. A description of the scoring methods and guidance is provided at the end of this document (Section 3.2). Projects are also given a relative cost score estimate and feasibility designation to provide a relative cost perspective in project selection and planning.

2.2 PROJECT OPPORTUNITIES OVERVIEW

A total of 25 project areas were identified. An effort was made to identify project boundaries that group similar actions or that address similar reach-scale conditions. However, these boundaries are meant to be modified as needed. In some cases, the project boundaries were based on the interdependence of or relationship between potential treatments. In other cases, the boundaries were based on commonly understood or working project area boundaries already established. The actual extent of a project that is brought forward for implementation is likely to change depending on factors such as funding, landowner cooperation, schedule, phasing, analysis results, etc. Identified project opportunities within or near previous projects are intended to complement and/or extend the lifespan or trajectory of the previous project actions. The interest of stakeholders and landowners to revisit previously enhanced areas for additional treatments likely varies and thus, is expected to influence the ultimate direction of project pursuit beyond this report.

The 25 projects have been evaluated and ranked for prioritization (Table 1). Ranking delineates the projects into three tiers identified as:

Tier 1 = Project that ranked the highest overall Total Benefit score

Tier 2 = Project with moderate Benefit score

Tier 3 = Project with relatively low Benefit score

The highest ranked projects (Grizzly and Lower Big 2) are in areas that rated (REI) the highest habitat uplift potential. The Tier 1 projects rank highest with Total Benefit Score because of the uplift potential and ability to address more of the root causes of degradation. The Tier 2 and 3 projects have lower Total Benefit Scores as a result of significant infrastructure constraints or user safety requirements that are not expected to change, have lower existing fish use, and often do not address root causes of degradation. Notes are included in the ranking table explaining the rationale for the rankings as well as the feasibility designation. These ranking results should be considered preliminary and open to adjustment by technical teams and potential project sponsors depending on circumstances and interpretations.

Table 1. Summary results of project prioritization. Ranked by Total Benefit Score. The full prioritization matrix is presented in Section 3.1.

Tiers	Project Name	Reach	Down-stream RM	Up-stream RM	Total Length (mi)	Total Benefit Score	Cost Score (1-4)	Benefit-to-Cost Score	Feasibility Designation
1	Lower Big 2	13	57.7	59.25	1.55	8	3	2.7	Moderate-High
	Grizzly	14	59.25	60.55	1.3	8	3	2.7	Moderate-High
	Sugar Channels	2	41.55	42.75	1.20	7	3	2.3	Moderate-High
	Foghorn	9-10	53.15	53.5	0.35	7	3	2.3	Moderate
	Lodge	12	55.4	55.8	0.4	7	2	3.5	High
	Upper Lodge (floodplain)	12	55.7	56.5	0.8	7	3	2.3	Moderate
	Lower Lucky	12	55.8	56.6	0.8	7	3	2.3	Moderate
	Upper Lucky	12	56.6	57.1	0.5	7	3	2.3	Moderate
	Lower Big 1	13	57.1	57.6	0.5	7	3	2.3	Moderate-High
	Mid Big	15	60.6	61.75	1.15	7	3	2.3	Moderate
2	Peace	3	43.70	44.50	0.80	6	2	3.0	Low-Moderate
	Two Channels	3-4	44.40	45.80	1.40	6	2	3.0	Low-Moderate
	3R	6	47.75	48.8	1.05	6	2	3.0	Moderate
	Lower Foghorn	9	52.4	53.15	0.75	6	2	3.0	High
	Spring Creek	8-9	51.6	52.4	0.8	6	2	3.0	Moderate-High
	Cassal	16	61.75	62.3	0.55	6	4	1.5	Low-Moderate
3	Eagle Rocks	2-3	42.80	43.70	0.90	5	2	2.5	Low-Moderate
	Mink	5	46.80	47.50	0.70	5	3	1.7	Moderate
	WDFW Floodplain	5	45.90	46.85	0.95	4	2	2.0	Moderate
	Whitefish	6	48.85	49.4	0.55	4	2	2.0	Moderate
	Barkley	7	49.9	50.2	0.3	4	2	2.0	Low-Moderate
	Riverside	8	50.6	51.1	0.5	4	2	2.0	Moderate-High
	Francis	10	53.50	54.10	0.60	4	2	2.0	Moderate
	Wolf Fan	10-11	54.15	55.3	1.15	4	2	2.0	Moderate
	Twisp Town	1	40.60	41.50	0.90	3	2	1.5	Low-Moderate

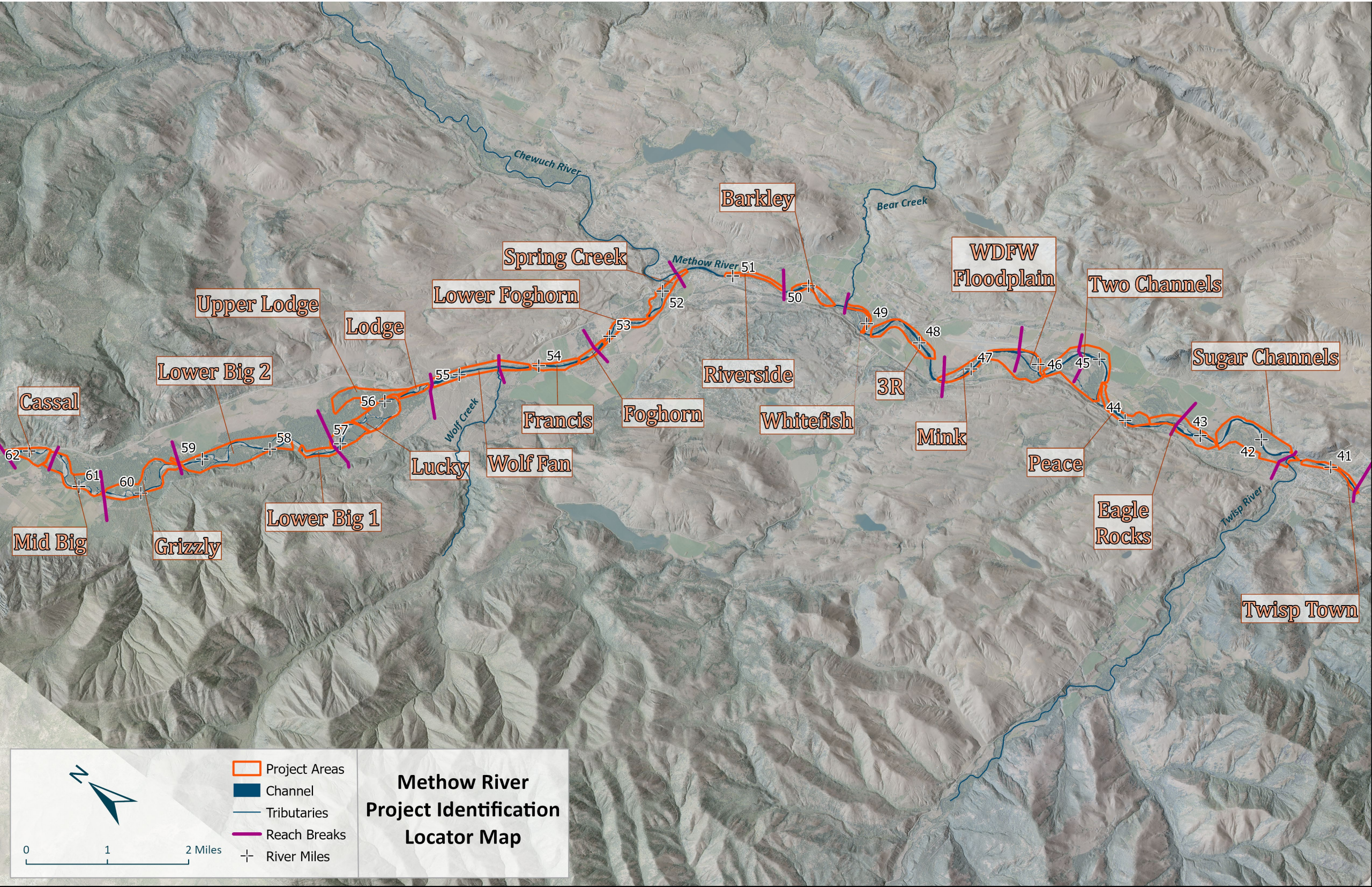


Figure 1. Locator map for identified projects in the Methow River (RM 40.6-62.2) assessment area.

2.3 PROJECT DESCRIPTIONS

This table describes project opportunities by project area within the Methow River assessment area (RM 40.6 - 62.2). Concept maps of the project opportunities are included below the table.

Reach and Segment	River Miles	Project Area Name	Project Description
1 Twisp	40.6-41.5	Twisp Town	The Twisp Town project area is situated in the confined and entrenched (past and present anthro-maintained state of floodplain disconnection) section of the Methow River adjacent to the town of Twisp. Infrastructure such as the Methow Valley Highway bridge crossing, armored banks, home and town structures, and utility crossings continue to limit channel processes in this reach. A large portion of the historical floodplain and Twisp River delta (immediately upstream of the project area) are cut off by levees and grading associated with residential and commercial development in the area. River process and habitat conditions are simplified and degraded in this segment. Riparian forest vegetation has been removed along the top of both sides of the channel as part of development. No prior restoration efforts were identified. Opportunities for in-stream habitat uplift and revegetation along bank tops that are not expected to increase risk to existing infrastructure are possible. The project area is located within City of Twisp or privately owned property, except for 0.15 miles of river-left hillslope bank owned by the Methow Conservancy near RM 41.3. Collaboration with property owners will be necessary. Potential actions include the following: • Installation of bank-ballasted large wood structures to provide localized in-channel habitat uplift in an otherwise simplified reach. Consider installation in both native material and rip-rap armored banks. Consider recreational uses and infrastructure protection. • Large wood placement at existing bedrock meander scour hole at RM 40.6 to provide habitat cover in an otherwise simplified reach. Consider recreational uses. • Large boulder placement (2-5) at existing bedrock meander scour hole at RM 40.6 to provide pool habitat complexity downstream of an otherwise simplified reach. • Revegetate banks with diverse native forests to provide long-term sources of shade and nutrient inputs into the project area. In-stream and riparian area treatments can be installed separately and provide localized habitat uplift.
2 White Sugar	41.55-42.75	Sugar Channels	The Sugar Channels project area includes mainstem and floodplain treatments as well as improvements to the previously constructed 1890’s gallery floodplain tributary (2014) outlet that enters the mainstem channel within the project area. The mainstem and its floodplain have reduced function because of extended sections of anthropogenic confinement, floodplain disconnection, and riparian forest loss. The Sugar Levee, along river right at the upstream end of the project area restricts lateral processes, induces localized erosion, and disconnects the adjacent floodplain. Extended sections of riprap armoring on the river left bank between RM 42 – 42.5 further restrict natural lateral processes and perpetuate reduced floodplain connectivity in this reach. In addition to a few small riparian projects completed in the past, the Sugar Reach Project (2025-2026) is currently underway and expected to add side channel and habitat improvements to the project area. Additional opportunities to improve mainstem habitat complexity, create side channel and floodplain groundwater tributaries, and reestablish riparian vegetation have been identified as part of this assessment. The project area is located entirely within privately owned property. Potential actions along the mainstem channel and its floodplain include the following: • Remove bank armoring where infrastructure allows to support floodplain connectivity and natural lateral processes. • Replace riprap bank armoring with or addition of large wood structures to improve localized mainstem habitat along stabilized banks. • Create and enhance complexity of side-channels through the floodplain in several locations. Investigate existing high-flow swales and old channel scars to identify feasibility, including potential groundwater inputs, and to determine if and how much excavation may be required. Include additional large wood in all side channels for habitat complexity and channel maintenance, as well as construct log jams at the inlet and outlets. • Create groundwater gallery side channel or floodplain tributaries to further increase high-quality off-channel habitat, if assessment and analysis indicate groundwater will support the feature. Evaluate potential along valley floor in historical partially wetted swale on river left floodplain with outlet at RM 41.55 and through river right floodplain with gallery development at upstream end with outlet at RM 41.9. • Install bank-ballasted large wood structures to provide localized in-channel habitat uplift in an otherwise simplified section. Consider and design for recreational uses. • Install large wood apex jams on identified riffle crests and bars to promote split flow complexity and enhance mainstem habitat complexity at RM 41.45, 42.2, 42.45, 42.55, and 42.75. Consider and design for recreational uses. • Install large wood bar roughness structures to promote vegetation establishment and island or floodplain development downstream of apex jams. • Install large boulder placement (3-10) in existing extended pool with low habitat complexity between RM 41.8-41.9 for cover and in-stream complexity feature. • Revegetate banks with diverse native riparian vegetation and forests to provide long-term sources of shade, large wood recruitment, and nutrient inputs into the project area. The only area with active lateral erosion occurs near the current outlet of the previously constructed 1890’s gallery channel outlet. To maximize the quantity of good off-channel habitat the feature provides over the long term, the downstream end of the 1890’s gallery channel could be re-routed through the adjacent floodplain to a new outlet location downstream of the lateral erosion impact area. The existing outlet would be replaced with a large wood structure to provide mainstem habitat enhancement. Habitat complexity in the form of large wood, outlet jam, potential small boulders, and riparian vegetation regeneration would be included. The project area is located entirely within privately owned property. Potential 1890’s tributary actions include the following: • Creation/Re-route extension of floodplain tributary to increase quantity of off-channel habitat the features provide over the long-term. • Install habitat large wood, appropriately sized to the side channel, to maximize habitat complexity. • Install bank-buried large wood structure at the new outlet. • Revegetate the banks and historical floodplain for improved riparian function for both the new tributary and the mainstem channel. • Conservation through easement or acquisition of the historical floodplain channel re-route would support installation and long-term maintenance of the project. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.

Reach and Segment	River Miles	Project Area Name	Project Description
2-3 Mink	42.8–43.7	Eagle Rocks	The Eagle Rocks project area offers mainstem, off-channel, and side channel habitat uplift opportunities as well as riparian forest revegetation opportunities. Substantial acreage of the adjacent floodplain surfaces is cleared and/or developed for agricultural uses or home and dense trailer/campground occupation. Past restoration projects added some large wood structures to the existing side channel at RM 43.2-43.35 and six bank-buried structures along river left at the upstream end of the project area. A large wood structure installation was completed in 2014 at the downstream end of the project area. In addition, native riparian revegetation efforts have been initiated in some sections of the project area. Identified project opportunities here are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed features. The project area is situated within privately owned property and Methow Salmon Recovery Foundation managed lands. Potential actions include the following: • Create and/or uplift off-channel habitat. Evaluate potential of partially wetted channel scar on river left for off-channel or alcove habitat at RM 42.9 with outlet jam to support confluence structure. Evaluate potential to reconnect or increase activation of high-flow side channel on river right with inlet at RM 43.1. Add habitat and structural wood if viable. • Install bank-ballasted large wood structures on river right near RM 43.2 to provide localized in-channel habitat uplift in an otherwise simplified section. Consider and design for recreational uses. • Install bank-ballasted alcove and side-channel outlet jam on river left at RM 43. • Uplift existing side channel habitat quality and complexity with added structural and habitat large wood. • Install apex jam (large) on bar to encourage 1) development of split-flow conditions and provide localized mainstem complexity and 2) stabilize island/bar/floodplain development behind the structure. Consider and design for recreational uses. • Install bank-buried large wood structures on river left to provide localized in-channel habitat uplift in an otherwise simplified section. Consider and design for recreational uses. • Install apex jam (large) on bar edge to encourage development of split-flow conditions, maintain scour pool with cover - uplifting localized mainstem complexity. Consider and design for recreational uses. • Install large wood roughness structures on poorly vegetated floodplain (river right) to promote riparian vegetation/forest and floodplain establishment. • Install large boulder placement (3-10) in existing extended pool with low habitat complexity between RM 41.8-41.9 for cover and in-stream complexity feature. • Revegetate historical floodplain surface previously cleared with diverse native riparian vegetation and forests to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel • Conservation through easement or acquisition of floodplain on river left (RM 42.8 – 43.1) and historical floodplain properties (i.e. river right at RM 43.15 – 43.3) would benefit long-term restoration efforts in this project area. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
3 Mink	43.7 – 44.5	Peace	The Peace project area offers mainstem and side channel habitat uplift opportunities as well as riparian forest revegetation opportunities. The modern channel is relatively straight and narrow here as it flows along the steep hillslope and road prism toe on river right. The adjacent floodplain surfaces were cleared for agricultural and anthropogenic uses. Past restoration projects added small-large wood structures (3) along the bank of an existing marginal side channel on river right (RM 44.15) and native riparian revegetation efforts have been initiated on the river left historical floodplain. Identified project opportunities here are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed features. The project area is located entirely within privately owned property. Potential actions include the following: • Create and enhance complexity of side-channels. Investigate existing high-flow swales and old channel scars to identify feasibility, including potential groundwater inputs, and if and how much excavation will be required. • Evaluate potential of enhancing/expanding connected groundwater channel on river-left floodplain with outlet at RM 43.7 that includes bank-buried outlet jam. • Install bank-ballasted large wood structures within riprap at RM 43.9 and on both banks near RM 44.2 to provide localized in-channel habitat uplift in an otherwise simplified section. Consider and design for recreational uses. • Install outlet jam at downstream end of existing side channel at RM 44 to 1) aid in maintaining side channel function and 2) aid in stabilizing vegetated bar behind the structure. • Install apex jam (large) at upstream end of side channel (RM 44.2) and along the island bar (RM 44.15) to 1) maintain and enhance split-flow conditions and provide localized mainstem complexity and 2) stabilize island/bar/floodplain development behind the structure. Consider and design for recreational uses. • Revegetate previously cleared historical floodplain surface with diverse native riparian vegetation and forests to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.

Reach and Segment	River Miles	Project Area Name	Project Description
3 – 4 Mink	44.4 – 45.8	Two Channels	The Two Channels project area includes mainstem habitat and complexity uplift, floodplain reconnection, side channel reactivation, and riparian forest establishment opportunities. The channel is currently disconnected from its river-right floodplain and confined by 0.95 miles of riprap armored banks and levees. This, and the lack of sufficient large wood in the project area, has resulted in diminished channel function and habitat quality. The armored bank on river left (RM 45.1 - 45.4) is in place to protect an irrigation canal that runs along the top of the bank. Downstream on river left the armored bank (RM 44.7 – 44.85) is also associated with canal protection along with structure protection near the top of bank. Ideally, levees and riprap could be removed to support recovery of natural channel processes and floodplain reconnection. In the absence of levee and riprap removal, there are opportunities to uplift mainstem habitat function along the armored banks, where channel hydraulics are appropriate. Breaching the river-right levee in select locations could also be used to partially reconnect the floodplain via side channel activation. In 2014 past restoration projects installed a few constructed jams into the levee riprap near RM 45.5 and a grazing enclosure that supports riparian and wetland recovery around an existing off-channel habitat (RM 44.4), though connectivity is currently impaired. A project slated for 2027, also named Two Rivers, is planned to support side channel connection and large wood quantities. Identified project opportunities here are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed and planned features. The project area is located within privately owned property. Acquisition of property on the river-right historical floodplain (RM 43.15 – 43.3) would support project implementation and long-term conservation. Potential actions include the following: • Reconnect the river left historical floodplain and natural lateral processes via levee and riprap removal. This will likely require rerouting the existing irrigation canal away from the channel bank to reduce risk of infrastructure. • Reconnect the river right historical floodplain and create quality off-channel habitat through side channel reactivation and enhancement. This will require levee/plug breaching and/or potentially additional grading for the inlets at RM 45.6 and RM 45.35. Side channel reactivation includes large wood inlet and outlet structures as well as habitat and side channel maintenance large wood throughout. • Install bank-ballasted wood structures, with bumper logs where needed, to provide localized in-channel habitat uplift in an otherwise simplified section while designing for recreational uses. • Install large wood apex jam at upstream end of existing side channels (RM 45.35 and 45.1) and along bars (RM 44.9, 45.25, 45.6, and 45.7) to 1) maintain and enhance split-flow conditions and provide localized mainstem complexity and 2) stabilize island/bar/floodplain development behind the structure. Add Floodplain roughness to bars to support revegetation establishment and floodplain development. Consider and design for recreational uses. • Install large wood in existing side channels (river left at RM 45.1 and 45. 25) to uplift available habitat and maintain side-channel function. • Place large boulders (10-15) in existing extended pool with low habitat complexity at RM 45.2 to provide cover and in-stream complexity. • Revegetate previously cleared riparian corridor with diverse native riparian vegetation to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the side channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
4 – 5 Mink	45.85– 46.8	WDFW Floodplain	The WDFW Floodplain project area offers areas of mainstem habitat uplift, riparian recovery, potential off-channel and side-channel habitat development, and the potential to develop groundwater-supported tributaries on the river-right floodplain that provide quality off-channel aquatic habitat that includes wetlands, beaver habitat, and riparian floodplain forest recovery. The river-right floodplain has been partially disconnected by the Old Twisp Hwy and functionally diminished by clearing, grading, roads, and ditching. The mainstem channel through the project area has received multiple phases of restoration project implementation since 2012 and is slated for additional efforts in 2028. Past projects include side channel development, large wood installations along the mainstem and side channels, and some floodplain restoration efforts. The East Canal irrigation intake and related infrastructure, updated in 2010, are located on river left near RM 46.5. Approximately 0.4 miles of river-left channel is armored with sets of rock gabions or riprap placed on banks in front of homes, canal infrastructure, and roads. The Methow Valley State Airport is located on the river left terrace adjacent to the channel at RM 46.3 – 46.75. Acquisition of property on the river-right historical floodplain near RM 45.9 would support riparian recovery along the mainstem channel. The identified project opportunities here are recommended with the understanding of infrastructure constraints and with the intent of maximizing habitat uplift potential in conjunction with and as adaptive management action that build off the already installed features. The project area is within a mix of private, municipal airport, and public lands managed by the WA State Dept of Wildlife. Potential actions include the following: • Installation of bank-buried large wood in the mainstem and side channel(s) to maximize in-stream habitat uplift. At the island side-channel near RM 46, additional habitat large wood is expected to improve and better maintain connectivity to the mainstem channel, including a bank-buried outlet jam that could provide habitat cover in a large pool that is currently notably lacking in complexity. • Install large wood apex jam at extended bars (RM 46, 46.2, and 46.3) to stabilize bar/floodplain development behind the structure, including riparian vegetation establishment. • Install large wood floodplain roughness structures on developing floodplain and bar tops behind jams to support floodplain development and vegetation establishment. • Activate high-flow side channel inlet (river right at RM 46.8) and outlet alcove to increase frequency of inundation and high-flow floodplain refugia and potentially support infiltration gallery success in Cottonwood project area. Include habitat and maintenance large wood as is appropriate. • Place large boulders (5-10) in existing extended pools with low habitat complexity at RM 45.9 and RM 46.75 to provide cover and in-stream complexity feature. • Create groundwater gallery channel (infiltration gallery and piping that feeds floodplain channel) to increase high-quality off-channel habitat, if assessment and analysis indicate groundwater will support the features. The gallery channel will include large wood for habitat function and channel maintenance, and outlet jam to support confluence structure. • Evaluate and upgrade road crossings for routing created gallery channel through existing pond at toe of hillslope. • Improve condition of existing wetland and riparian vegetation on disconnected floodplain behind Old Twisp Hwy to improve passage under road and connectivity to the mainstem channel – includes outlet/alcove large wood structure and loading. • Revegetate previously cleared floodplains with diverse native riparian forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the side channel and mainstem channel. Identified actions along the mainstem channel maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift. Actions related to groundwater tributary development should be installed simultaneously to maximize uplift potential.

