Executive Summary

Umatilla River Assessment and Action Plan

March 2025

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

Statement from the Confederated Tribes of the Umatilla Indian Reservation

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Department of Natural Resources (DNR) Fisheries Habitat Program has undertaken a study to provide a scientifically defensible and strategic approach to protect, enhance, and restore sustainable and functional river-floodplain systems that support and sustain healthy aquatic habitat conditions and populations of focal aquatic species.

Guiding the Fisheries Habitat Program is the "First Foods" DNR Mission and Tribal community-driven management approach (Quaempts et al. 2018), which identifies physical and ecological processes ("key touchstones") of a highly functional watershed and dynamic river system important for providing water quality and fish habitat that supports aquatic First Foods integral for Tribal ceremonies and traditions. Focal aquatic species include Middle Columbia River summer steelhead (*Oncorhynchus mykiss*) (Endangered Species Act [ESA] listed Threatened), Columba River bull trout (*Salvelinus confluentus*) (ESA-listed Threatened), spring Chinook salmon (*O. tshawytscha*), Pacific lamprey (*Entosphenus tridentatus*), freshwater mussels, and other native fish, and ultimately lead to self-sustaining populations of all native First Foods species that will be available for Tribal and non-tribal use.

To ensure the study was scientifically defensible, the CTUIR collated existing data, reports, and input from state co-managers, federal and local agencies, and other stakeholders into an Umatilla Subbasin (Subbasin) watershed-scale assessment of historic, current, and desired conditions (**Assessment**). Using the information presented in the Assessment, the CTUIR has developed a subwatershed-scale and reach-scale Restoration Prioritization (**Prioritization**) to protect, enhance, and restore the highest priority areas within the Subbasin. Prioritization tools have been developed to evaluate and rank subwatersheds and reaches within the Subbasin. The results of the prioritization tools have been incorporated into an action plan (**Action Plan**) to guide the CTUIR regarding the types and locations of actions to implement throughout the Subbasin.

The Assessment 1) identifies the historic and current function of natural geomorphic and hydrologic processes that are linked to focal fish species habitat, as organized by the CTUIR River Vision (Jones et al. 2008) and Upland Vision Touchstones (Endress et al. 2019); 2) assesses the effect of current land use on the function of these natural processes and their influence on the production of focal species, 3) provides data used to develop the quantitative prioritization of geographic areas according to the potential for restoration and conservation of watershed/floodplain processes that support focal fish species habitat, and 4) provides the data used to develop restoration plans that can be applied to each geographic area to aid in restoring watershed processes and achieving enhancement and sustainability of native fish habitats.

The results from the prioritization tools form the basis for the Action Plan, which identifies the highest priority geographic areas where the CTUIR might propose protection, enhancement, and restoration actions. The Action Plan also proposes next steps for implementing these actions.

The Assessment, Prioritization, and Action Plan supply the scientific rationale for a 30-year strategic Tribal and State co-manager and stakeholder approach to floodplain restoration, based upon natural processes and watershed-specific data. The study is focused on the alluvial channel and floodplain of the Umatilla River, from the confluence with the Columbia River near Umatilla, Oregon, to the headwaters of the North and South Forks of the Umatilla River in northeast Oregon. The focal area includes 108 miles of stream and the associated floodplain and tributary confluences of those stream segments. The Subbasin also includes a reconnaissance-level assessment of the upland conditions and tributary processes across the Subbasin that influence the focal area. This Executive Summary provides an overview of the information presented in the Assessment, Prioritization, and Action Plan.