Reach and Segment	River Miles	Project Area Name	Project Description
5 Mink	46.8 – 47.5	Mink	The Mink project area represents the transition point between upstream narrower, partially bedrock-controlled reaches and wider historical floodplain downstream. During high flows, split channel conditions occur where marginally functioning side channels around partially or non-vegetated islands. The channel is lacking habitat complexity throughout the project area and is over-widened at the upstream end. No record of past projects was discovered but a constructed large wood jam was noted on river right at RM 47.33. Potential restoration actions in this reach include mainstem channel habitat uplift opportunities, improved side channel connectivity and habit function, and riparian bar and floodplain vegetation recovery. The Mink project area site characteristics offer opportunities to notably uplift the quality of available aquatic habitat via side channel treatments while keeping a recreation-use route relatively open. The project area is located within privately owned property, but most of the treatments are within the active channel margins. Potential actions include the following: • Improve connectivity and functional habitat of side channels options include river left at RM 46.7-46.85, river right at RM 47-47.1, and on river left at RM 47.1-47.35. Currently, these high-flow routes are disconnected at normal flows at the upstream end with varied connectivity of low-quality at the downstream end. Convert high-flow routes to perennial side channels with high-quality habitat. Evaluate if excavation is required in addition to installation of large wood. • Install large wood bank-buried and habitat large wood throughout the side channels, including outlet jams with scour holes to 1) maintain side channel connectivity through forced hydraulics and 2) create and maintain habitat complexity. • Install large apex jams at the inlets to side channels to maintain split flow conditions and provide localized habitat uplift. • Install apex jams along extended bars (RM 46, 46.2, and 46.3) to promote additional split-flow conditions at high flow, and stabilize bar/floodplain development behind the structure, including riparian vegetation establishment. • Install large wood floodplain roughness structures on bar tops behind jams to support floodplain development and vegetation establishment. • Install bank-buried large wood along the mainstem to maximize in-stream habitat uplift, where conditions and recreational uses allow – for example on river right at RM 46.7-46.75 and RM 47.2-47.3. • Place large boulders (5-15) in existing extended pool with low habitat complexity at RM 47.6 to provide cover and in-stream complexity. • Revegetate previously cleared historical floodplain surfaces and developing islands within the installed roughness features with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the side channel and mainstem channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
6 Bear	47.75 – 48.8	3R	The 3R project area channel and modern floodplain are inset below its historical floodplain (terraces). The bedrock bank and channel bed contact on river left at RM 48.25-48.4 confine lateral processes along the meander as well as partially resist additional downcutting. During flood events, high flow side channels activate on available floodplain surfaces on river left at RM 47.65-48, river right at RM 48-48.2, and river right at RM 48.6-48.75. A groundwater-fed tributary initiates on the river-left floodplain, flows through riparian forest, then along the back of an extended bar to its confluence with the mainstem channel near RM 48.5. The existing floodplain groundwater tributary and high-flow side channels are lacking in structure and habitat function. Potential restoration actions in the 3R project area include mainstem channel habitat uplift opportunities, improved side channel and groundwater tributary connectivity and habit function, and riparian bar and floodplain vegetation recovery. Past projects include three bank-buried large wood structures on river right at RM 47.8-47.95 and the downstream end of the Barklay Irrigation (2020) at RM 48.4. Additional restoration treatments are reported for installation in 2027. The project area is situated in privately owned property, including a section owned and managed by Trout Unlimited (river left at RM 48.15-48.25). Access via private property will be required. Potential identified actions include the following: • Improve connectivity and functional habitat of side channels on river left at RM 47.65-48, river right at RM 48-48.2, and river right at RM 48.6-48.75. Currently, these high-flow routes are disconnected at normal flows at the upstream end with varied connectivity with low-quality habitat at the downstream end. Evaluate if the existing high-flow routes can be converted to perennial side channels with high-quality habitat. • Improve connectivity of groundwater floodplain tributary to the mainstem channel with outlet at RM 48.5 on river left. • Install large wood bank-buried and habitat large wood throughout the side channels and groundwater floodplain tributary, including outlet jams with scour holes to 1) maintain side channel connectivity through forced hydraulics and 2) create and maintain habitat complexity. • Install large apex jams at the inlets to side channels to maintain split flow conditions and provide localized habitat uplift. • Install large wood floodplain roughness structures on bar top behind apex jam at RM 48.7 to support floodplain development and vegetation establishment. • Install bank-buried large wood structures along the mainstem where conditions are appropriate (river left RM 48.15-48.25 and 48.7-48.75) to maximize in-stream habitat uplift, consider recreational use and safety in design • Revegetate previously cleared adjacent banks downstream of RM 48.25 and within the installed floodplain roughness large wood at RM 48.7 with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the side channel and mainstem channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.

Reach and Segment	River Miles	Project Area Name	Project Description
6 Bear	48.85 – 49.4	Whitefish	The Whitefish project area includes the mainstem channel and designed split flow around Whitefish Island, as well as the confluence with Bear Creek. Past restoration work (2012-2014) developed connected side channel on the river right side of the island and installed large wood structures around the island, including a large apex jam that maintains split flow at the upstream end of the island. Another project (2020-2025) included rerouting the mouth of Bear Creek to reconnect to the Methow River, moving the diversion point of the Barkley Irrigation Canal. Identified project opportunities here are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed features. Potential restoration actions in the Bear project area include mainstem channel habitat uplift opportunities, continued adaptive management actions for habitat recovery at the mouth of Bear Creek, and riparian floodplain vegetation recovery in cleared areas. Bank armoring (riprap) exists along the outside bank of the meander at RM 49.1-49.25, likely associated with the previous location of the Barkley Irrigation Canal along the top of the bank as well as an existing structure built near the bank. The project area is situated in privately owned property on river left and Methow Salmon Recovery Foundation manage Whitefish Island and the adjacent bank on river right. Potential actions include the following: • Install bank-buried large wood structures along the mainstem where conditions are appropriate (river left RM 49.3-49.4) to maximize in-stream habitat uplift, consider recreational use and safety in design. Because the riprap along the meander bend is not likely to be removed due to proximity of built structures, this action also includes installing large wood structures within the armored bank at 49.15-49.25. • Install bank-buried outlet large wood structures at RM 48.85 as outlet maintenance and habitat uplift of an existing large pool with very limited cover and complexity. • Install apex jam along extended bars (RM 49.05) to instigate split flow potential, localized habitat complexity uplift, promote bar stability/floodplain development. • Place large boulders (10-15) along bed of existing large pool with low habitat complexity at RM 48.85 to provide cover and in-stream complexity. • Consider installation of channel spanning bed-buried log jam in selected areas within the existing side channel designed to collect and retain spawning gravels to maximize fish use. • Revegetate previously cleared adjacent banks along river left with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
7 Bear	49.9 – 50.2	Barkley	The Barkley project area is the transition zone between the confined transport reach (8) upstream and only partially confined reach 7. As such, downstream of the RM 50 bedrock contact on river left, the channel widens, allowing for the sediment and debris delivered from upstream to deposit and maintain a large bar on river left. The project area includes opportunities for mainstem habitat uplift, side channel function uplift, and floodplain vegetation/forest recovery opportunities. Past restoration efforts in the area (2020-2025) replaced ditching with side channel flow routes and some habitat large wood and small apex jam. Identified project opportunities here are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed features. Boulder spurs were constructed on river right at RM 49.9 for bank protection via flow deflection. If side channel function is desired, the priority action for Up Bear is to route sufficient flow into the existing side channel to flush out incoming sediment and to capture the incoming debris with structural large wood. The project area is situated in privately owned property. Potential actions include the following: • Install bank-buried large wood structures along the mainstem channel where conditions are appropriate (both sides at RM 50.1-50.2) to create in-stream habitat uplift, consider recreational use and safety in design. Install bank-buried structures with scour holes and back-water alcove habitat to support existing side channel maintenance (approximately RM 49.55, 49.8, and 49.85). • Install very large apex jam and scour pool at upstream end of split-flow bar to deflect more discharge into the side channel and provide localized habitat. Consider recreational use and safety in design. • Remove rock spurs. Evaluate/consider if replacing with large wood structure is appropriate. • Create off-channel habitat as alcoves with large-wood habitat and scour structures at downstream end of high-flow side channel routes. • Revegetate previously cleared adjacent banks along river left with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified side channel flow deflection actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
8 Winthrop	50.3 – 51.1	Riverside	The Riverside project area is in a confined, straight, and entrenched (Anthro-maintained state of floodplain disconnection) reach on the south side of the town of Winthrop. Identified restoration opportunities include localized mainstem habitat uplift and riparian forest regeneration. The channel through the project area is an extended glide of varied depths with no habitat complexity or off-channel refugia. Opportunities are limited to the river left side of the channel because it is of manageable height above the channel and has far less development constraints, compared to river right. The project area is situated within privately owned parcels and Town of Winthrop owned and managed property, including the town’s waste-water treatment facility and related infrastructure near the bank. Potential actions include the following: • Install bank-buried large wood structures with scour holes along the river-left side of the mainstem channel where conditions are appropriate (RM 50.62-50.75, 50.9-50.95, and 51.1) to create in-stream habitat uplift. Consider recreational use and safety in design. • Revegetate previously cleared or thinned adjacent banks along river left (RM 50.3-50.95) with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.

Reach and Segment	River Miles	Project Area Name	Project Description
8 – 9 Winthrop - Hatchery	51.6 – 52.4	Spring Creek	The Spring Creek project area is lacking in both in-stream habitat complexity and connected off-channel habitat. Identified restoration opportunities include localized mainstem habitat uplift, side channel activation, potential to remove armoring, as well as riparian vegetation and forest recovery. The river right floodplain, in front of the levee, and downstream portion of the Hatchery canal/channel (RM 51.6-52.1) include converting a high-flow route into a connected perennial side channel that intercepts and contributes to the existing Hatchery Canal channel outlet at its downstream end. Currently, the Hatchery Canal channel is of low-habitat quality with issues of connectivity at its delta to the mainstem channel. Hatchery and wild fish interactions/needs should be evaluated to guide approach and design of restoration efforts related to the Hatchery Canal. Habitat and scour maintenance large wood structure treatments would extend through the downstream portion of the Hatchery Canal channel. The river-left floodplain offers multiple opportunities to establish side channels and high-flow routes with complexity habitat locations at their outlets. No recorded or observed past restoration projects were found in the project area. However, sediment augmentation (gravels) and marginal habitat uplift treatments were observed in the canal. Acquisition of property on river left (RM 52.05-52.22) could provide development and conservation of a constructed side channel that, depending on additional analysis, may be able to reduce flood risk along Johnson Road. The project area is situated in private property and public property. Potential actions include the following: • Activate (create and reconnect) side channels, focusing on existing high-flow scar routes. Include habitat and scour-maintenance large wood installations. • Install bank-buried large wood structures with scour holes along the mainstem channel where conditions are appropriate to create in-stream habitat uplift, and as side channel outlet jams that support connectivity and provide off-channel alcove habitat. Consider recreational use and safety in design. • Install apex (large) jam at the upstream end of the side channel inlets for upstream connectivity and to provide quality habitat along the mainstem channel (scour pool with cover). • Uplift the Hatchery Canal channel / new side channel delta/confluence by installing bank-buried outlet jams that support connectivity and provide off-channel alcove habitat. • Revegetate previously cleared or thinned adjacent banks with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
9 Hatchery	52.4 – 53.15	Lower Foghorn	The Lower Foghorn project area is partially confined by floodplain terraces, levees, and armored banks. The channel is lacking in both in-stream habitat complexity and connected off-channel habitat. Identified restoration opportunities include localized mainstem habitat uplift, side channel activation, potential to remove armoring, and riparian vegetation and forest recovery. Two previously constructed bank-buried log structures exist in the project area on river left at RM 52.67. A 2025-2028 project named Foghorn is located mostly within the Lower Foghorn and upper Spring Creek project areas is expected to include side channel reconnection and mainstem large wood installations, similar to restoration actions identified in this assessment. The project area is situated within a mix of private, federal, public utility district, and Methow Conservancy lands. Potential actions include the following: • Install bank-buried large wood structures with scour holes along the mainstem channel where conditions are appropriate (river left at RM 52.92-53) to create in-stream habitat uplift, and as side channel outlet jams that support connectivity and provide off-channel alcove habitat. Consider recreational use and safety in design. • Removal of bank armoring at RM 52.5. This may include installation of bank-buried large wood structures in place of the removed riprap, depending on further evaluation of site conditions. • Activate (create and reconnect) side channels through available floodplain areas. Include habitat and scour-maintenance large wood installations. • Install large apex jams at the inlets to side channels to maintain split flow conditions and provide localized habitat uplift. • Revegetate previously cleared or thinned adjacent banks along river left with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
9 – 10 Hatchery	53.15 – 53.5	Foghorn	The Foghorn project area contains restoration opportunities in proximity to the existing Foghorn Irrigation impoundment structure and its related infrastructure. The Foghorn project area has low quality habitat currently. The channel and its narrow floodplain are confined between natural terraces, but entrenchment (maintained state of floodplain disconnection) is exaggerated by past and current anthropogenic impacts, including bank armoring. The structure’s intake was upgraded with a fish screen in 2003 (USFWS). Restoration approach options vary, depending on allowable impoundment upgrades. The more comprehensive restoration approach would include removing the impoundment and related surface water outtake infrastructure and converting hatchery water sources to installed groundwater well(s) on the floodplain. This would allow for the greatest habitat and geomorphic uplift potential with limited infrastructure constraints. If an impoundment needs to remain, upgrades and functional fish passage to the impoundment and stabilized habitat features upstream, downstream, and potentially around it is an option. Actions include bank-buried large wood to uplift otherwise poor habitat in pools, evaluating the potential for a fish-passable side channel through the river-left narrow floodplain, and reestablishing riparian forest along the banks of the channel. Part of all approaches should include evaluation of the structural stability and fish-passage of the large-boulder grade control that impounds the mainstem channel. The project area is situated within private and public utility district property. Potential actions include the following: • Option: Removal of existing infrastructure or upgrade its fish-passage. • Install bank-buried large wood structure(s) into riprap armored bank on river left at existing pools to create in-stream habitat uplift. Install bank-buried jam at outlet of side channel to maintain connectivity and alcove habitat. Consider recreational use and safety in design. • Activate side channel through river left floodplain along existing flood-flow swale to provide quality off-channel habitat. Include habitat and scour-maintenance large wood installations. • Install apex jam at the side channel inlets (RM 53.5) to establish and maintain upstream connectivity and to provide habitat uplift along the mainstem channel. • Revegetate previously cleared or thinned adjacent armored banks and levee along river left with native riparian forest to provide long-term sources of shade and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.

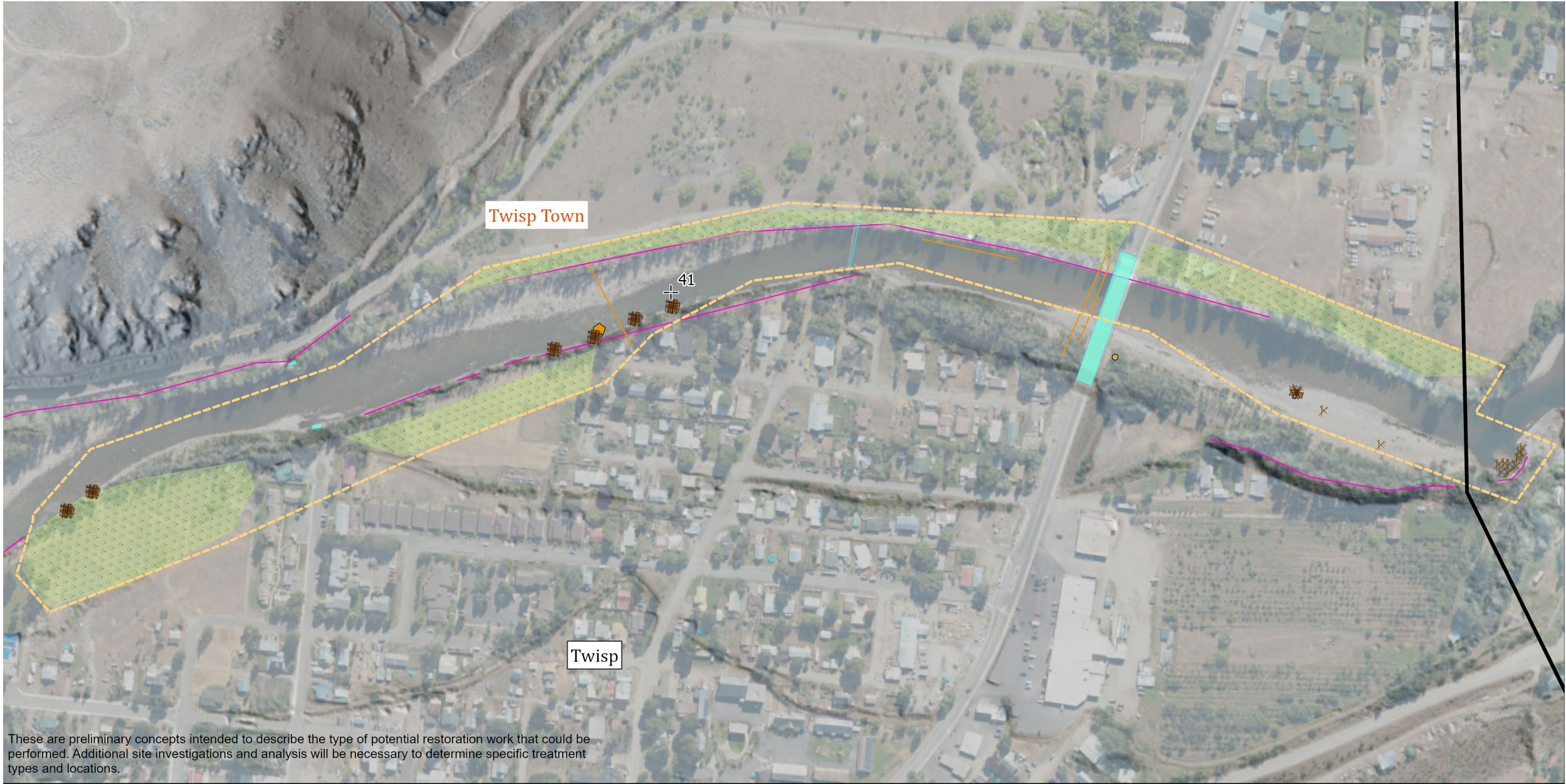
Reach and Segment	River Miles	Project Area Name	Project Description
10 Hatchery	53.5 – 54.1	Francis	The Francis project area is partially confined and entrenched (maintained state of floodplain disconnection). The channel is lacking in both in-stream habitat complexity and connected off-channel habitat. Identified restoration opportunities include localized mainstem habitat uplift, side channel activation, potential to remove armoring, and riparian vegetation and forest recovery. No previous restoration projects were reported or observed for the area. The project area is situated within privately owned properties. Potential actions include the following: • Install bank-buried large wood structures with scour holes along the mainstem channel where conditions are appropriate (river left at RM 53.8 and river right at 53.75-53.8) to create in-stream habitat uplift, and as side channel outlet jams that support connectivity and provide off-channel alcove habitat (river left near RM 53.5 and RM 53.73). Consider recreational use and safety in design. • Remove or partially remove bank armoring at RM 53.73-53.8. This may include installation of bank-buried large wood structures in place of the removed riprap or into remnant riprap, depending on further evaluation of site conditions. • Activate side channels, utilizing existing flood-event flow routes, as created and connected off-channel high-quality habitat. Include habitat and scour-maintenance large wood installations. River left side channel opportunities (RM 53.5-53.8) include multi-inlet potential. • Install large apex jams at the inlets to side channels (river left at RM 53.67, 53.75, 53.8 and river right at RM 54.06) to maintain split flow conditions and provide localized habitat uplift. • Revegetate previously cleared or thinned banks with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in uplift.
10 - 11 Hatchery - Wolf	54.14 – 55.3	Wolf Fan	The Wolf Fan project area is confined and entrenched (maintained state of floodplain disconnection) by the Wolf Creek fan terrace on river right and hillslope toe, exaggerated by SR 20’s road prism and armoring on river left. The channel is lacking in both in-stream habitat complexity and connected off-channel habitat. Only the upstream section of this project area has bar development. Remnants of one old small, constructed log jam immediately downstream from the Wolf Creek confluence were observed. No additional past restoration projects are reported for this area. Identified restoration opportunities in the Wolf Fan project area include mainstem habitat uplift, Wolf Creek fan uplift, enhanced bar development and split flow maintenance at the upstream end, and riparian vegetation and forest recovery. The project area is situated within a mix of private properties and state (WSDOT and WDFW) owned properties. Potential actions include the following: • Install bank-buried large wood structures with scour holes along the mainstem channel to create in-stream habitat uplift at river left RM 54.21-54.34, 54.82 and river right RM 54.14 and 55.25. The bank buried jam(s) on river left at RM 54.82, immediately downstream from riprap armoring could be constructed to deflect flow towards river right to potentially encourage lateral processes and the gradual development of an inset floodplain. Consider recreational use and safety in design. • Activate side channels, utilizing existing flood-event flow routes, as created and connected off-channel high-quality habitat. Include habitat and scour-maintenance large wood installations. River left side channel opportunities (RM 53.5-53.8) include multi-inlet potential. • Install large apex jams at upstream end of existing bars to encourage bar maintenance, floodplain development (inset below fan terrace and road), and split flow conditions in the mainstem channel between RM 55.08-55.3. Apex jams will also provide localized habitat uplift (pool and cover) to the mainstem channel. • Install floodplain surface roughness behind the apex jams at RM 55.2 to support vegetated floodplain development, if flow hydraulics are appropriate. • Revegetate previously cleared or thinned banks with diverse native riparian vegetation and forest to provide long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in localized uplift.
12 Lower Big Valley	55.4 – 55.8	Lodge	The Lodge project area represents the transition between the unconfined Big Valley segments upstream and the confined Wolf Creek alluvial fan segment downstream. As such, available floodplain in this project area shifts from unconfined at the upstream end and partially confined at the downstream. Potential project elements include mainstem habitat uplift, geomorphic complexity structure improvements, and improved side channel activation. The side channel activation on river left has the potential to improve habitat and connectivity of the downstream portion of an existing groundwater-fed tributary. The project area is situated within a mix of state owned and managed (WA DNR) and private land. Potential actions include the following: • Install bank-buried large wood structures along the mainstem channel to increase in-steam habitat quality at river left RM 55.78, river right at RM 55.5, and as alcove outlet uplift on river left at RM 55.5. • Install apex jams within the mainstem channel to initiate and maintain split flow conditions, bar/floodplain development, and vegetation establishment. Apex jam installation at the inlet of activated side channel(s) for side channel connectivity. Apex jams will also provide localized habitat uplift (pool and cover) to the mainstem channel. Size and ballasting of apex jams will be dependent on specific site conditions and treatment goals. • Activate side channels, utilizing existing flood-event flow routes, as connected off-channel high-quality habitat, at RM 55.52 and 55.68. Include habitat and scour-maintenance large wood installations. • Improve groundwater floodplain tributary outlet habitat quality and connectivity to the mainstem channel. Include habitat and scour-maintenance large wood installations. Identified actions maximize uplift potential when installed simultaneously but, treatments can be installed separately and result in localized uplift. For maximum uplift, Lodge and Upper Lodge are constructed together or in sequence.

Reach and Segment	River Miles	Project Area Name	Project Description
12 Lower Big Valley	55.7 -- 56.5	Upper Lodge (floodplain)	The Upper Lodge project area hosts a matrix of groundwater floodplain tributaries with both constructed and beaver-created ponds that contribute surface and groundwater. The tributary currently connects with the mainstem channel on the river-left side of the Lower Lodge project area. Groundwater supported off-channel habitat is a valuable resource in the Big Valley reaches. Areas that host groundwater floodplain tributaries should be prioritized for conservation, preservation, and as a climate resiliency resource. The project area is situated within a mix of state owned and managed (WA DNR) and private land. Potential actions include the following: • Improve groundwater floodplain tributary habitat quality and connectivity to the mainstem channel. Include habitat and scour-maintenance large wood installations. • Remove, partially remove, or install fish-passage through anthropogenic floodplain tributary impoundment structures. • Conservation through easement or acquisition of river left floodplain groundwater source would benefit long-term restoration efforts for the Lower Big Valley section of the Methow River. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. To maximize uplift, it is recommended that Lodge tributary channel uplift and Upper Lodge treatments be considered together or in sequence.
12 Lower Big Valley	55.8 – 56.6	Lower Lucky	The Lower Lucky project area is in the unconfined Lower Big Valley with existing split flow complexity and some recent large wood recruitment resulting in jam development. The floodplain is connected and mostly vegetated but the size of the trees in the riparian forest builds relatively temporary jams because they are smaller than the channel’s hydraulics require to function as geomorphically effective key structures. The valley left floodplain hosts a matrix of groundwater floodplain tributaries that contribute surface and groundwater to the project area. Groundwater supported off-channel habitat is a valuable resource in the Big Valley reaches. The identified restoration actions are intended to utilize existing processes to uplift and maximize geomorphic function and habitat complexity throughout the project area. A past project exists in this project area at RM 56.4 -- a small bank stability treatment with 4 bank ballasted large wood structures. The Lower Lucky project area is situated within a mix of state managed public (WA Dept of Wildlife) and private property. Acquisition of critical floodplain properties would support long-term restoration and conservation possibilities. Potential actions include the following: • Install bank-buried large wood structures along the mainstem channel to increase in-stream habitat quality, stabilize bars to support floodplain development and vegetation establishment, and as alcove side channel outlet structure that maintain connectivity and provide habitat to outlet alcoves. Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Install apex jams to initiate and maintain split flow conditions and to develop bar/floodplain surfaces that support vegetation establishment. Apex jam installation at the inlet of activated side channel(s) to maintain channel connectivity and provide additional habitat along the mainstem. Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Activate side channels -- utilizing existing flood flow routes to create off-channel habitat and/or to improve connectivity to existing groundwater tributaries. Include habitat and scour-maintenance large wood installations. • Improve groundwater supported side channel habitat quality and connectivity to the mainstem channel. Include habitat and scour-maintenance large wood installations. • Install or add large wood as floodplain roughness to support native riparian vegetation and forest establishment. • Vegetate identified banks and bars with diverse native riparian vegetation and forests that provide floodplain roughness structure as well as long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. • Conservation through easement or acquisition of river right floodplain groundwater source would benefit long-term restoration efforts in this project area. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. Treatments can be installed separately and result in localized uplift.
12 Lower Big Valley	56.6 – 57.1	Upper Lucky	The Upper Lucky project area is in the unconfined Lower Big Valley with some jam development on bars. The valley right floodplain hosts a matrix of hyporheic-supported side channels that contribute surface to the project area. Groundwater supported off-channel habitat is a valuable resource in the Big Valley reaches. The identified restoration actions are intended to utilize existing processes to uplift and maximize geomorphic function and habitat complexity throughout the project area. A bank stability past project reported at RM 57 along ~80 feet of bank was evaluated during the field assessment, but the channel is no longer interacting with the past project due to an accumulation of large wood that formed a log-plug that forced avulsion of the channel away from the past project. The Upper Lucky project area is situated within a mix of state managed public (WA Dept of Wildlife) and private property. Acquisition of critical floodplain properties would support long-term restoration and conservation possibilities. Potential actions include the following: • Install bank-buried large wood structures along the mainstem channel to increase in-stream habitat quality, stabilize bars to support floodplain development and vegetation establishment, and as alcove side channel outlet structure that maintain connectivity and provide habitat to outlet alcoves. Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Install apex jams to initiate and maintain split flow conditions and to develop bar/floodplain surfaces that support vegetation establishment. Apex jam installation at the inlet of activated side channel(s) to maintain channel connectivity and provide additional habitat along the mainstem. Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Activate side channels -- utilizing existing flood flow routes to create off-channel habitat and/or to improve connectivity to existing groundwater tributaries. Include habitat and scour-maintenance large wood installations. • Improve groundwater support side channel habitat quality and connectivity to the mainstem channel. Include habitat and scour-maintenance large wood installations. • Install or add large wood as floodplain roughness to support native riparian vegetation and forest establishment. • Vegetate identified banks and bars with diverse native riparian vegetation and forests that provide floodplain roughness structure as well as long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. • Conservation through easement or acquisition of river right floodplain groundwater source would benefit long-term restoration efforts in this project area. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. Treatments can be installed separately and result in localized uplift.

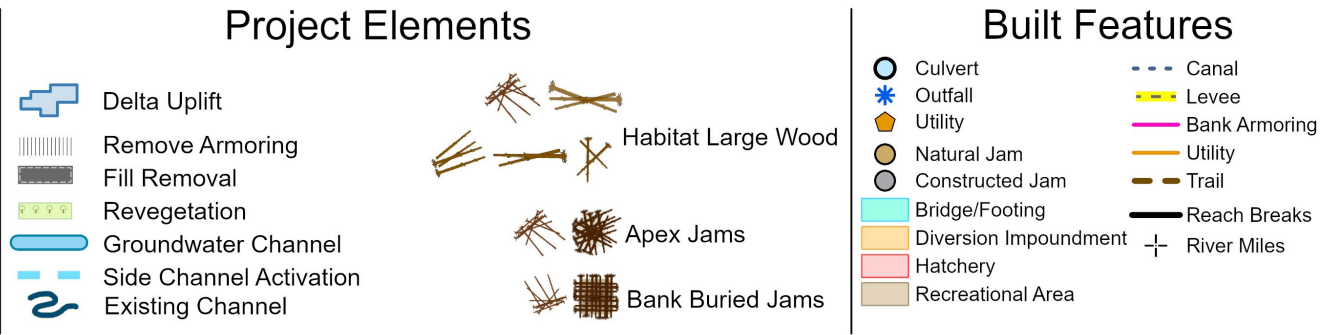
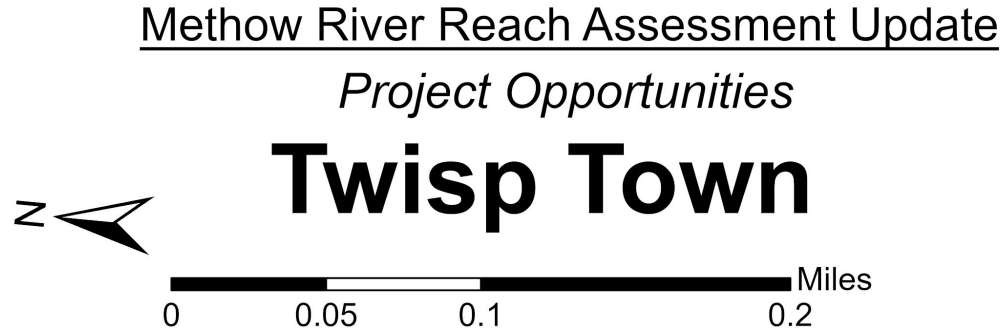
Reach and Segment	River Miles	Project Area Name	Project Description
13 Lower Big Valley	57.1 – 57.6	Lower Big 1	The Lower Big 1 project area occupies a portion of the downstream section of the past Big Valley restoration project (2018). Identified project opportunities here are recommended with the intent of maximizing habitat uplift potential in conjunction with the already installed features, some as adaptive management actions post-project implementation and channel response. Opportunities include large wood installations for both habitat and geomorphic function, as well as identified areas of riparian vegetation establishment. The project area is situated with state managed public lands (WA Dept of Natural Resources). Potential actions include the following: • Install bank-buried large wood structures to increase in-stream habitat quality and quantity, stabilize bars to support floodplain development and vegetation establishment, and as alcove side channel outlet structure that maintain connectivity and provide habitat to outlet alcoves. Size and ballasting of jams are expected to vary, dependent on specific site conditions and treatment goals. • Install apex jams to initiate and maintain split flow conditions and to develop bar/floodplain surfaces that support vegetation establishment. Apex jam installation at the inlet of activated side channel(s) to maintain channel connectivity and provide additional habitat along the mainstem. Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Install habitat and scour maintenance large wood to existing side channels to uplift available habitat and sustain connectivity of the side channel to the mainstem. • Vegetate identified banks and bars with diverse native riparian vegetation and forests that provide floodplain roughness structure as well as long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. Treatments can be installed separately and result in localized uplift.
13 Lower Big Valley	57.7– 59.25	Lower Big 2	The Lower Big 2 project area is in the unconfined Lower Big Valley, but the channel and active floodplain only occupy the west half of the valley floor. Some active lateral processes and large wood recruitment from the floodplain are occurring. Forest age is not mature so often natural jams are temporary and wide active bars are present. Several groundwater-supported floodplain tributary and side channels occur in this project area and are a valuable off-channel resource with sometimes impaired connectivity to the mainstem channel. Identified restoration opportunities include the addition of large wood to the mainstem and side channels, activation of perennial side channels, creating perennial connection to existing groundwater-supported off-channel habitat, and a small revegetation effort – all to maximize habitat uplift and geomorphic complexity in the project area. No past projects are reported in the area but a future project (Big Valley Phase II large wood - 2028) overlaps with the upstream 0.45 miles of Lower Big 2 project area. The Lower Big 2 project area is situated within a mix of state managed public (WA Dept of Wildlife) and private property. Potential actions identified throughout the project area include the following: • Install bank-buried large wood structures along the mainstem channel to increase in-stream habitat quality, stabilize bars to support floodplain development and vegetation establishment, and as alcove side channel outlet structure that maintain connectivity and provide habitat to outlet alcoves. Size and ballasting of jams are expected to vary, dependent on specific site conditions and treatment goals. • Install apex jams to initiate and maintain split flow conditions and to develop bar/floodplain surfaces that support vegetation establishment. Apex jam installation at the inlet of activated side channel(s) to maintain channel connectivity and provide additional habitat along the mainstem. Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Activate side channels – including improving connectivity to existing groundwater-supported channel. Consider creating split-flow conditions of the mainstem (see Lucky Project Area as analog). Include habitat and scour-maintenance large wood installations. • Improve groundwater supported tributaries (Dripping Springs) and off-channel habitat quality and connectivity to the mainstem channel. Include habitat and scour-maintenance large wood installations • Vegetate identified adjacent floodplain (river left at RM 58.7) with riparian native forest species. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. Treatments can be installed separately and result in localized uplift.
14 Mid Big Valley	59.25 – 60.55	Grizzly	The Grizzly project area is in the unconfined Lower Big Valley, but the channel currently only occupies the west half of the valley floor. Some active lateral processes and large wood recruitment from the floodplain are occurring. Forest age is not mature so often natural jams are temporary and wide active bars are present. An extended groundwater-supported floodplain tributary with marginal habitat occurs on the river left floodplain with its outlet at RM 58.95. Identified restoration opportunities include the addition of large wood to the mainstem and side channels, activation of perennial side channels, and creating perennial connection to existing groundwater-supported off-channel habitat – all to maximize habitat uplift and geomorphic complexity in the project area. Three log structures installed in riprap on river-right at RM 59.7 is the one reported past project in this project area. However, a future project (Big Valley Phase II large wood - 2028) overlaps with all the Grizzly project area. The Grizzly project area is situated within private property. Potential actions include the following: • Install bank-buried large wood structures along the channel, side channel, and Hancock Creek confluence channel to increase in-stream habitat quality, stabilize bars to support floodplain development and vegetation establishment, and as alcove side channel outlet structures that maintain connectivity and provide habitat to outlet alcoves. Size and ballasting of jams are expected to vary, dependent on specific site conditions and treatment goals. • Install apex jams to initiate and maintain split flow conditions (including mid-channel apex jams) and to develop bar and floodplain surfaces downstream. Apex jam installation at the inlet of activated side channel(s) to maintain channel connectivity as well as provide additional habitat (scour and cover). Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Activate side channels – including improving perennial connectivity to existing groundwater-supported channel(s). Evaluate option of creating split-flow conditions of the mainstem (see Lucky Project Area as analog). Include habitat and scour-maintenance large wood installations. • Improve groundwater supported channel habitat quality and connectivity to the mainstem channel. Include habitat and scour-maintenance large wood installations. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. Treatments can be installed separately and result in localized uplift.

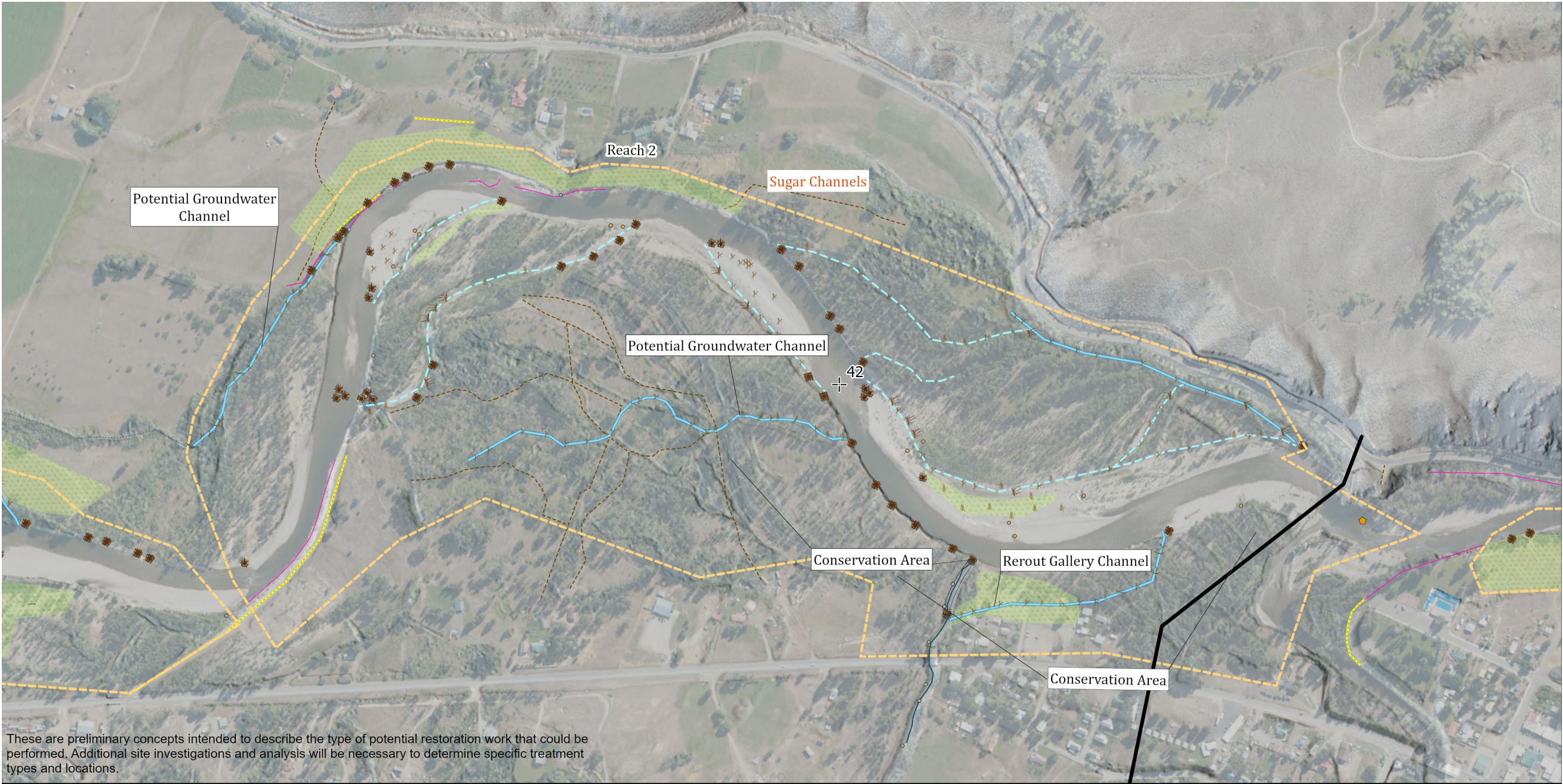
Reach and Segment	River Miles	Project Area Name	Project Description
15-16 Mid Big Valley	60.6 - 61.75	Mid Big	The Mid Big project area is in the unconfined Big Valley, but the channel is currently confined and entrenched (maintained state of incision) at the SR 20 (Weeman) bridge crossing at the upstream end and an armored meander on river right at RM 60.07-61.2. Several groundwater-supported channels occur within and contribute to this project area. Groundwater supported off-channel habitat is a valuable resource and thus its habitat quality and connectivity to the mainstem channel are a priority. Identified restoration opportunities include the addition of large wood to the mainstem and side channels, activation of perennial side channels, creating perennial connection to existing groundwater-supported off-channel habitat, and bank-top revegetation effort – all to maximize habitat uplift and geomorphic complexity in the project area. An existing constructed groundwater gallery channel (Fender Mill – 2015) provides perennial off-channel habitat but its confluence with the mainstem is now compromised as mainstem split flow conditions are no longer perennial. The other past project in the area is a constructed large wood structure on river right at RM 60.07. A future project (Big Valley Phase II large wood - 2028) overlaps with the downstream 0.25 river miles of the Mid Big project area. The Mid Big project area is situated within a mix of state managed public (WA Dept of Wildlife) and private property. Potential actions include the following: • Install bank-buried large wood structures along the channel, side channel, and Hancock Creek confluence channel to increase in-stream habitat quality, stabilize bars to support floodplain development and vegetation establishment, and as alcove side channel outlet structure that maintain connectivity and provide habitat to outlet alcoves. Size and ballasting of jams are expected to vary, dependent on specific site conditions and treatment goals. • Install apex jams to initiate and maintain split flow conditions (including mid-channel apex jams) and to develop bar and floodplain surfaces downstream. Apex jam installation at the inlet of activated side channel(s) to maintain channel connectivity as well as provide additional habitat (scour and cover). Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Install floodplain roughness structures, where appropriate to promote floodplain development and vegetation establishment on extensive bar surfaces behind bar-installed large wood jams, where appropriate flow hydraulics occur. • Activate side channels – including improving perennial connectivity to existing groundwater-supported channel(s). Evaluate option of creating split-flow conditions of the mainstem (see Lucky Project Area as analog). Include habitat and scour-maintenance large wood installations. • Improve groundwater supported channel habitat quality and connectivity to the mainstem channel. Include habitat and scour-maintenance large wood installations. • Vegetate identified banks with native riparian vegetation and forests that provide floodplain roughness structure as well as long-term sources of shade, large wood recruitment, and nutrient inputs for the channel. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. Treatments can be installed separately and result in localized uplift.
16 Mid Big Valley	61.75 – 62.3	Cassal	The Cassal project area is confined and entrenched (maintained state of incision) at the downstream end by State Route 20 (RM 61.7) and its bridge crossing (Weeman), which runs generally perpendicular across the channel and its historical floodplain. The project area extends along the toe of Goat Creek Road on river left with a relatively narrow floodplain. Identified restoration opportunities include localized mainstem habitat uplift, side channel activation, and replacing the existing bridge crossing with a larger spanning bridge to reduce confinement. Due to the proximity of the bridge and State Route 20, all major large wood installations will likely need to be ballasted. A side channel activation that reconnects the river right floodplain would require a fish-passable culvert or bridge under State Route 20. This action would reconnect an existing groundwater supported wetland located downstream of the road crossing in Reach 15. No past projects are reported in the project area, but the Salmon Cassal project planned for 2029 looks to install large wood and improve habitat conditions. The Cassal project area is situated within a mix of private properties, Methow Salmon Recovery Foundation managed parcels, and Goat Creek Rd and State Route 20 road prisms. • Install bank-buried large wood structures along the channel and side channels to increase in-stream habitat quality and perform as alcove side channel outlet structure that maintain connectivity and provide habitat to outlet alcoves. Size and ballasting of jams are expected to vary, dependent on specific site conditions and treatment goals. • Install apex jams to initiate and maintain split flow conditions, including a mid-channel apex jam. Apex jam installation at the inlet of activated side channel(s) to maintain channel connectivity as well as provide additional habitat (scour and cover) along the mainstem. Size and ballasting of apex jams are expected to vary, dependent on specific site conditions and treatment goals. • Activate side channels – including a river-right side channel with fish-passable culvert under or bridge crossing. Include habitat and scour-maintenance large wood installations. • Consider replacing Weeman bridge with a large spanning bridge to reduce confinement impacts. • Conservation through easement or acquisition of river right floodplain, including existing wetlands could benefit long-term restoration efforts in this project area. In Big Valley, the identified suite of projects presents potential restoration opportunities. Projects that enhance or create groundwater-fed habitat should evaluate reach-scale hydrology, water quality, and access for fish. The projects may or may not be constructed simultaneously. Treatments can be installed separately and result in localized uplift.

2.4 PROJECT OPPORTUNITY MAPS

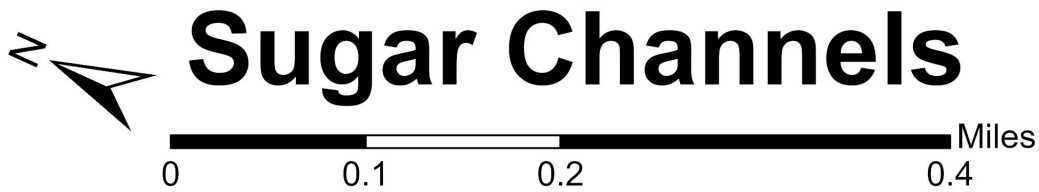


These are preliminary concepts intended to describe the type of potential restoration work that could be performed. Additional site investigations and analysis will be necessary to determine specific treatment types and locations.