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Abbreviations and Acronyms

Assessment	Umatilla River Assessment
BPA	Bonneville Power Administration
BRAT	Beaver Restoration Assessment Tool
CMZ	channel migration zone
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
cfs	cubic feet per second
DNR	Department of Natural Resources
ESA	Endangered Species Act
FpMP	Floodplain Monitoring Plan
FshMP	Fisheries Monitoring Plan
GRAIP	Geomorphic Roads Analysis and Inventory Package
HUC	hydrologic unit code
HSI	habitat suitability index
NF	North Fork
RM	river mile
SF	South Fork
SPP	Smolt Production Potential
Subbasin	Umatilla Subbasin
TEK	Traditional Ecological Knowledge
UM	Mainstem Umatilla River
USGS	U.S. Geological Survey
USURP	Umatilla Subbasin Uplands Restoration Plan

Umatilla River Assessment and Action Plan Vision

The vision is to restore an ecologically functioning Umatilla River Subbasin. An ecologically functional Subbasin is one in which upland, river, and floodplain processes sustain water quantity and quality, harvestable fish populations, and other First Foods central for Tribal and public use.

Introduction to the Umatilla Subbasin and Umatilla River

Since time immemorial, the members of what is now known as the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have lived in the Umatilla Subbasin (Subbasin) (Exhibit 1) and their traditional homelands. For many thousands of years, the Tribes managed the landscape and lived with the Umatilla River, guided by the traditional philosophy of tamánwit—unwritten traditional law that includes, but is not limited to, the reciprocal responsibility of the People to take care of the First Foods that, in Tribal creation belief, made a promise to provide for the people. Beginning with the Euro-American settlement in the 1800s, impacts such as logging, agriculture, and the building of infrastructure (e.g., roads and railroads) have resulted in the ecological deterioration of the Subbasin. This deterioration has disrupted the traditional reciprocal relationship between the people and the First Foods.

The CTUIR has been working collaboratively to restore and enhance the Subbasin using holistic, process-based strategic planning and methodology for restoring watershed processes to support First Foods and treaty-reserved resources for perpetual cultural, economic, and sovereign use. To sustain harvestable fish populations, and for CTUIR to exercise related Treaty rights, the watershed, rivers, and floodplain must be ecologically healthy to support clean, abundant water and fish. As part of this effort, the CTUIR and its partners and stakeholders identified the need to develop a scientifically-robust assessment of the Subbasin's historic and current condition, a geographical prioritization of where restoration and conservation actions might occur, and an action plan based on desired future conditions.