Methow River Reach Assessment Update
Project Opportunities



Sugar Channels

Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

Built Features

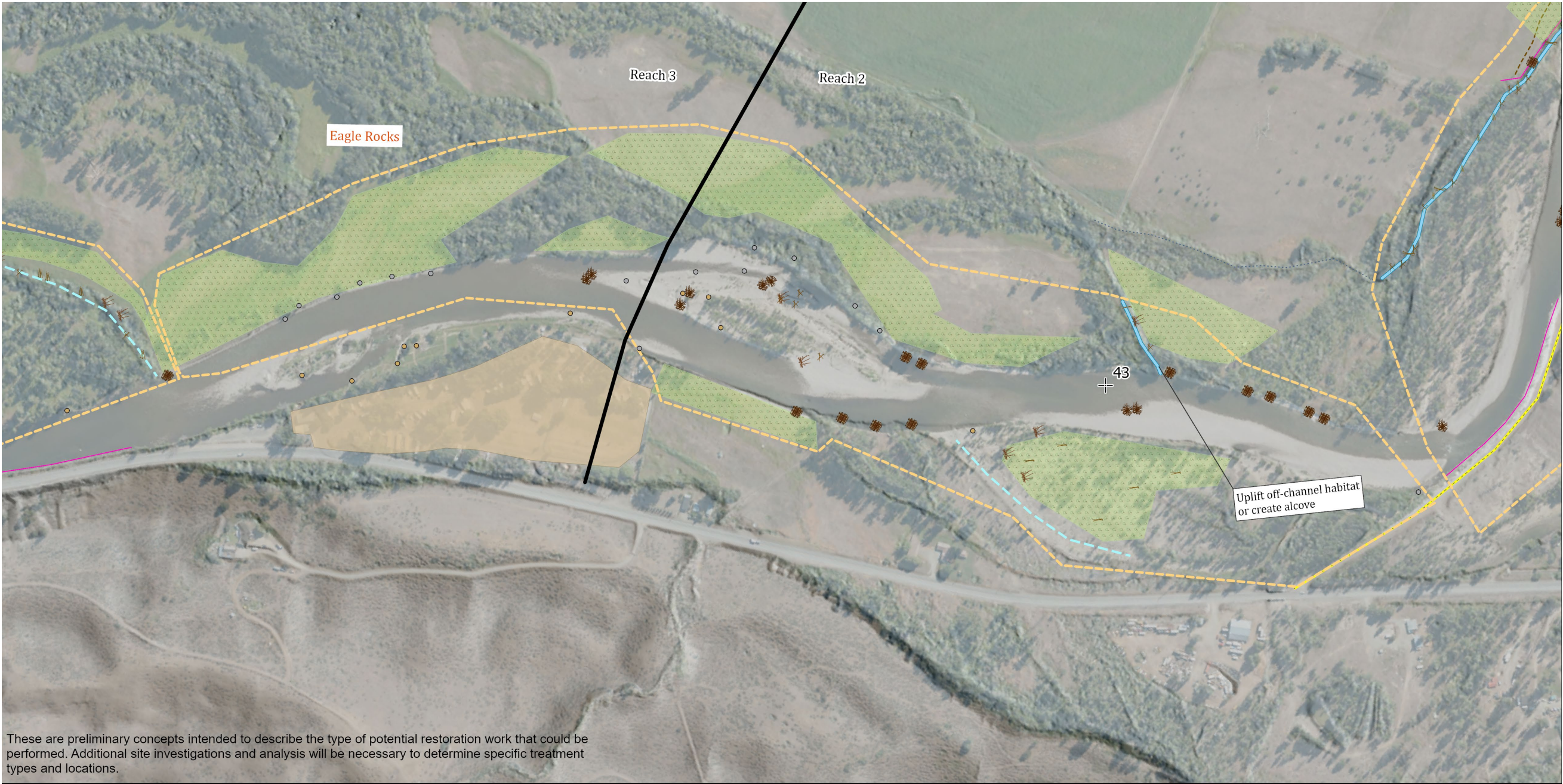
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles

Project Elements

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area

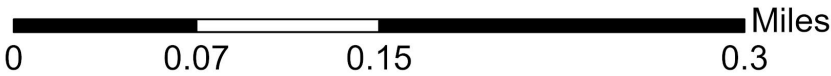


Methow River Reach Assessment Update

Project Opportunities



Eagle Rocks



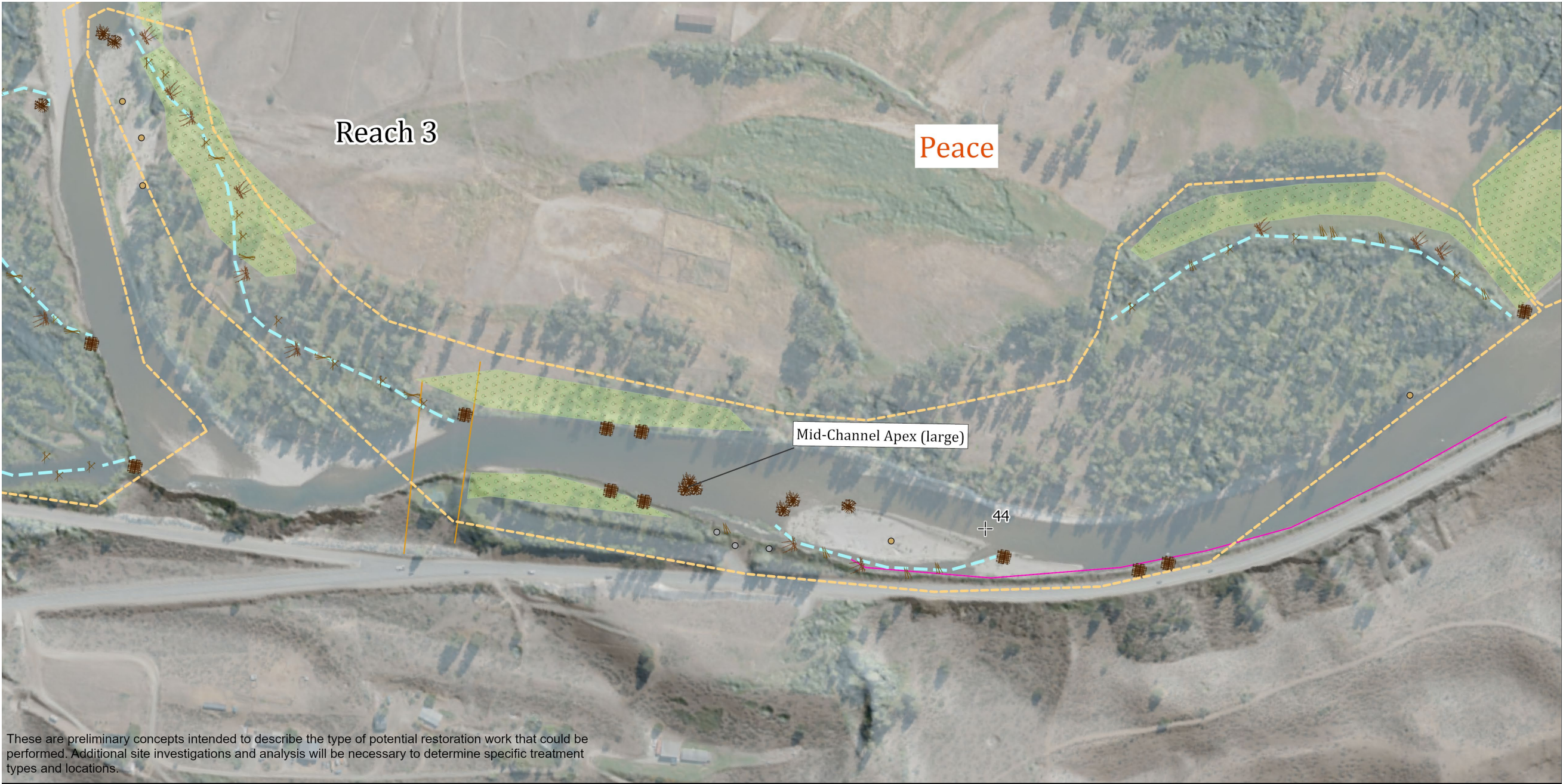
Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

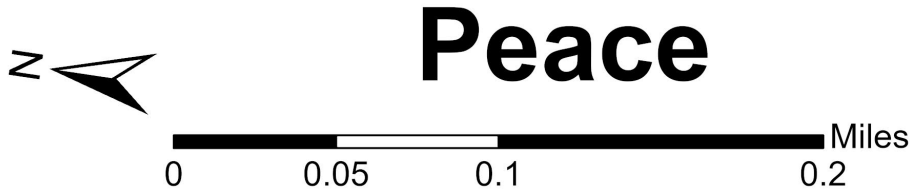
- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

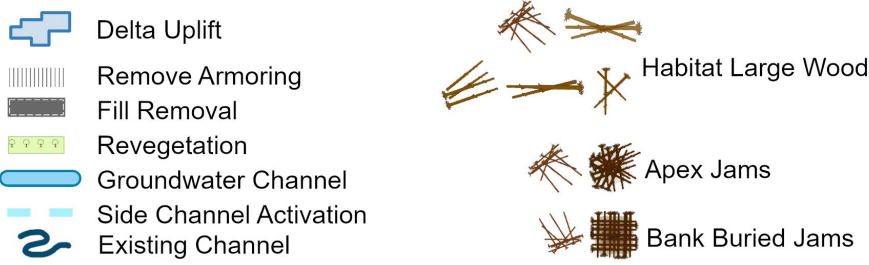
- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles



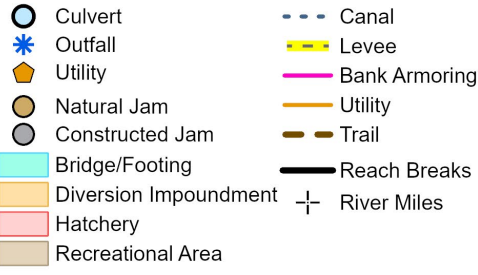
Methow River Reach Assessment Update
Project Opportunities

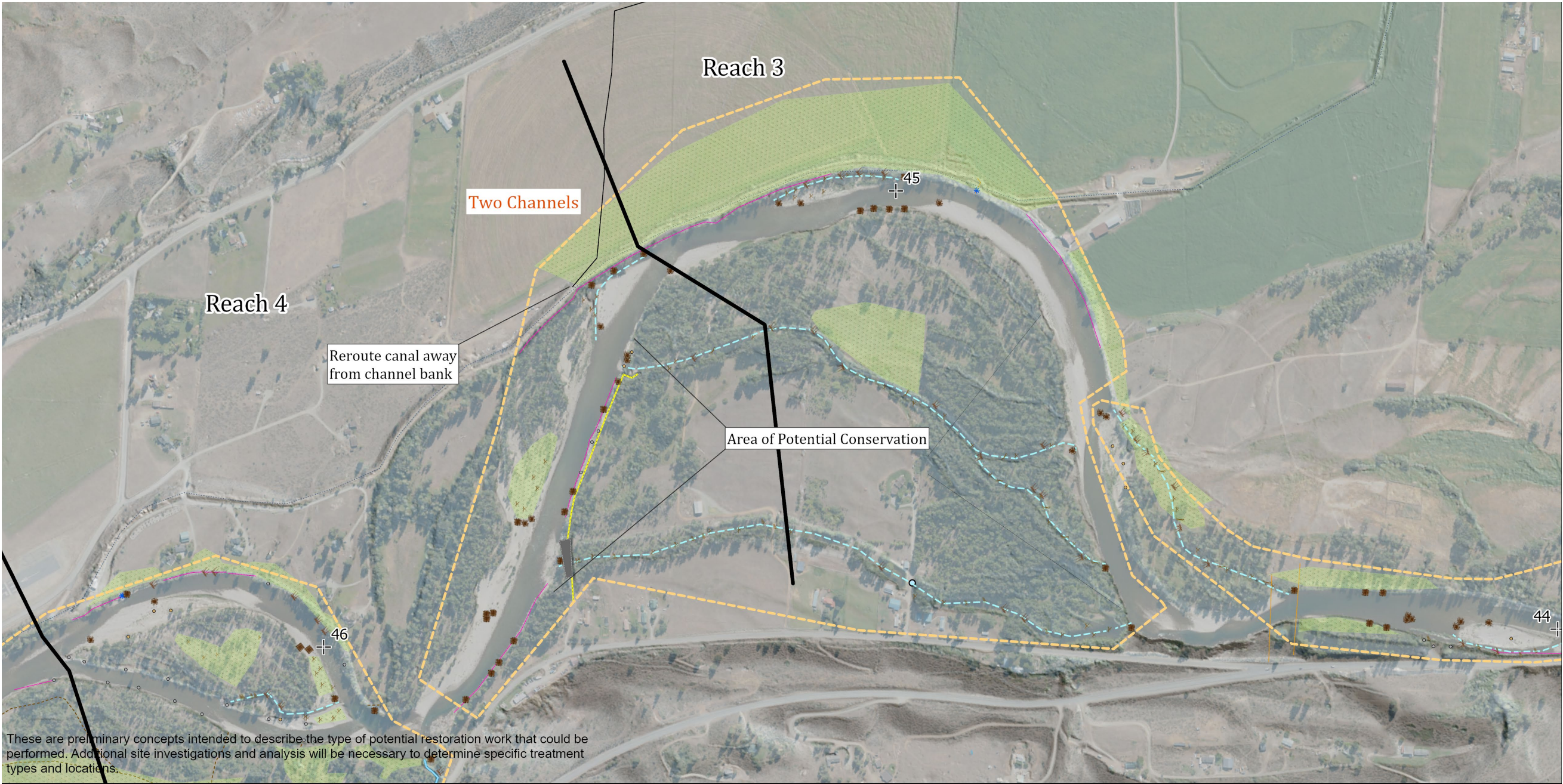


Project Elements



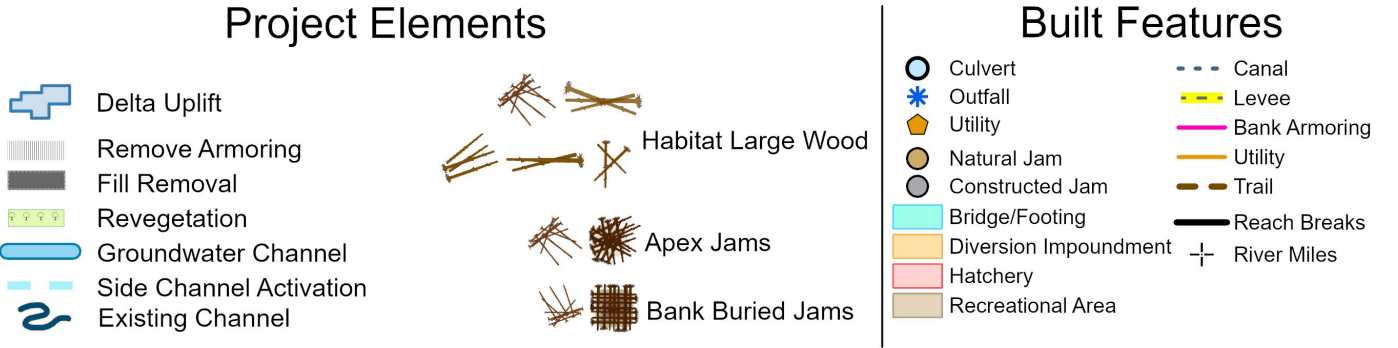
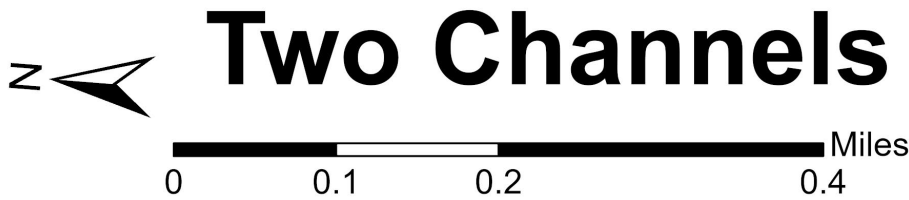
Built Features

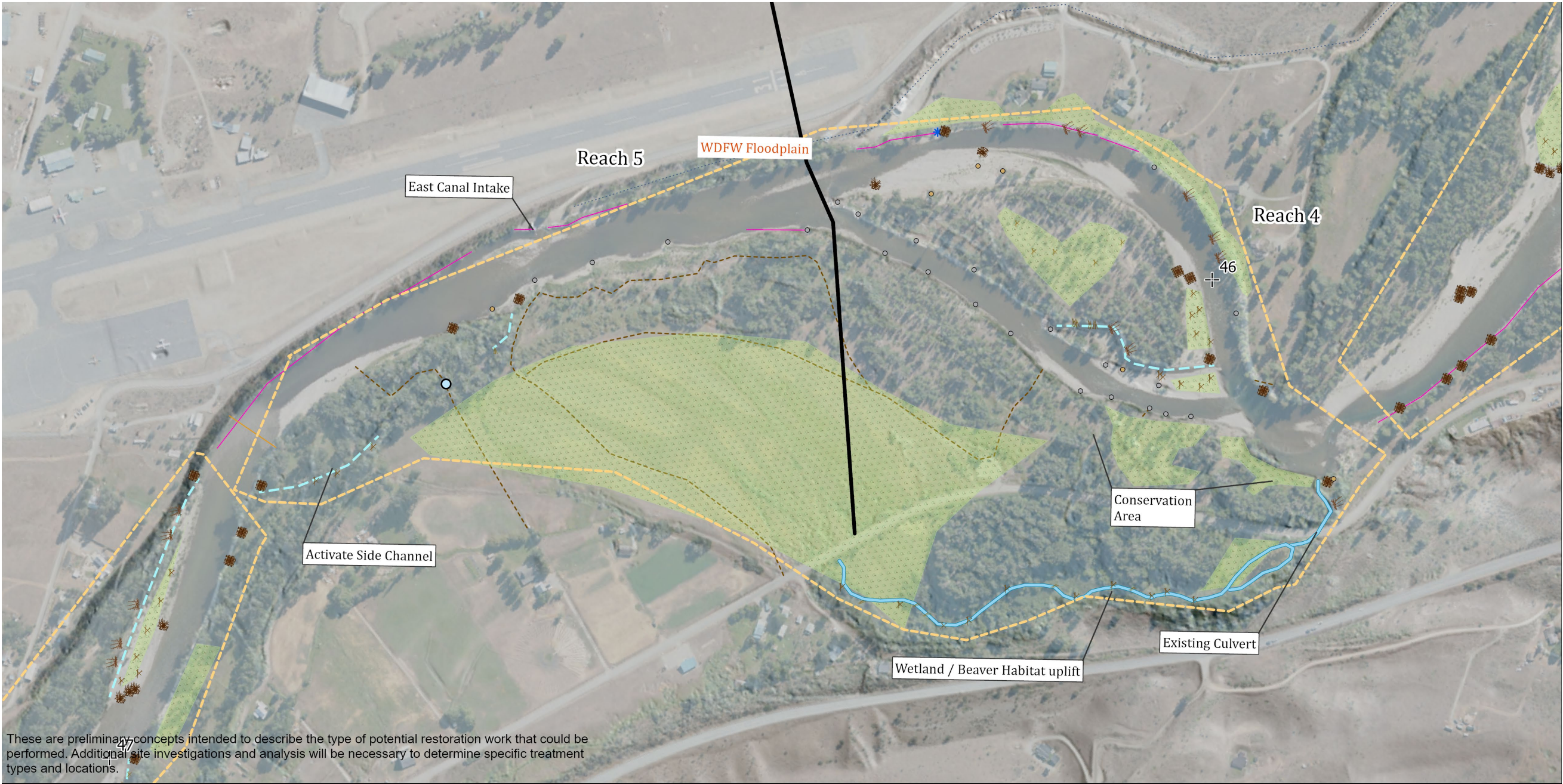




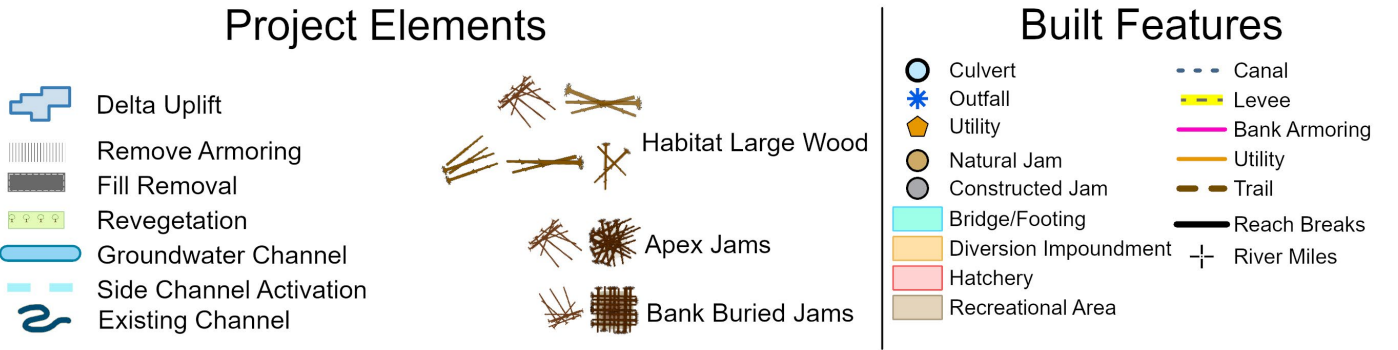
Methow River Reach Assessment Update

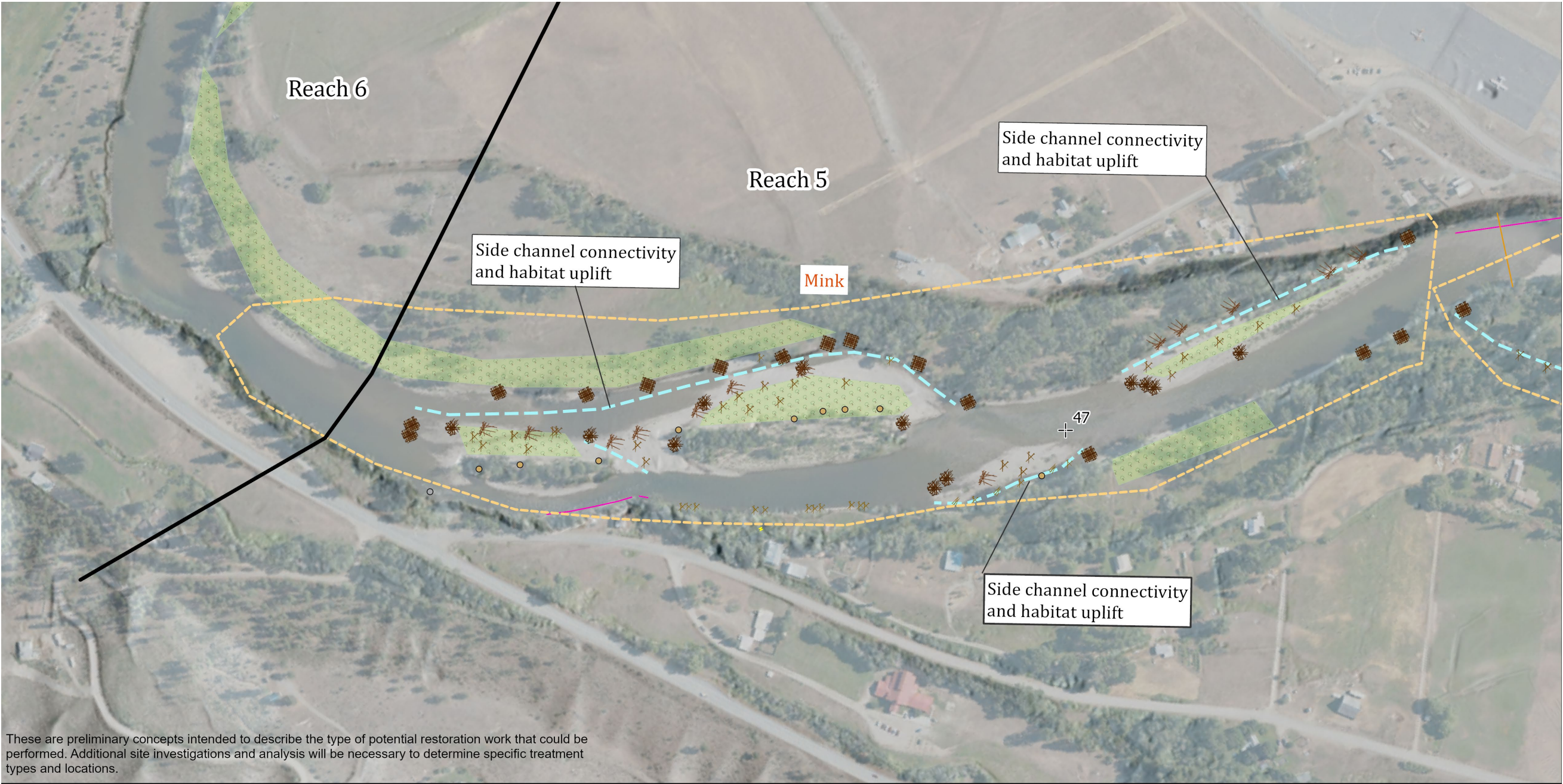
Project Opportunities





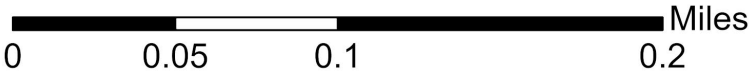
Methow River Reach Assessment Update
Project Opportunities