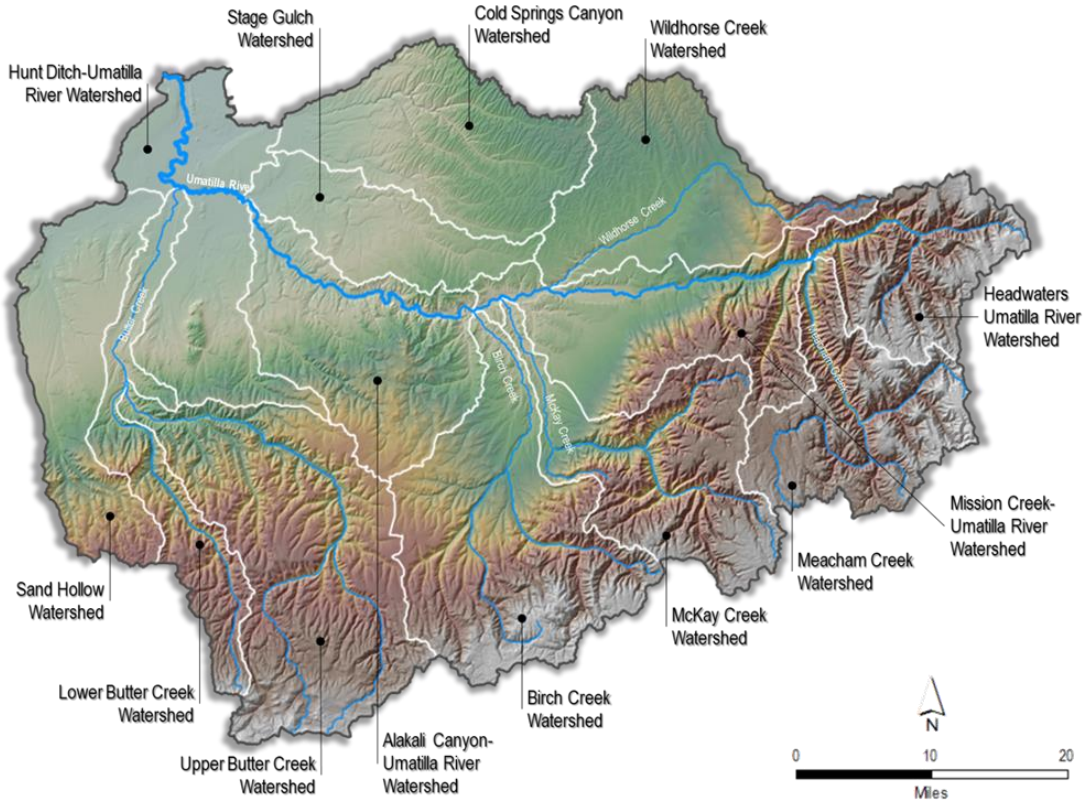

Exhibit 1. Overview of the Umatilla Subbasin

Umatilla River Assessment and Action Plan Outline

Exhibit 2 summarizes the components and illustrates the iterative process used to compile these documents and tools.

Exhibit 3 provides an outline of the documents and tools that were developed as part of the Umatilla River Assessment (Assessment) and Action Plan.

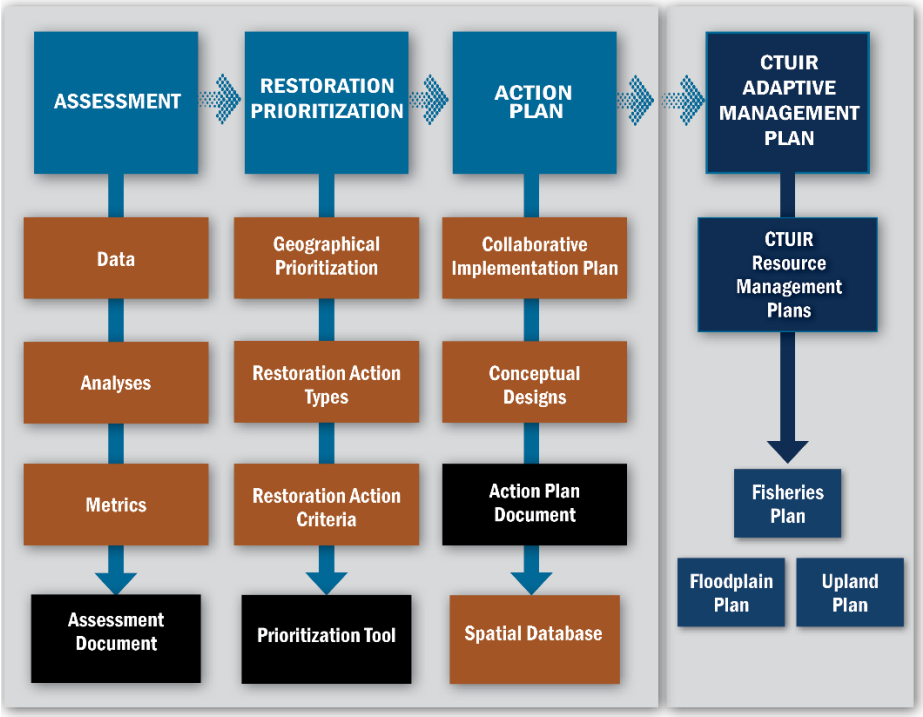

Exhibit 2. Assessment and Action Plan Steps

Exhibit 3. Outline of the Umatilla River Assessment and Action Plan Documents and Tools

Tool / Document / Deliverable(s)	Summary
Existing Data Analyses	• Existing data provided by CTUIR, state co-managers, federal and local agencies, and other stakeholders

Umatilla Assessment	• Uplands Vision; River Vision
	• Umatilla River Assessment Summary
	  ○ Uplands Characteristics
	  ○ Hydrology and Hydraulics
	  ○ Geomorphic Roads Analysis and Inventory Package (GRAIP) Lite
	  ○ Geomorphic Characteristics
	  ○ Channel Migration Zone (CMZ) and Avulsion Potential
	  ○ Habitat Suitability Index (HSI) Modeling
	  ○ Smolt Production Potential (SPP) Modeling