Methow River Reach Assessment Update
Project Opportunities

Mink



Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

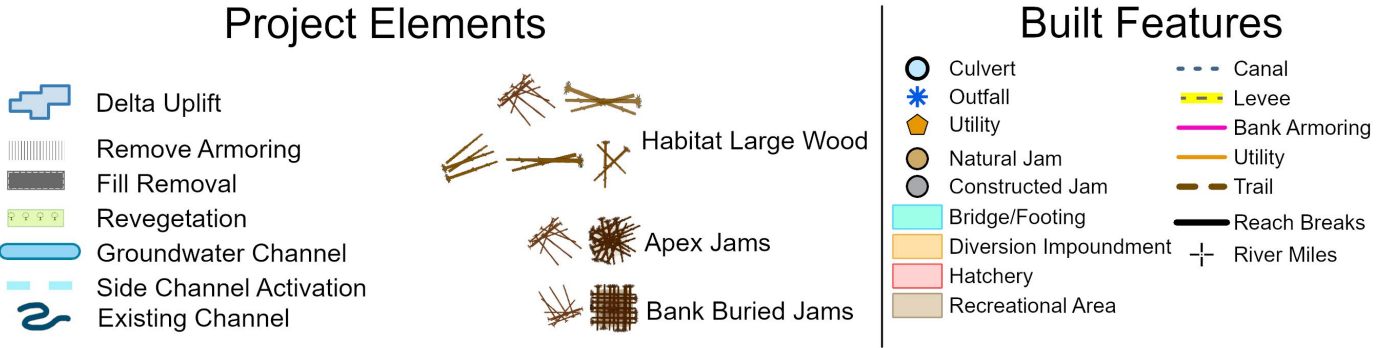
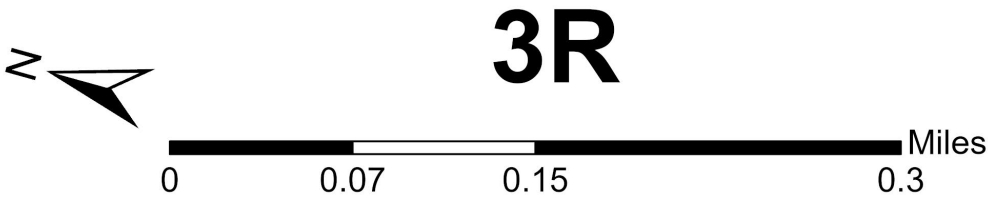
- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

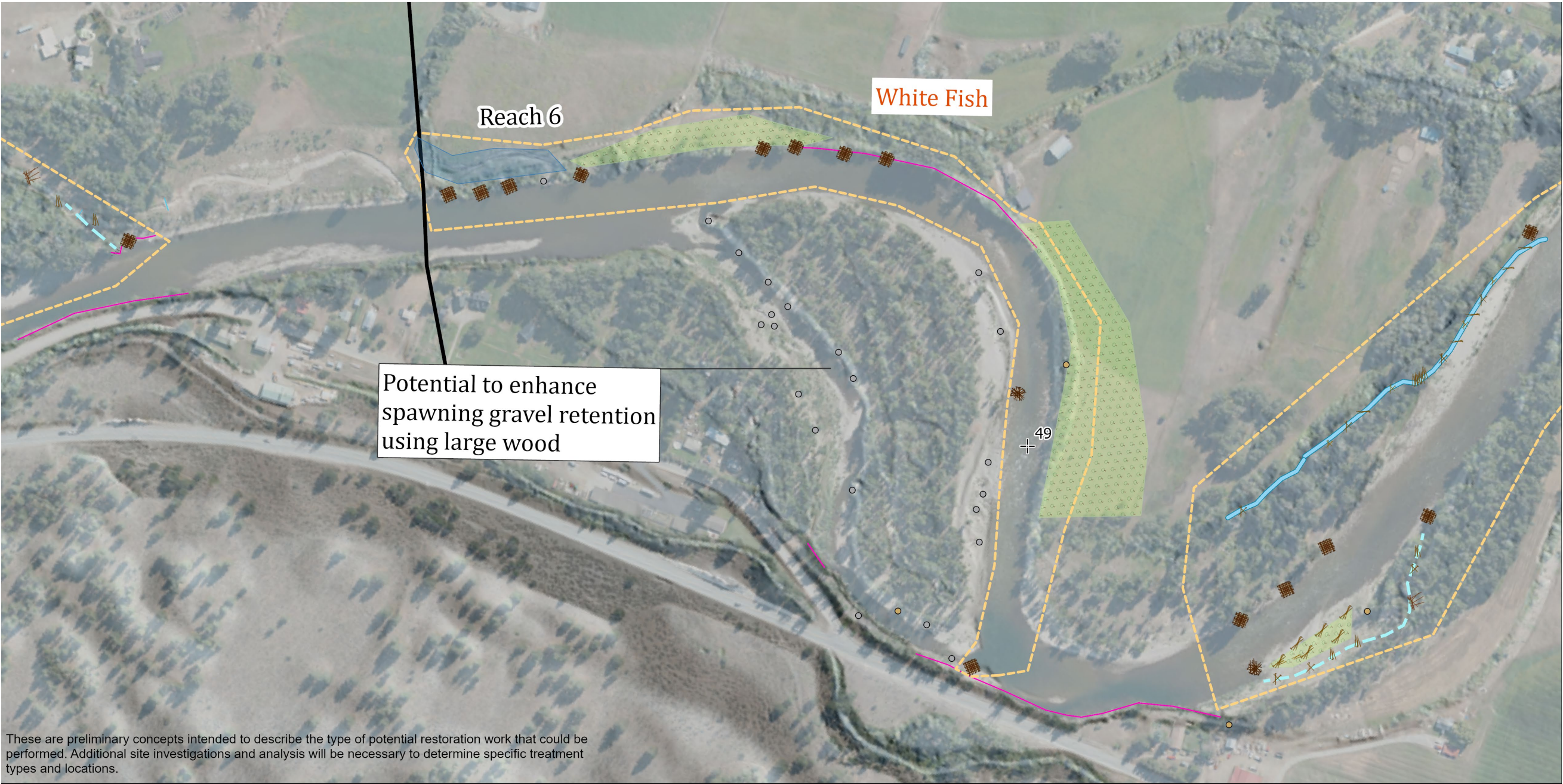
Built Features

- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles



Methow River Reach Assessment Update
Project Opportunities

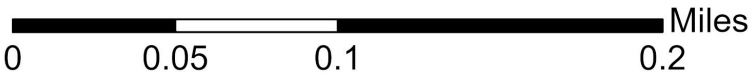




Methow River Reach Assessment Update

Project Opportunities

White Fish



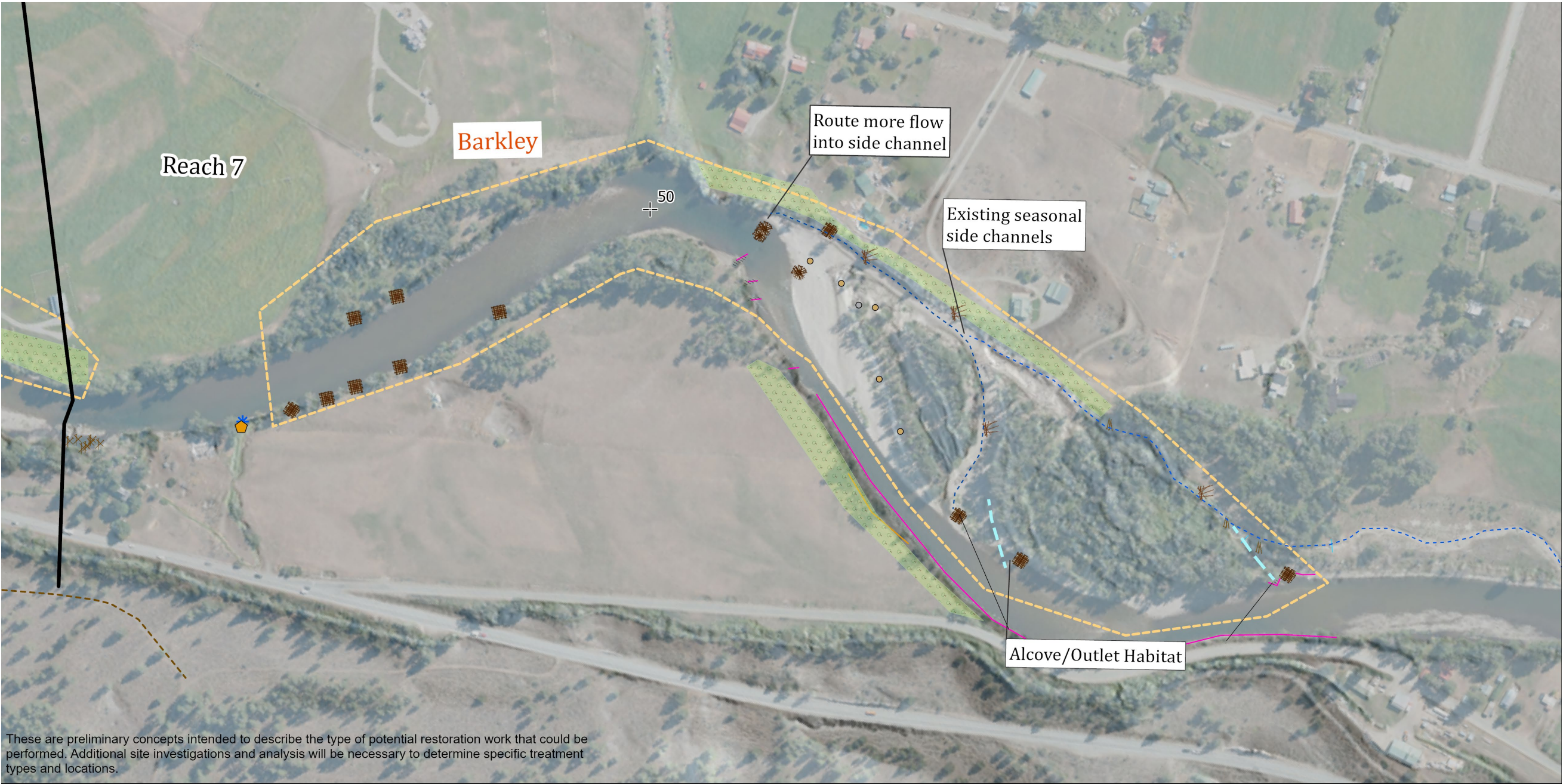
Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles



Methow River Reach Assessment Update
Project Opportunities



Barkley

Project Elements

- | | |
|-------------------------|--------------------|
| Delta Uplift | Habitat Large Wood |
| Remove Armoring | Apex Jams |
| Fill Removal | Bank Buried Jams |
| Revegetation | |
| Groundwater Channel | |
| Side Channel Activation | |
| Existing Channel | |

Built Features

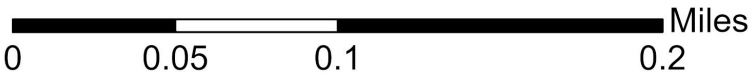
- | | |
|-----------------------|---------------|
| Culvert | Canal |
| Outfall | Levee |
| Utility | Bank Armoring |
| Natural Jam | Utility |
| Constructed Jam | Trail |
| Bridge/Footing | Reach Breaks |
| Diversion Impoundment | River Miles |
| Hatchery | |
| Recreational Area | |



Methow River Reach Assessment Update

Project Opportunities

Riverside



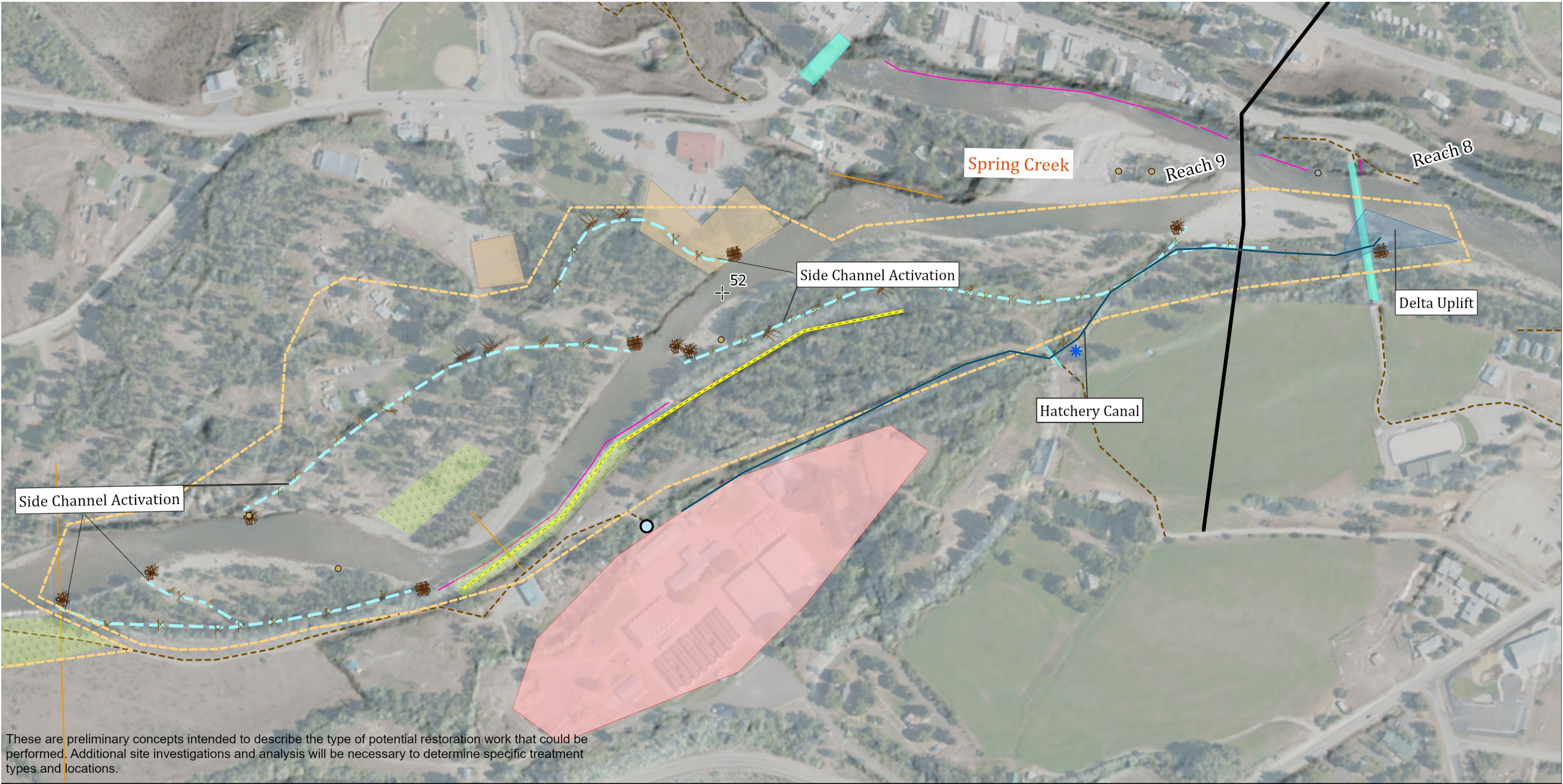
Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles



Methow River Reach Assessment Update

Project Opportunities

Spring Creek



0 0.05 0.1 0.2 Miles

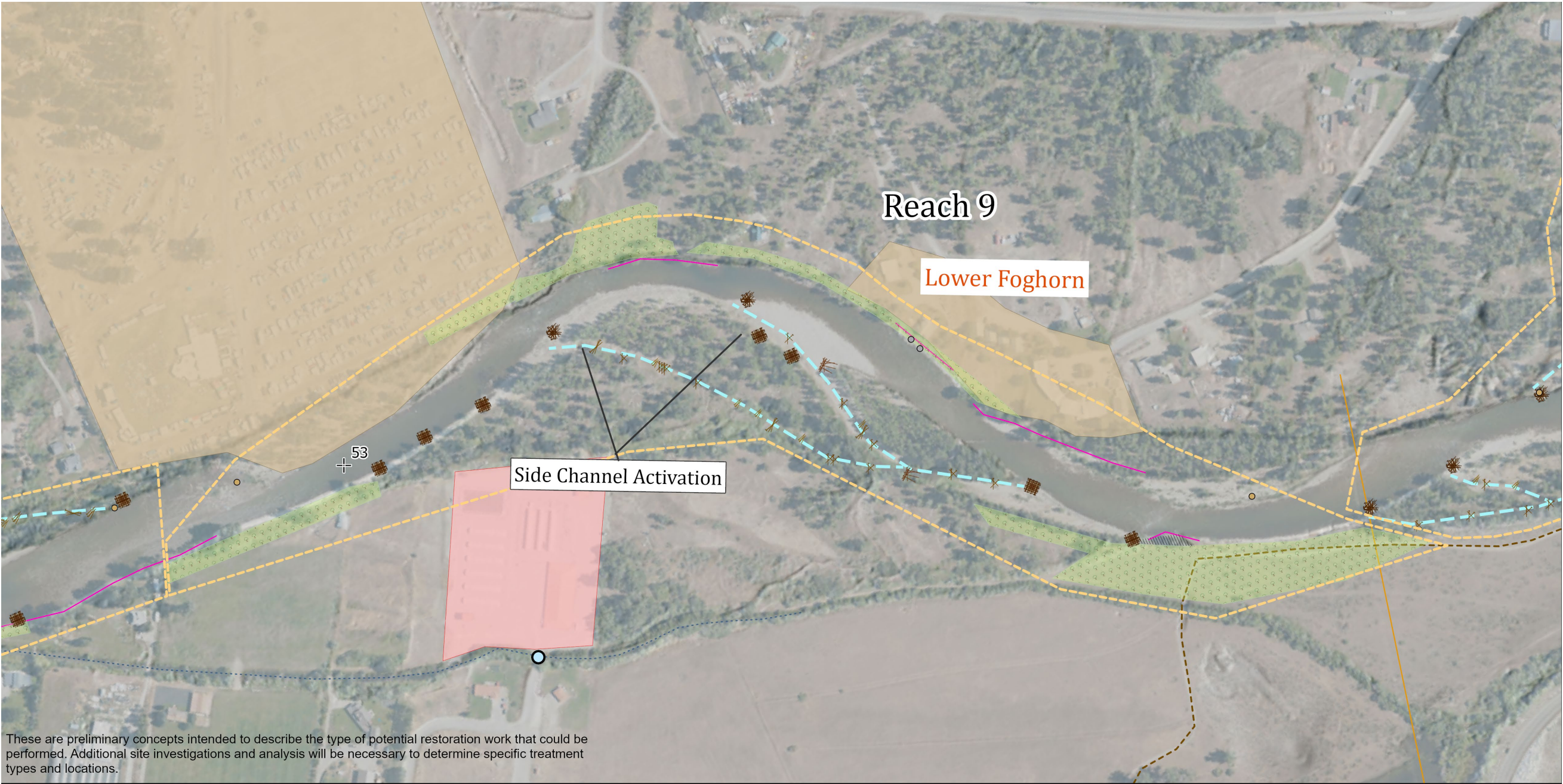
Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles



Methow River Reach Assessment Update

Project Opportunities



Lower Foghorn

0 0.05 0.1 0.2 Miles

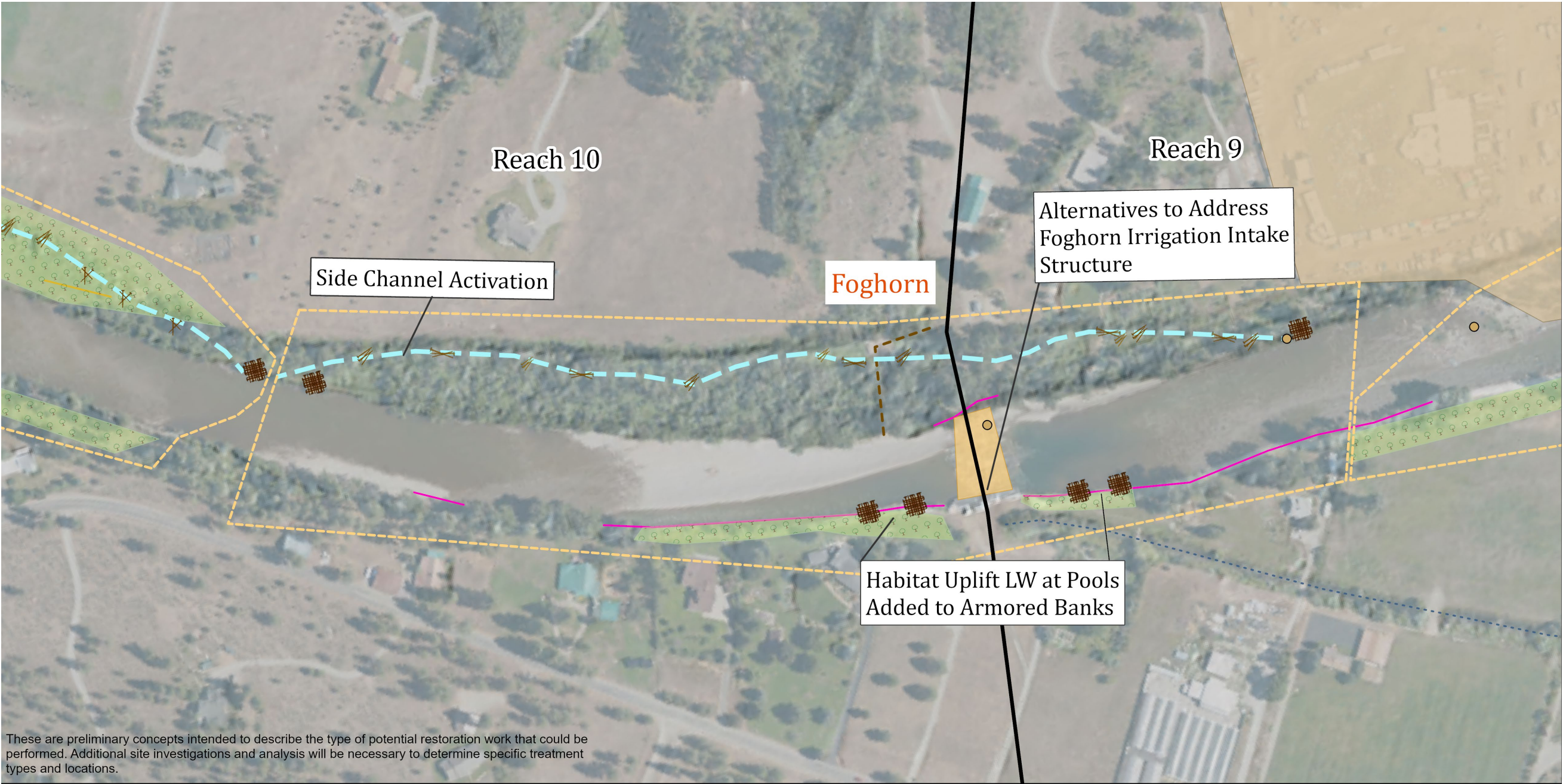
Project Elements

- Delta Uplift
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- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

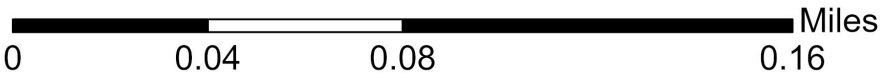
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- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
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- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles



Methow River Reach Assessment Update

Project Opportunities

Foghorn



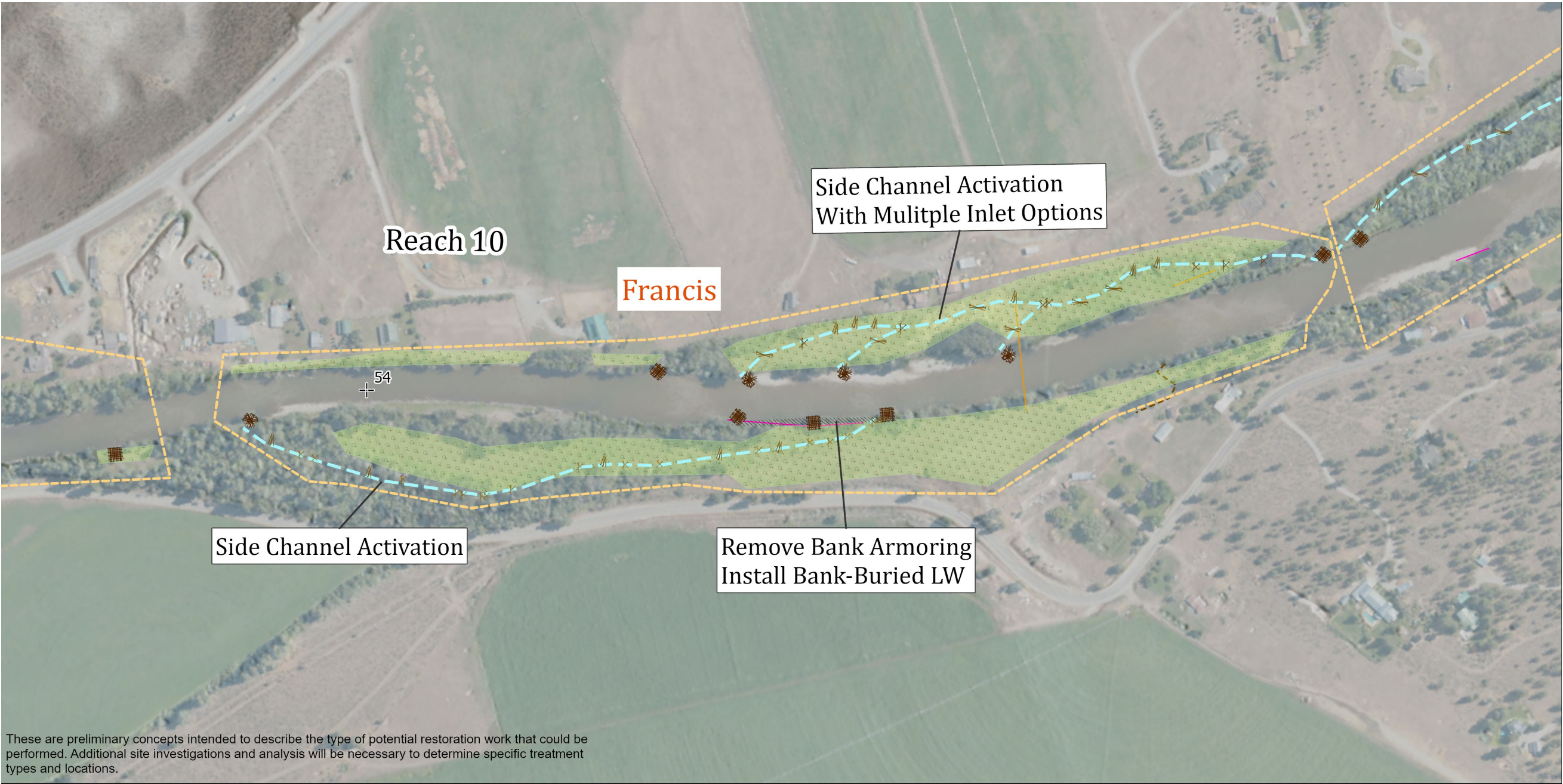
Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

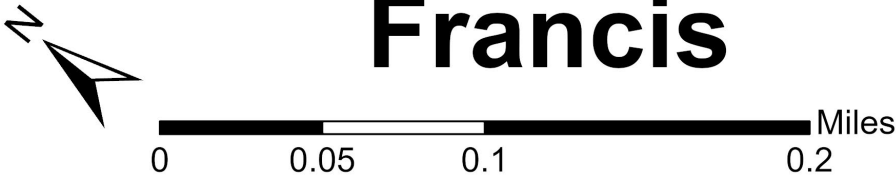
Built Features

- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles

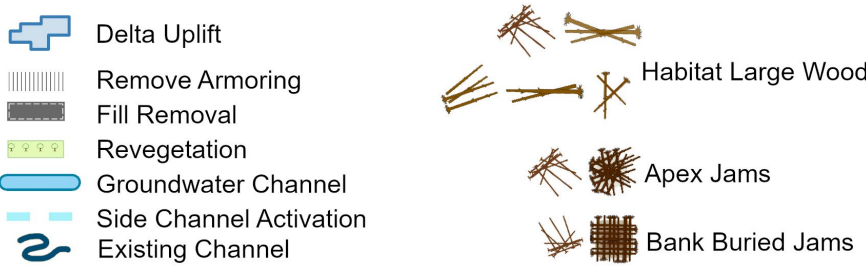


Methow River Reach Assessment Update
Project Opportunities

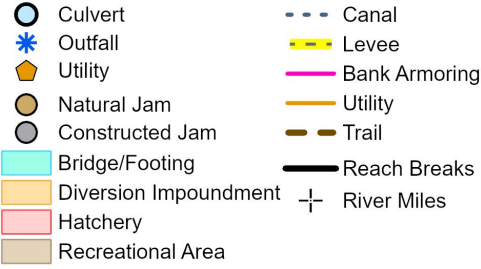
Francis

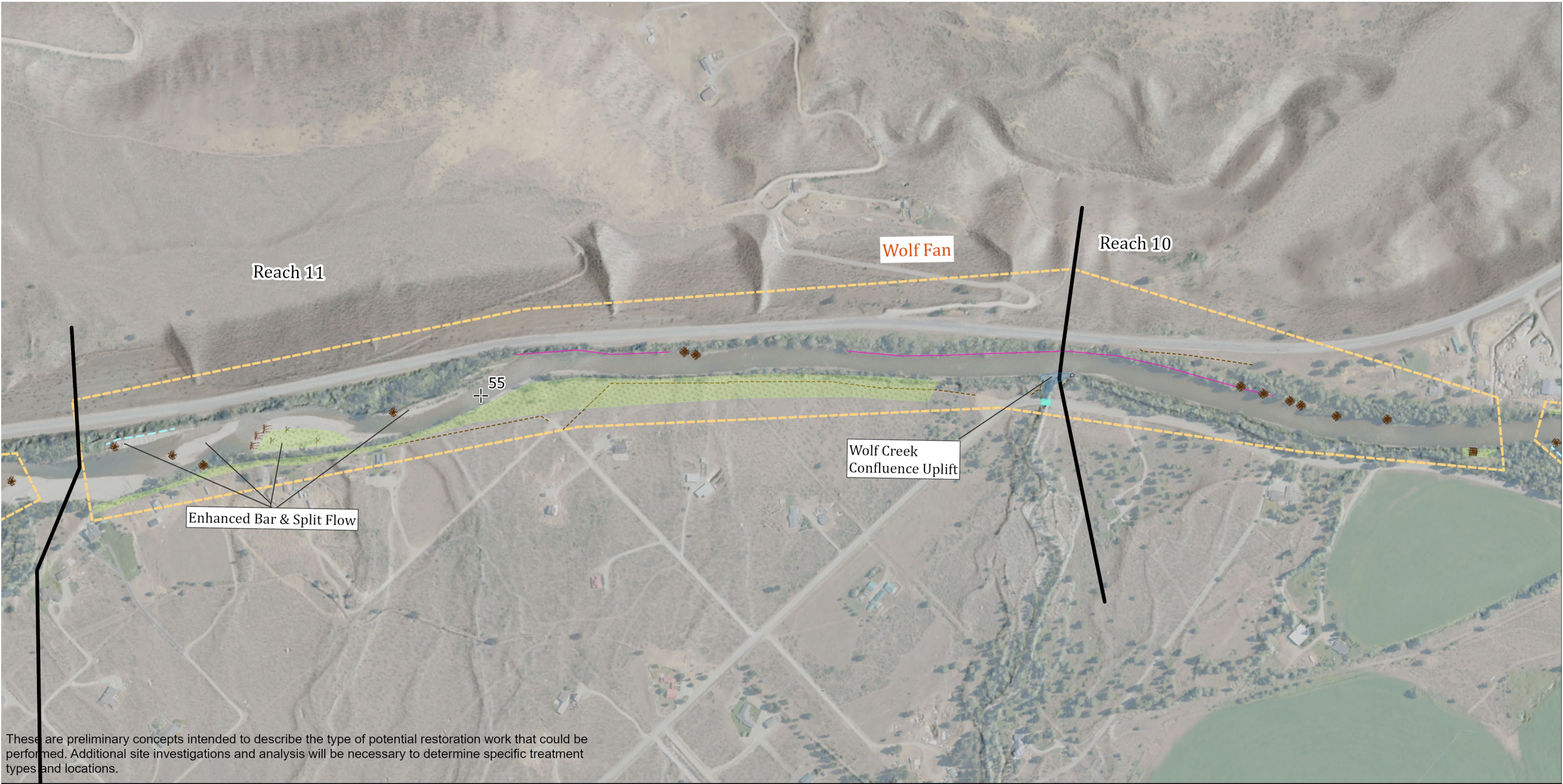


Project Elements



Built Features

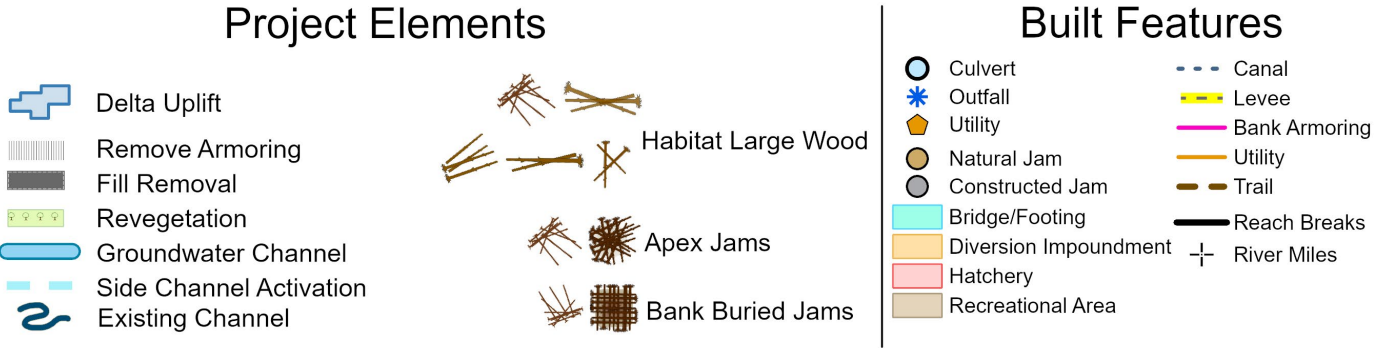
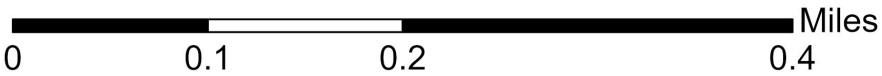


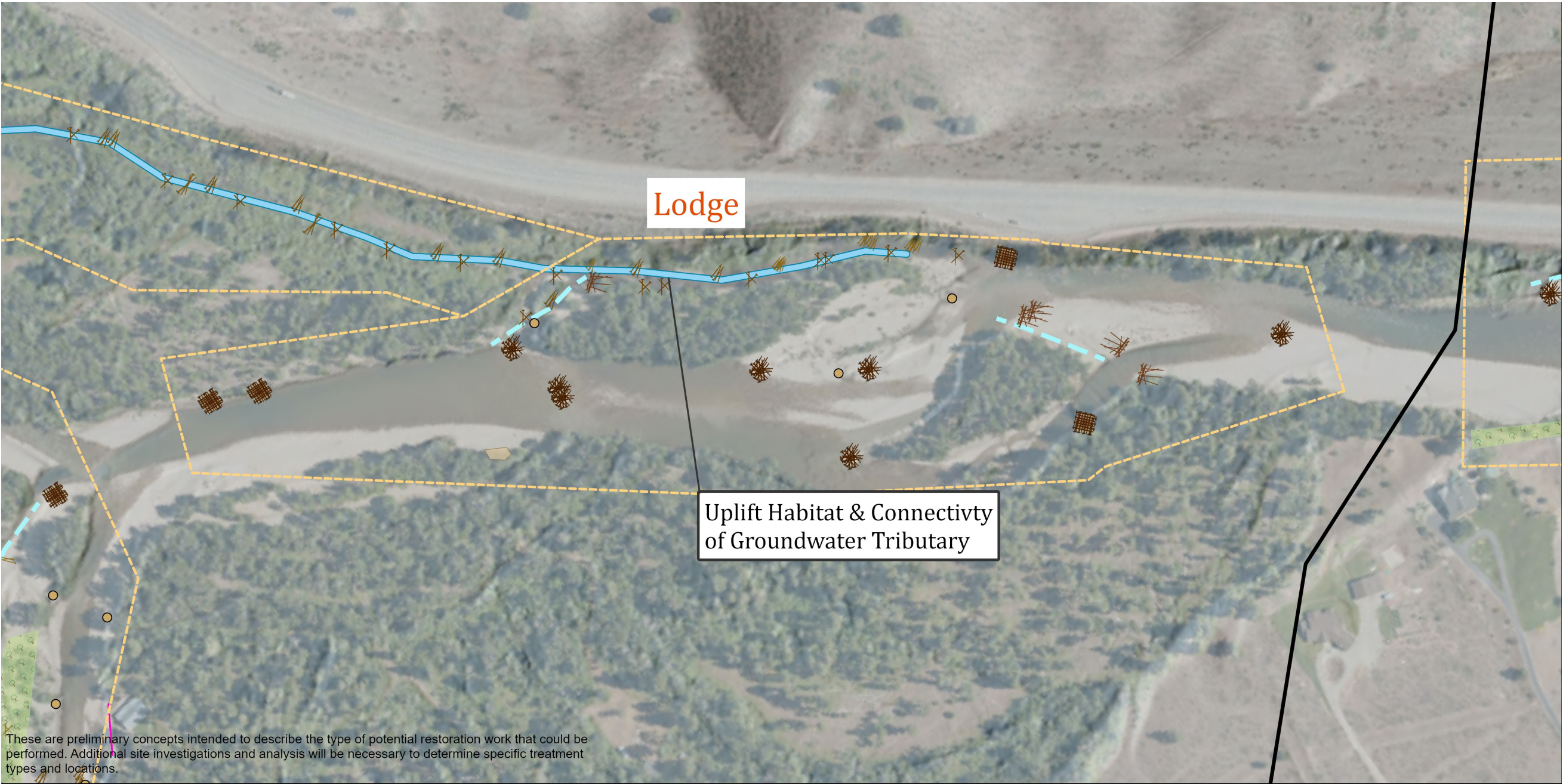


Methow River Reach Assessment Update

Project Opportunities

Wolf Fan

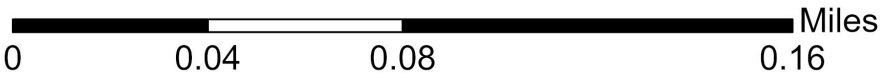




Methow River Reach Assessment Update

Project Opportunities

Lodge



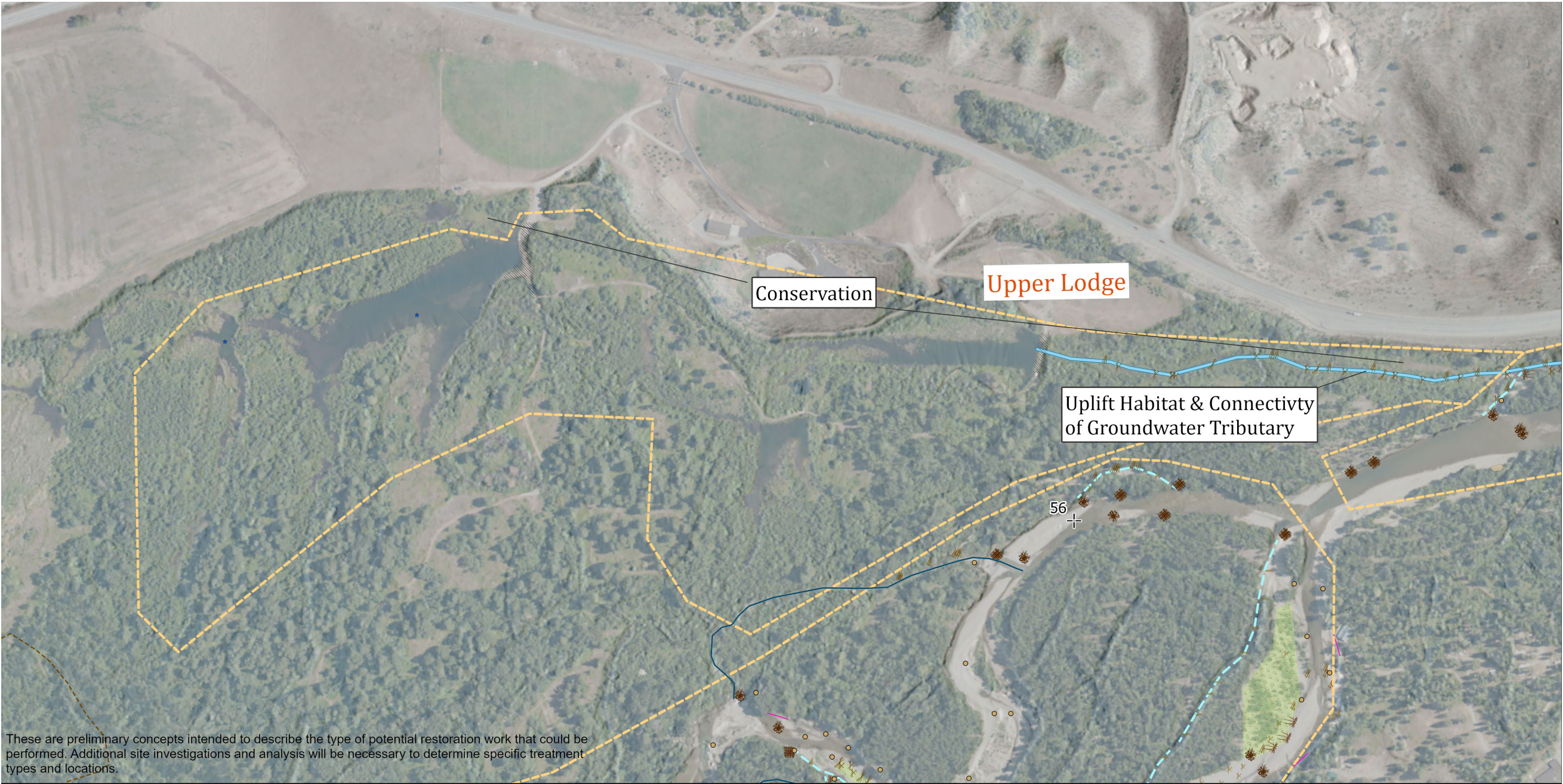
Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

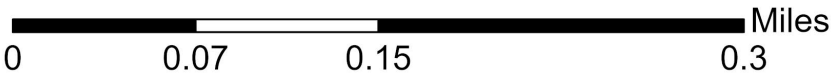
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- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
- Trail
- Reach Breaks
- River Miles



Methow River Reach Assessment Update

Project Opportunities

Upper Lodge



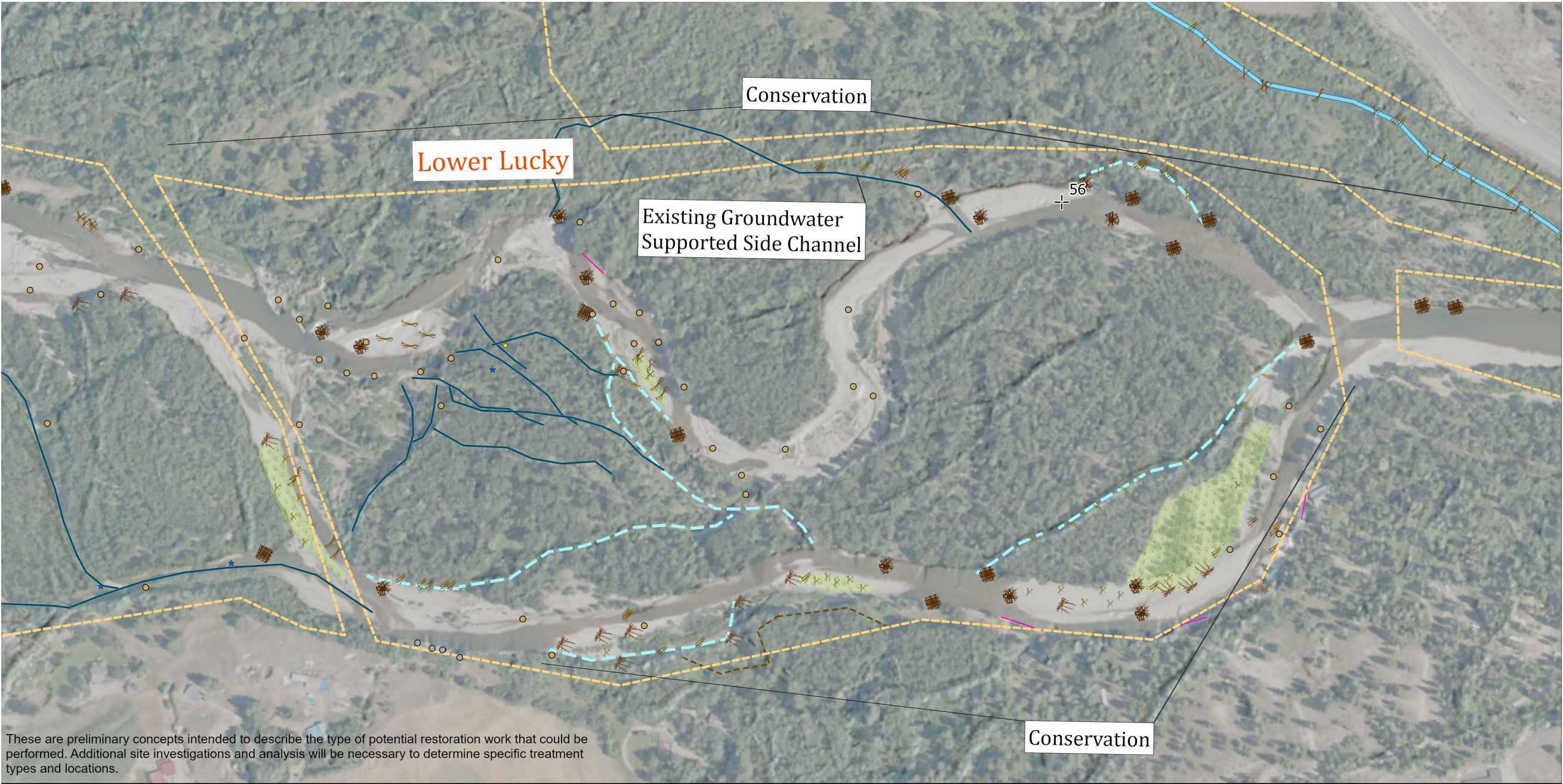
Project Elements

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- Remove Armoring
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- Groundwater Channel
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- Existing Channel

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- River Miles



Methow River Reach Assessment Update

Project Opportunities

Lower Lucky



0 0.05 0.1 0.2 Miles

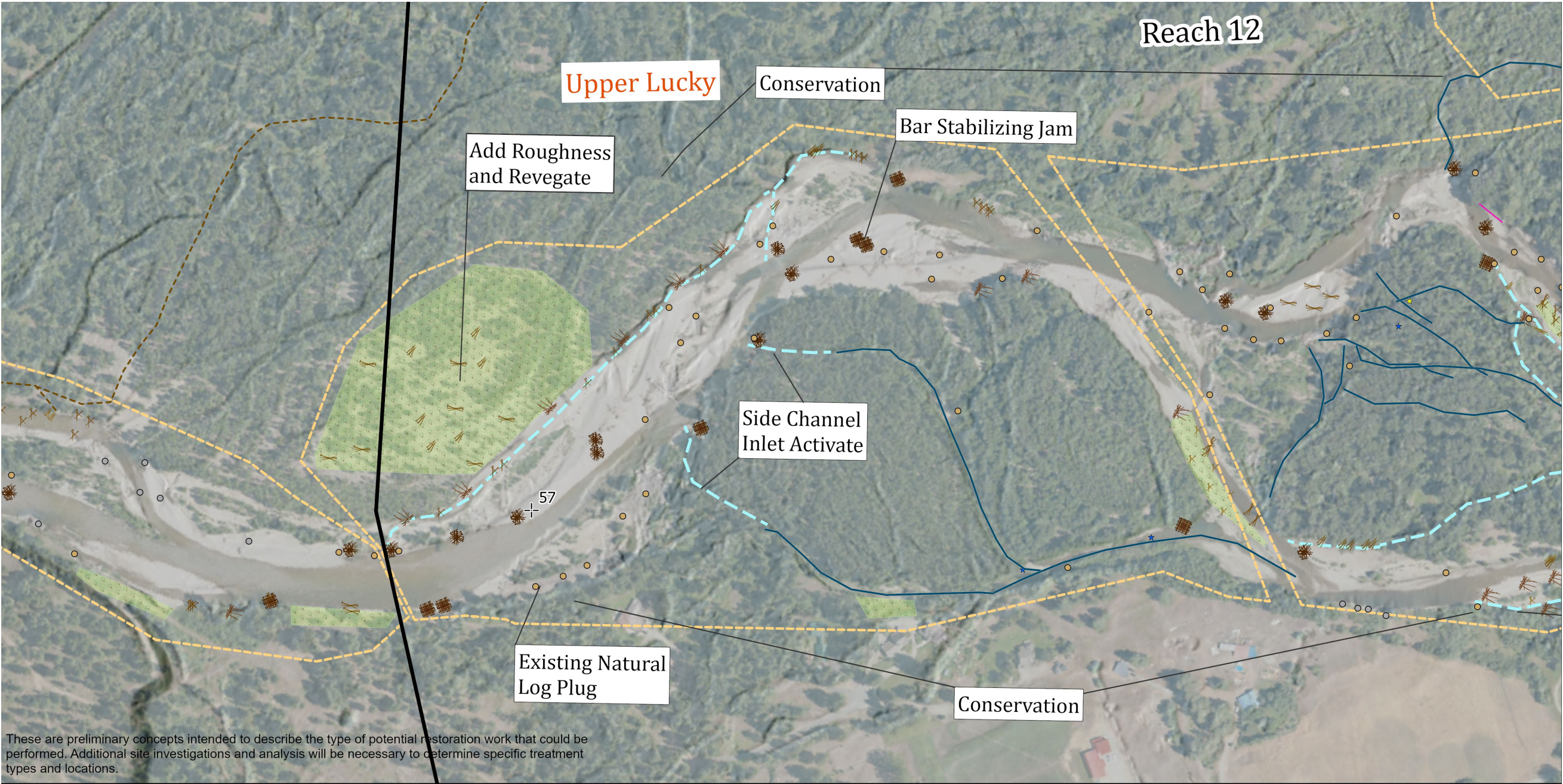
Project Elements

- Delta Uplift
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- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

- Culvert
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- Canal
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- Utility
- Trail
- Reach Breaks
- River Miles



Methow River Reach Assessment Update

Project Opportunities



0 0.05 0.1 0.2 Miles

Upper Lucky

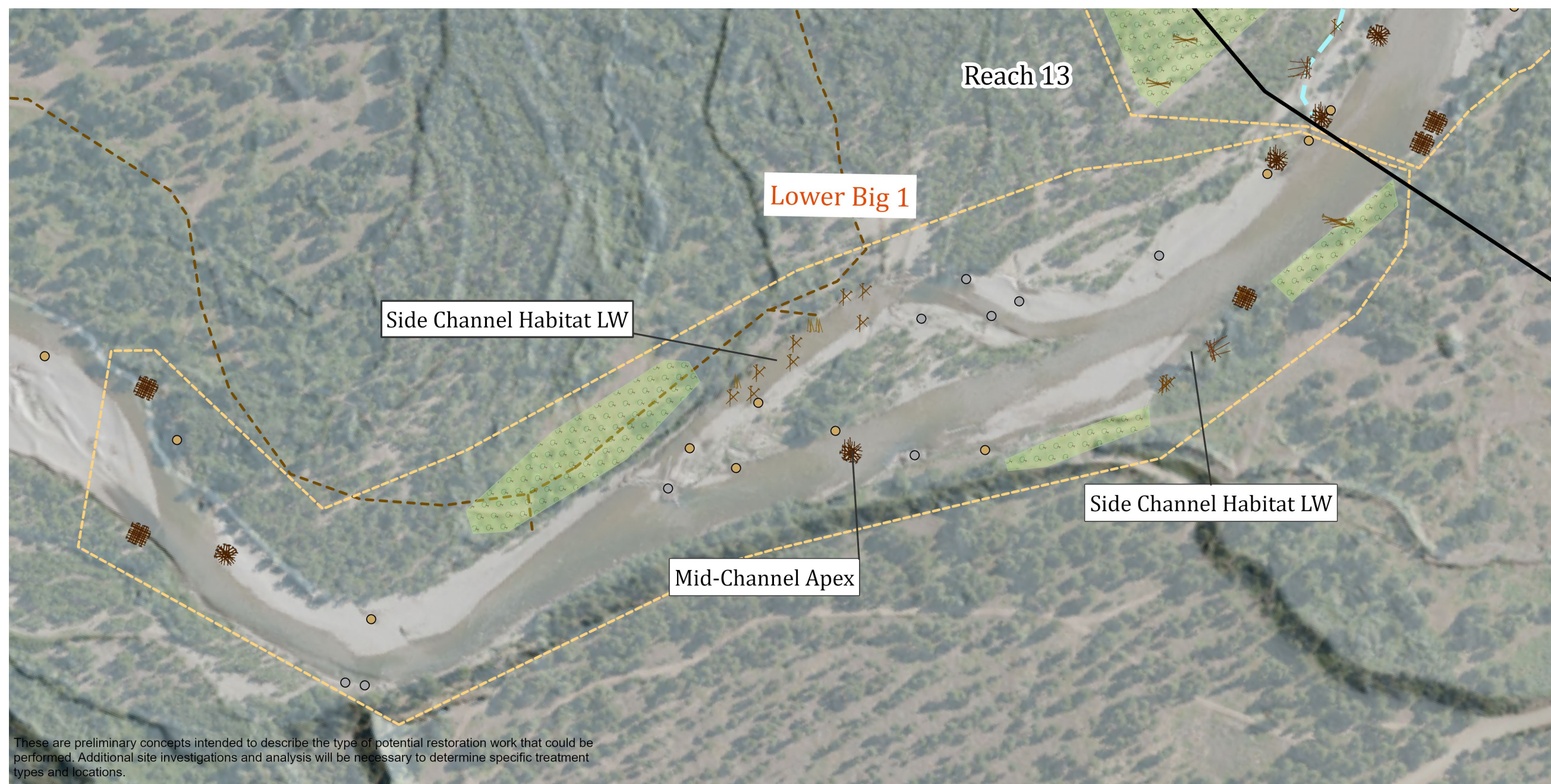
Project Elements

- Delta Uplift
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- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

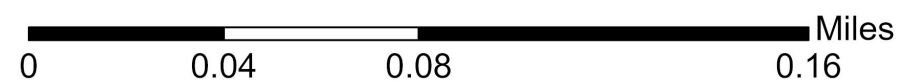
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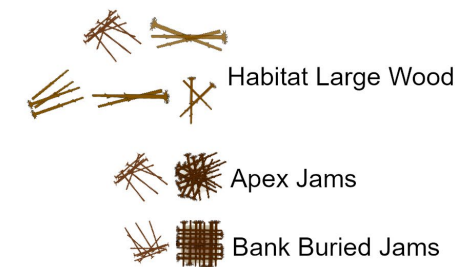
Methow River Reach Assessment Update

Project Opportunities

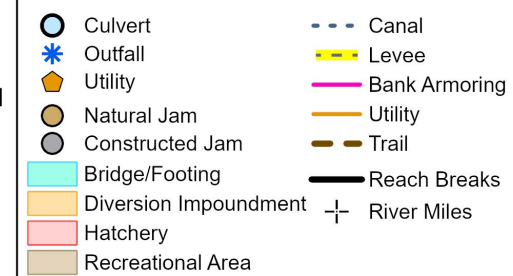
Lower Big 1

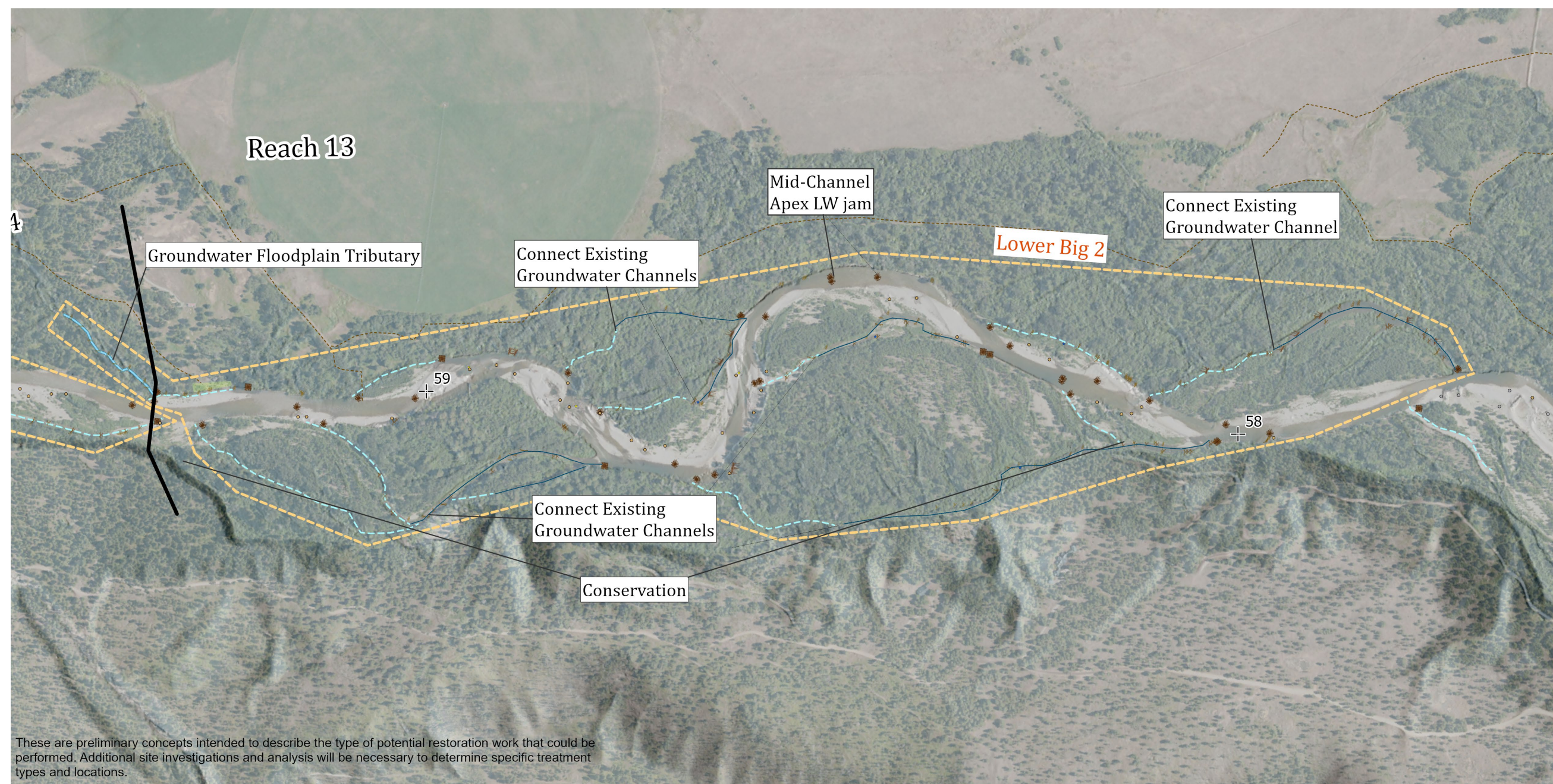


Project Elements



Built Features

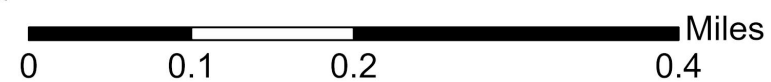




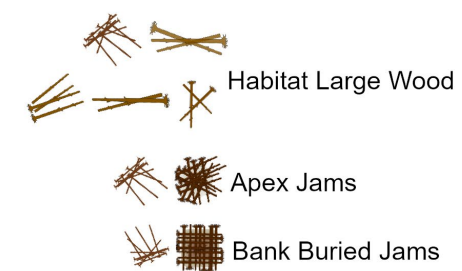
Methow River Reach Assessment Update

Project Opportunities

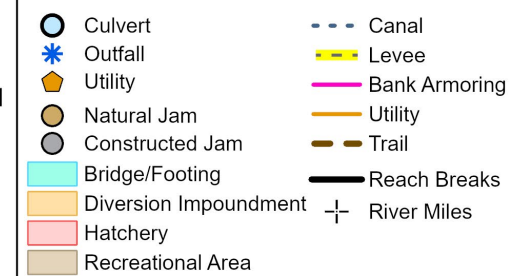
Lower Big 2

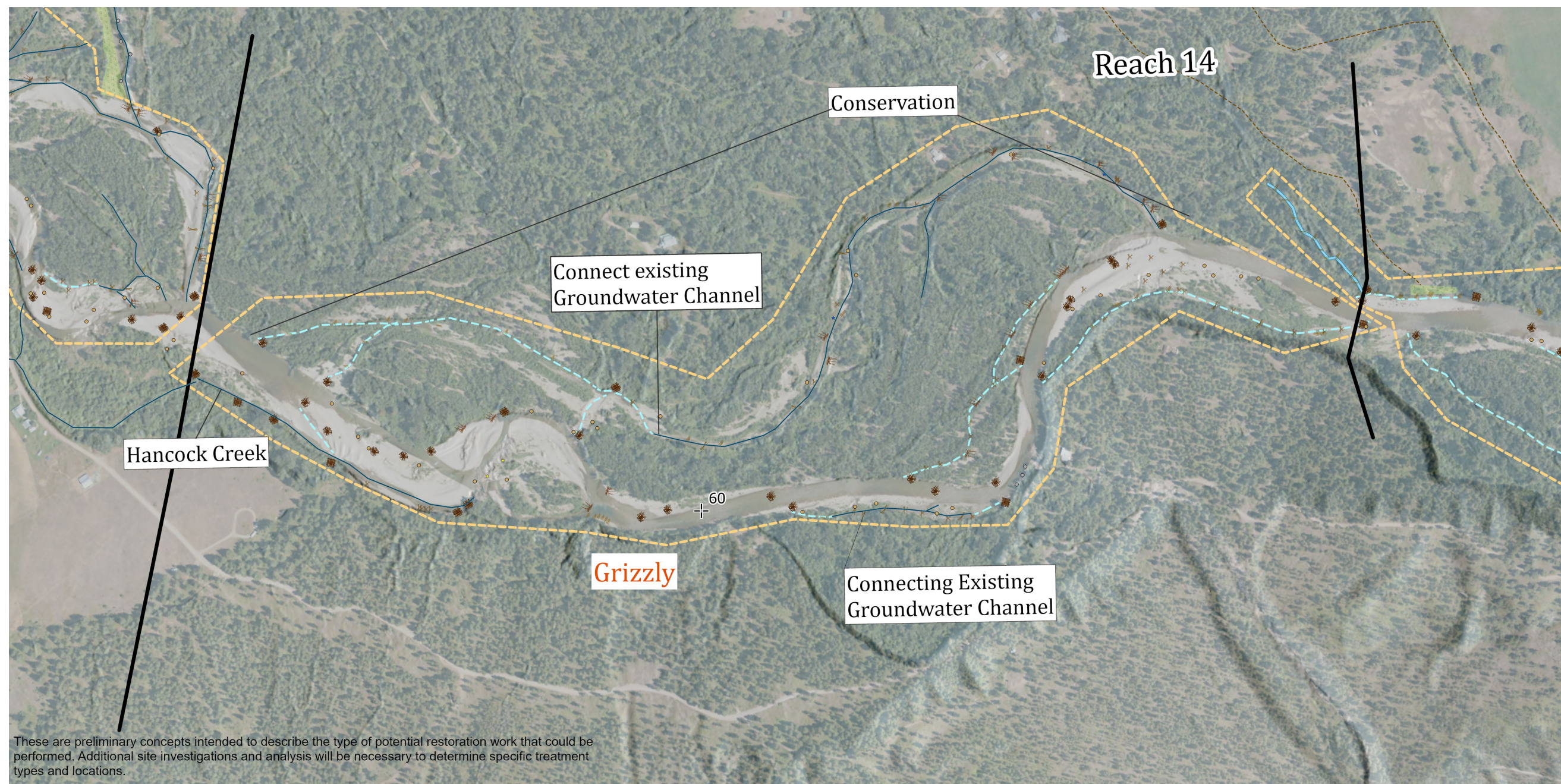


Project Elements



Built Features





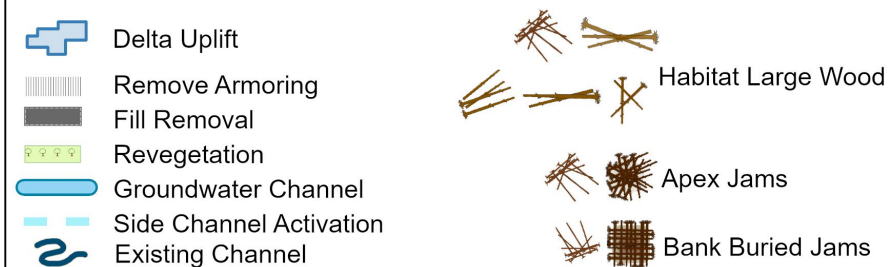
Methow River Reach Assessment Update

Project Opportunities

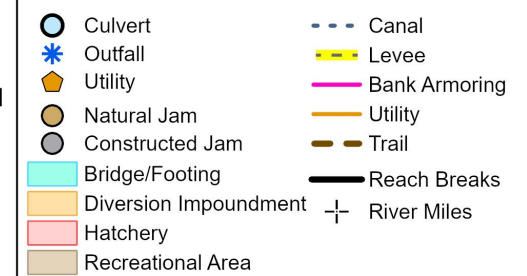
Grizzly

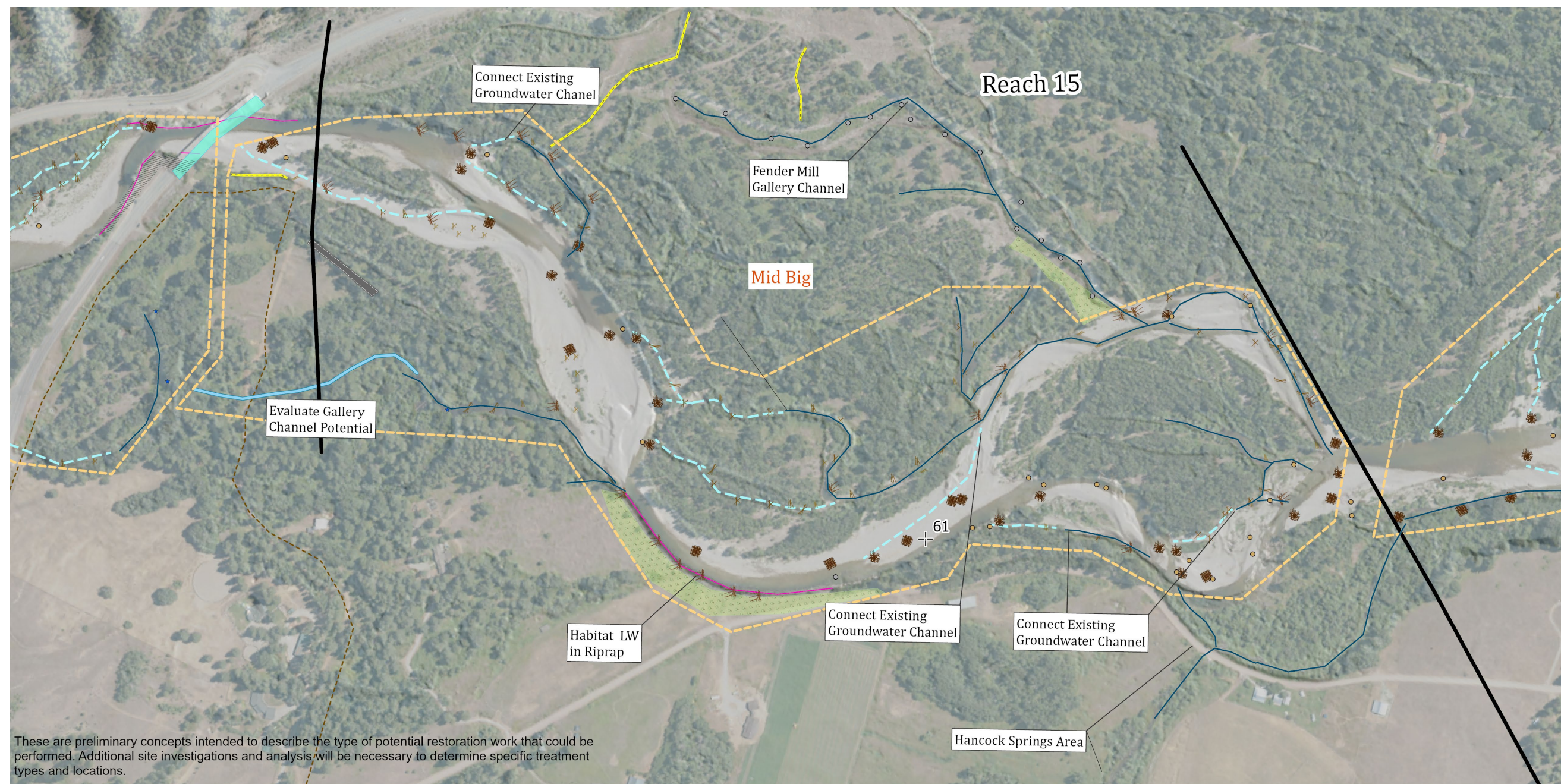


Project Elements



Built Features

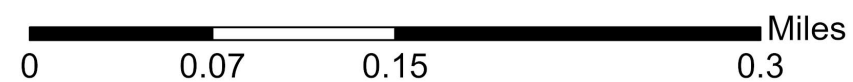




Methow River Reach Assessment Update

Project Opportunities

Mid Big

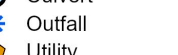


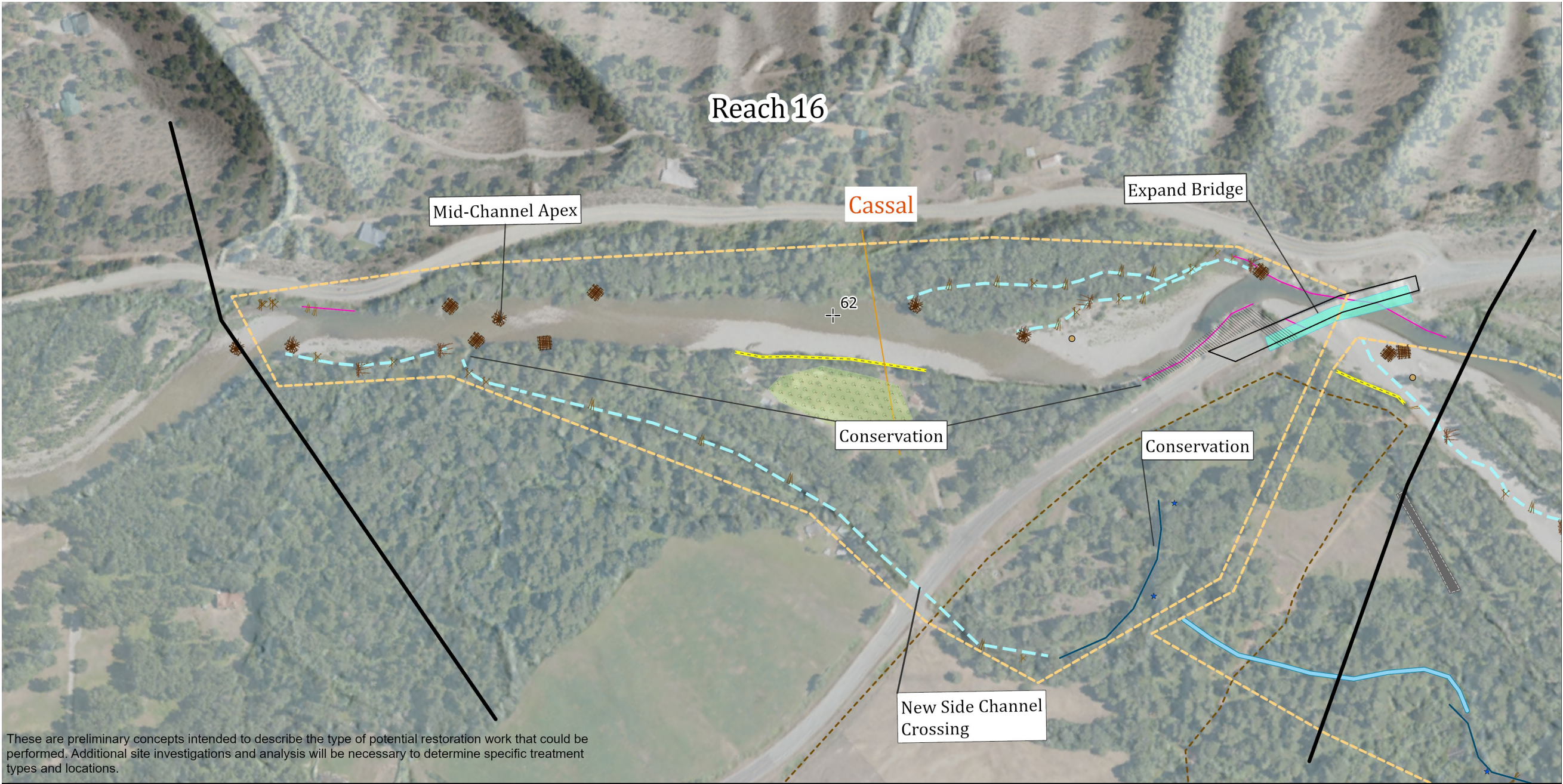
Project Elements

-  Delta Uplift
-  Remove Armoring
-  Fill Removal
-  Revegetation
-  Groundwater Channel
-  Side Channel Activation
-  Existing Channel

-
- The diagram illustrates three types of jams using stick models:
- Habitat Large Wood:** Shows three individual sticks and two small bundles of sticks.
 - Apex Jams:** Shows two small bundles of sticks and one large, dense, tangled mass of sticks.
 - Bank Buried Jams:** Shows two small bundles of sticks and one rectangular block-like structure made of sticks.

Built Features

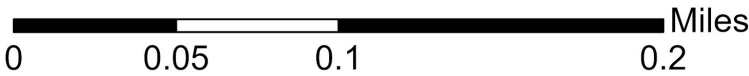
- 
-  Culvert
 -  Outfall
 -  Utility
 -  Natural Jam
 -  Constructed Jam
 -  Bridge/Footing
 -  Diversion Impoundment
 -  Hatchery
 -  Recreational Area
 -  Canal
 -  Levee
 -  Bank Armoring
 -  Utility
 -  Trail
 -  Reach Breaks
 -  River Miles



Methow River Reach Assessment Update

Project Opportunities

Cassal



Project Elements

- Delta Uplift
- Remove Armoring
- Fill Removal
- Revegetation
- Groundwater Channel
- Side Channel Activation
- Existing Channel

- Habitat Large Wood
- Apex Jams
- Bank Buried Jams

Built Features

- Culvert
- Outfall
- Utility
- Natural Jam
- Constructed Jam
- Bridge/Footing
- Diversion Impoundment
- Hatchery
- Recreational Area
- Canal
- Levee
- Bank Armoring
- Utility
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- River Miles

3 Project Prioritization and Ranking

3.1 PRIORITIZATION MATRIX

RANKED BY TOTAL BENEFIT: Teir 1 =8-7; Tier 2: 6; Tier 3: 5-3

Project Area						Benefit Score									Cost Score			Cost Benefit	Feasibility Designation	
Tiers	Project Name	Reach	Down-stream RM	Up-stream RM	Total Length (mi)	Restoration Gap Analysis				Existing and Potential Fish Use		Root Causes		Total Benefit Score	Cost Score (1-4)	Rationale/ assumption	Benefit-to-Cost Score	Feasibility Designation	Rationale/ assumption	
						Existing Condition (1-7)	Achievable Target (1-7)	Final Gap Score (Target - Existing) (0-6)	Rationale/ assumption	Score (1-3)	Rationale/ assumption	Score (1-3)	Rationale/ assumption							
1	Lower Big 2	13	57.7	59.25	1.55	5	7	2	High quality existing conditions. Actions expected to maximize uplift and encourage dynamic response.	3	good habitat quality. Utilized for migration, rearing, and spawning.	3	Increases off-channel habitat connectivity. Addresses lack of channel-spanning structural jams.	8	3	May require helicopter delivery of large wood materials and potentially of equipment	2.7	Moderate-High	Multiple land owners at downstream section. Accessibility could be challenging in some locations.	
	Grizzly	14	59.25	60.55	1.3	5	7	2	Moderate-High quality existing conditions. Actions expected to maximize uplift and encourage dynamic response.	3	good habitat quality. Utilized for migration, rearing, and spawning.	3	Increases off-channel habitat connectivity. Addresses lack of pools with large jams that maintain scour pools and promote split flow.	8	3	May require helicopter delivery of large wood materials and potentially of equipment	2.7	Moderate-High	Multiple land owners. Accessibility could be challenging in some locations.	
	Sugar Channels	2	41.55	42.75	1.20	2	5	3	High potential for off-channel habitat creation. Recreational uses and assumption that not all bank armoring and levee disconnections can be removed due to private property. Assumes acquisition of property to extend/re-route 1890's outlet	2	Moderate fish habitat quality ratings. Mainstem used for migration, rearing, and sparse spawning. Tributary used as off-channel refugia during high flows but not used for migration and no sawning data.	2	Assumes activation of off-channel habitats is possible and increased quantity of large wood and related complexity can be done within recreational use limitations. Assumes that not all levee and bank armoring can be removed. The 1890's tributary is a constructed feature.	7	3	Treatment types range from low-cost to moderate costs. For example, large mid-channel jams require specialized techniques in rivers of this size, while side channel and other large wood installation are common. If 1890's re-route requires property aquisition, then costs are assumed to be higher.	2.3	Moderate-High	Multiple private landowners so collaboration will be necessary. Sites are relatively easy to access. Property acquisition from one landowner may be required to reconstructed tributary outlet.	
	Foghorn	9-10	53.15	53.5	0.35	2	5	3	Low-Moderate existing conditions. Assume Foghorn Irrigation intake structure will remain in place. Assume side channel activation/creation potential as part of impoundment structure upgrades	2	Low-moderate fish habitat quality but spawning, rearing, and migration utilization in mainstem. .	2	Root causes are imposed anthropogenic structure that confines lateral processes, as well as lack of effective structural large wood and related complexity. 1 if no change to impounds are made and 3 if impoundment removed.	7	3	Bank buried large wood are simple and low-cost. Side channel excavation activation that may include infrastructure protection such as armoring, would be more costly. Removal or upgrade to the impoundment would increase costs to a 3-4.	2.3	Moderate	Large wood installation for habitat uplift is high feasibility. Side channel activation may have existing infrastructure limitations. Removal or improvements of impoundment structure option will require coordination and permitting. Site is accessible	
	Lodge	12	55.4	55.8	0.4	5	7	2	Moderate-High existing conditions. Mainstem channel has complexity but lacks large wood	3	good habitat quality. Utilized for migration, rearing, and spawning.	2	Large wood installation will address lack of existing large wood; if conservation and reconnection of groundwater channel occurs, off-channel habitat will be maximized	7	2	In-stream restoration elements are relatively low-moderate costs. If impoundment structures are removed or acquisition of floodplain is required, costs will increase to moderate	3.5	High	High feasibility for in-stream actions are constructable. Access is adequate.	
	Upper Lodge (floodplain)	12	55.7	56.5	0.8	4	6	2	Connectivity of important groundwater tributary a priority.	2	Fish passage is currently blocked but potential fish use is high. No fish survey data available.	3	If constructed dams and barriers are removed, the floodplain tributary will be continuous. Assumes improved connectivity to mainstem in Lodge project ara	7	3	If this requires property acquisition to accomplish, it could be costly.	2.3	Moderate	Floodplain connectivity will require property owner approval. DNR and one property owner. Access is adequate	
	Lower Lucky	12	55.8	56.6	0.8	5	7	2	Moderate-High quality existing conditions. Actions expected to maximize uplift and encourage dyanmic response.	3	good habitat quality. Utilized for migration, rearing, and spawning.	2	Assume that conservation measures will, over the long-term, support mature riparian forest regeneration.	7	3	May require helicopter delivery of large wood materials and potentially of equipment	2.3	Moderate	Multiple land owners . Accessibility could be challenging in some locations.	
	Upper Lucky	12	56.6	57.1	0.5	5	7	2	Moderate quality existing conditions. Actions expected to maximize uplift and encourage dyanmic response.	3	good habitat quality. Utilized for migration, rearing, and spawning.	2	Assume that conservation measures will, over the long-term, support mature riparian forest regeneration.	7	3	May require helicopter delivery of large wood materials and potentially of equipment	2.3	Moderate	Multiple land owners . Accessibility could be challenging in some locations.	
	Lower Big 1	13	57.1	57.6	0.5	5	7	2	High quality existing conditions. Actions expected to maximize uplift and encourage dynamic response.	3	good habitat quality. Utilized for migration, rearing, and spawning.	2	Needs additional channel-spanning and large apex jams. Over time, mature riparian forest establishment.	7	3	May require helicopter delivery of large wood materials and potentially of equipment	2.3	Moderate-High	State owned lands. Some access challenges. Low Risk to infrastructure.	
	Mid Big	15	60.6	61.75	1.15	4	6	2	Moderate-High quality existing conditions.Assume bank armoring at RM 61.1 will remain for road protection.	3	good habitat quality. Utilized for migration, rearing, and spawning.	2	Bank armoring and upstream bridge confinement not resolved.	7	3	Multiple access points are required. May require helicopter delivery of materials.	2.3	Moderate	Multiple land owners. Armored banks are high - may need specialized equipment for LW install.	

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2	Peace	3	43.70	44.50	0.80	2	4	2	Creation of off-channel habitat in existing high-flow routes. Assumes partially groundwater supported	2	Moderate existing fish use with potential uplift. Development of new side-channel habitat.	2	Root cause is lack of effective structural large wood in the mainstem to maintain perennial or seasonal side channel activated, especially with plentiful sediment supply of the Methow River.	6	2	Large mid-channel jams require specialized techniques in rivers of this size. Access along road and toe slope and installation of jams in road prism riprap will require specialized equipment. River-right floodplain features have adequate access.	3.0	Low-Moderate	Dependentend on landowner participation and access/installation challenges.
	Two Channels	3-4	44.40	45.80	1.40	3	5	2	Assumes the upstream levee plug will not be removed, reducing capacity to reconnect floodplain and side channels.	2	Moderate exising fish use with potential to uplift.	2	Root causes are lack of effective structural large wood in the channel and disconnected and home-site developed floodplain. Assumes levee and recreational usage prioritization remain in place.	6	2	If levee plug removal and property acquisition for side channel reactivation is not possible, costs for large wood installation is moderate.	3.0	Low-Moderate	Previous preiminary evaluation (IFI) concluded that site conditions are not fully conducive to gallery channel development.
	3R	6	47.75	48.8	1.05	3	5	2	Poor-moderate existing conditions. Recreational user safety considerations will limit full uplift/restoration potential of mainstem.	2	Poor-moderate fish habitat quality ratings. Used for migration, marginal rearing habitat, and sparse spawning areas	2	Root causes are lack of effective structural large wood and entrenchment below historical floodplain. Assumes recreational usage prioritization remain in place.	6	2	Primarily large wood installations, side channel creation or uplift, and revegetation in previously accessed sites. Adequate access	3.0	Moderate	Multiple landowners but ladequae access;
	Lower Foghorn	9	52.4	53.15	0.75	2	4	2	Low-Moderate existing conditions. Recreational user safety and anthro-developed banks will limit full uplift/restoration potential of mainstem.	2	Moderate fish habitat quality but spawning, rearing, and migration utilization in mainsteman and groundwater-supported side channel outlets.	2	Root causes are lack of effective structural large wood and maintained entrenchment below historical floodplain for anthro-development on banks, as well as riparian forest clearing.	6	2	Primarily large wood installation and side channel activation. Sites are accessible.	3.0	High	Resotration efforts are planned for the area. All treatment elements are common action. Sites are accessible.
	Spring Creek	8-9	51.6	52.4	0.8	2	5	3	Low-Moderate existing conditions. Mainstem lacking off-channel habitat Recreational user safety considerations will limit full uplift/restoration potential of mainstem. Achievable target in side channel is good	2	Moderate mainstem fish habitat quality but high fish use for spawning in tributary Hatchery channel. Mainstem migration, rearing, and some spawning.	1	Root causes are lack of effective structural large wood and entrenchment below historical floodplain. Assumes recreational usage remains a priority and no additional risk to township of Winthrop will occur.	6	2	Large apex jam in mainstem channel at upstream end to facilitate split flow into side channel and habiat uplift contributions to activated side channel and Hatchery Canal channel. Side channel activation. Adequate access;	3.0	Moderate-High	Resotration efforts are planned for the area, All treatment elements are common action. Assume Hatchery goals will be positively served by canal channel uplift . Sites are adequately accessible
	Cassal	16	61.75	62.3	0.55	3	4	1	Low-Moderate quality existing conditions. Assumes forced confinement and disconnection by roads at downstream end and along river left will remain. Weeman brige may be expanded to reduce confinement, but road will remain.	3	Low-moderate fish habitat quality but spawning, rearing, and migration utlization in mainsteman. .	2	Improved habitat. Assumes Weeman Bridg is expanded and confinement at crossing is reduced. Assumes partial reconnection of floodplain with side channel creation under road.	6	4	In-stream large wood restoration elements and side channel creation are moderate. Creation of side channel crossing under road is moderate-high. Expanding the Weeman Bridge crossing would be High.	1.5	Low-Moderate	Multiple land owners, including road. Expanding Weemand Bridge will require permitting and civil engineering support.

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3	Eagle Rocks	2-3	42.80	43.70	0.90	3	4	1	Recreational user safety considerations and high-use campground occupation of the river-right floodplain limit full uplift/restoration potential. If downstream levee remains, uplift potential is limited	2	Moderate existing fish use with potential to uplift.	2	Root causes are lack of effective structural large wood in the channel. Assumes recreational and private campground usage prioritization remain in place, and downstream levee remains in placee.	5	2	Large wood installations with adequate access on river right but side chanel crossing/access on river left. Floodplain revegetation effort will require maintenance during establishment..	2.5	Low-Moderate	Multiple land-owners, including provate campground that values river access; acceptable access.
	Mink	5	46.80	47.50	0.70	3	4	1	Poor-moderate existing conditions. Recreational user safety considerations will limit full uplift/restoration potential of mainstem.	2	Moderate fish habitat quality ratings. Used for migration, rearing, and sparse spawning.	2	Root causes are lack of effective structural large wood in the channel and loss of riparian forest. Assumes recreational usage prioritization remain in place.	5	3	Primarily large wood installations, side channel creation or uplift, and revegetation in previously accessed sites.	1.7	Moderate	Multiple landowners but adequate access;
	WDFW Floodplain	5	45.90	46.85	0.95	3	4	1	Moderate existing conditions. Assumes existing irrigation intake and bank armorning have to remain in place; Recreational user safety considerations will also limit full uplift/restoration potential of the site.	2	Moderate existing fish use with potential to uplift.	1	Root causes are lack of effective structural large wood in the channel and infrastructure, bank protection, and recreational usage prioritization remain in place.	4	2	Primarily large wood installations and revegetation in previously accessed sites.	2.0	Moderate	Amenable land-owners; adequate access.
	Whitefish	6	48.85	49.4	0.55	3	4	1	Moderate existing conditions. Assumes recreational user safety considerations will limit full uplift/restoration potential in the mainstem and bank armoring will remain in place.	2	Poor to moderate fish habitat quality ratings. Used for migration, rearing, and side channel spawning.	1	Root causes are lack of effective structural large wood, bank armorning, and entrenchment below historical floodplain. Assumes recreational usage prioritization remain in place.	4	2	Primarily large wood installations in previously accessed sites.	2.0	Moderate	Multiple landowners but adequae access; Landlower may be willing to convert pasture into riparian buffer.
	Barkley	7	49.9	50.2	0.3	3	4	1	Moderate existing conditions. Recreational user safety considerations will limit full uplift/restoration potential of mainstem.	2	Moderate fish habitat quality ratings. Used for migration, rearing, and spawning.	1	Root causes are lack of effective structural large wood to manage incoming sediment and debris from upstream trasnport reach, and entrenchment below historical floodplain. Assumes recreational usage prioritization remain in place.	4	2	Mainstem large wood and boulder installations, and alcove/outlet jams, previously accessed sites on river left but channeling access on river right	2.0	Low-Moderate	Past and on-going efforts are underway at the site. Difficult to predict feasibility and need of additional treatments.
	Riverside	8	50.6	51.1	0.5	2	3	1	Low-Moderate existing conditions. Recreational user safety considerations will limit full uplift/restoration potential of mainstem.	2	Moderate fish habitat quality ratings. Used for migration, rearing, and spawning.	1	Root causes are lack of effective structural large wood, entrenchment below historical floodplain, and loss of riparian buffer. Assumes recreational usage prioritization remain in place.	4	2	Primarily bank-buried large wood installations and bank revegetation in accessible site.	2.0	Moderate-High	2-3 landowners, including township of Winthrop. Riparian buffer recovery strip is cleared but does not look to be in formal agricultural production.
	Francis	10	53.50	54.10	0.60	3	4	1	Low-Moderate existing conditions. Straight terrace-confined channel with narrow floodplain strips. Low complexity in the channel. All infrastructure is on terraces and out of active floodplain, minus utility crossing.	2	Low-moderate fish habitat quality but spawning, rearing, and migration utilization in mainsteman. .	1	Root causes are lack of effective structural large wood , exaggerated entrenchment/confinement (includes bank armorning) and loss of riparian forest.	4	2	Bank buried structures, side channel activation, and removal of bank armorning. Adequate access	2.0	Moderate	Multiple landowners. Accessible, but only through private property.
	Wolf Fan	10-11	54.15	55.3	1.15	2	3	1	Low existing conditions. Straight fan terrace and road/hillslope toe-confined channel with no floodplain except narrow strips and bars at the upstream end. Entrenchment exaggerated with armored banks and road prism. Proximity of roads limits lateral process initiation.	2	Low fish habitat quality but utilized for migration, marginal rearing and some spawning where substrate allows.	1	Root causes are lack of effective structural large wood , exaggerated entrenchment/confinement (includes bank armorning) and loss of riparian forest. Assume that protection of road is priority. Assumes not permissible to install channel-spanning structures.	4	2	Elements are not difficult to construct, but proximity to road may require traffic control. Multiple access points are required.	2.0	Moderate	Multiple landowners. Accessible, but only through private property on river right and along State Route 20.
	Twisp Town	1	40.60	41.50	0.90	2	3	1	Poor existing habitat conditions. Town of Twisp and its existing infrastructure along the bank top limit achievable recovery.	1	Poor fish habitat quality ratings. Used for migration and marginal rearing habitat.	1	Confinement, entrenchment, and simplification related to the town of Twisp historically and the modern related infrastructure does not allow for restoration of root causes.	3	2	Relatively simple large wood or boulder installation habitat enhancement treatment and bank-top riparian buffer revegetation.	1.5	Low-Moderate	Multiple private landowners. Potential to construct all or one of the identified treatments, thus flexible feasibility.

3.2 PROJECT RANKING METHODS

Step 1: Benefit Score: Projects are scored according to 3 benefit categories, which include a “recovery gap” category, fish use, and root causes. Scores for each category are summed up to obtain the ***Benefit Score***.

Project Prioritization Considerations:

Step 2: Cost Score: Projects are given a ***Cost Score***, which reflects the overall *relative cost* for the project based on techniques, access, and construction feasibility issues.

Step 3: Benefit-to-Cost Score: Total benefit score (sum of all 4 benefit scores) is divided by the cost score to obtain the ***Benefit-to-Cost Score***.

Step 4: Feasibility Designation: Projects are given a ***Feasibility Designation*** based on the overall likely feasibility of being able to implement the project within a 10-year timeframe.

Benefit Score

The Benefit Score includes the summation of scores from 3 categories. These include the Recovery Gap score (0-6 points), the Fish Use score (1-3 points), and the Root Causes score (1-3 points). The guidelines for scoring are provided below.

Recovery Gap

Existing Condition Rating (1-7)

- 1 – Very low ecosystem function and habitat quality. Highly altered systems.
- 2 – Low ecosystem function and habitat quality.
- 3 – Low-to-moderate ecosystem function and habitat quality.
- 4 – Moderate ecosystem function and habitat quality.
- 5 – Moderate-to-high ecosystem function and habitat quality.
- 6 – High ecosystem function and habitat quality.
- 7 – Very high level of natural ecosystem function and habitat quality. Pristine, unaltered systems.

Achievable Condition Rating (1-7)

These ratings use the same categories as above but reflect the future potential recovery trajectory. This is a rating of what can realistically be achieved given past and on-going impacts and constraints of land use, infrastructure, social acceptance, and ownership. Ratings should reflect an “optimistic potential scenario” in order to not discount large potential changes.

Final Gap Score (0-6)

This is simply the achievable condition rating minus the existing condition rating. This represents the gap that can be filled between existing and target conditions through restoration measures.

Fish Use

- 3 – High existing or potential productivity area for spawning or rearing for multiple species
- 2 – Moderate existing or potential productivity area for one or more species
- 1 – Low existing or potential productivity area for one or two species

Root Causes

- 3 – Restoration of root causes and key physical processes that create and maintain habitat over time
- 2 – Partial restoration of root causes
- 1 – Primarily a structurally-focused restoration strategy that doesn’t significantly address underlying causes

Cost Score

The cost score reflects the relative cost for the project based on techniques, access, and feasibility issues. This is a relative cost, not an absolute cost, so the scale of the project is NOT factored into this score. The cost score ranges from 1 to 4, with 1 reflecting relatively lower cost projects. The following guidelines/examples can help to determine the cost score.

4 – High relative cost

- Requires high-cost techniques or materials (e.g., highly engineered log jams, extensive channel shaping, water crossings or bridges, use of helicopter)
- Deep excavation or long-distance hauling of spoils
- Entails construction of additional new flood control or bank erosion features (e.g. set-back levees or buried rip-rap)
- Intensive de-watering requirements
- Limited, difficult, or remote access

2-3 – Moderate relative cost

- Uses moderate cost techniques (e.g. typical log jam structures)
- Moderate excavation and hauling distance of spoils
- Typical planting or invasive weed control
- Moderate access conditions
- Standard or no de-watering requirements

1 – Low relative cost

- Uses low-cost techniques (e.g. non-ballasted log placements)
- Minimal excavation and hauling distance of spoils
- Little to no planting or weed control
- Easy access conditions
- No de-watering required
- Availability of free materials or volunteer labor

Benefit-to-Cost Score

The benefit-to-cost score is simply the benefit score divided by the cost score. This is a relative value used to compare project benefits.

Feasibility Designation

The feasibility designation is the overall likely feasibility of being able to implement the project within a 10-year timeframe. This is based on landownership, as well as economic, regulatory, political, social, permitting, or other considerations that are known to impact the feasibility of conducting projects within a reasonable timeframe. The feasibility designation is not used as part of the project scoring because feasibility issues may change over time and it is desirable to evaluate project benefits independent of feasibility. The designations include the following:

High feasibility

- No known feasibility issues.
- One or two landowners; or landowner(s) has already indicated willingness

Moderate feasibility

- There are potential feasibility constraints that could affect the likelihood of project implementation within a 10-year timeframe

- Three to five landowners; or there is reason to believe landowner(s) would grant permission

Unfeasibility

- There are known feasibility constraints that would be expected to limit the ability to implement the project within a 10-year timeframe
- More than five landowners: or there is reason to believe landowner(s) would not grant permission