Analyses Tools	• Avulsion Potential Spreadsheet • Expected Sinuosity Calculator • Fish Periodicity vs. Mean Daily Flow and Temperature Spreadsheet • HSI Results Spreadsheet • Juvenile Salmonid Densities Spreadsheet • Large Wood Calculator • Umatilla River Stream Gages and Summary Spreadsheet • Umatilla River Vision Statistics Spreadsheet • Umatilla Subbasin Uplands Vision Statistics Spreadsheet • Smolt Production Potential Model Calculator
Prioritization Tools	• Umatilla Subbasin Watershed and Subwatershed Prioritization Spreadsheet • Umatilla River Reach Prioritization Spreadsheet • Umatilla Subbasin Watershed and Subwatershed Opportunities Tool • Umatilla River Reach Opportunities Tool
Action Plan	• Summary of Key Findings for the Subbasin and Umatilla River • Summary of Prioritization Results • Conceptual Designs • Implementation Pathways and Timeline

Analyses presented in the Assessment provide key findings for the current functionality of the Subbasin and the Umatilla River. The following subsections provide a summary of the key findings. These are presented first for the Umatilla Subbasin and then following for the Umatilla River.

Umatilla Subbasin Uplands Vision – Key Findings

Based on analyses conducted during the Assessment, departure from historic uplands conditions was identified for each subwatershed in the Subbasin. The subwatersheds that were more departed from historic conditions received a higher priority for restoration actions.

Conditions were analyzed based on metrics identified in the Uplands Vision (Endress et al. 2019) that are directly connected to the Uplands Vision Touchstones (Hydrologic Function, Soil Stability, Landscape Pattern, and Biotic Integrity). Traditional Ecological Knowledge (TEK) was also used to further characterize the historic functionality of the Subbasin. Areas known to have been utilized for traditional uses were identified geographically, but not provided publicly due to the sensitivity of the locations. Exhibit 4 summarizes the key findings for the Uplands Vision Touchstones.

Hydrologic Function

- By 2080, mean summer stream flows in the Umatilla River are expected to decrease by more than 60 cubic feet per second (cfs).
- The Subbasin will shift from a mix of snow-and-rain dominant hydrology to rain-dominant, impacting timing and duration of flows.

Soil Stability

- Highly erodible soils are found in 54 percent of the Subbasin and 29 percent of the Subbasin is highly or very highly susceptible to landslides.
- Roads in the Subbasin contribute an additional 343 tons of sediment per year to streams..

Landscape Pattern

- Within the Subbasin, 34 percent of land has been converted to agriculture.
- High intensity fires have impacted 23,000 acres of the between 2004-2014.
- Mechanical disturbances (i.e., logging), have impacted 70,000 acres of the Subbasin and insects/disease have impacted 700 acres of the Subbasin.

Biotic Integrity

- Vegetation highly departed from historic conditions comprises 57 percent of the vegetation in the Subbasin.
- Regarding composition, 33 percent of vegetation in the Subbasin is early seral, 66 percent is mid seral, and only 1 percent is late seral.
- Regarding canopy cover, 17 percent of canopy cover in the Subbasin is less than 10 meters tall, 20 percent is greater than 20 meters tall, and 63 percent is between 10 and 20 meters tall.

Exhibit 4. Summary of Uplands Vision Touchstone Key Findings

Umatilla River Vision – Key Findings

During the Assessment, departure from historic River Vision conditions was identified for each reach of the Umatilla River. The subwatersheds that were more departed from historic conditions received a higher priority for restoration actions. Conditions were analyzed based on metrics identified in the Umatilla River Vision (Jones et al. 2008) that are directly connected to the Umatilla River Vision Touchstones (Hydrology, Geomorphology, Connectivity, Riparian Vegetation, and Aquatic Biota).

TEK was also used to further characterize the historic functionality of the Umatilla River. Areas known to have been utilized for traditional uses were identified geographically but not provided publicly due to the sensitivity of the locations of the traditional uses. Exhibit 5 summarizes the key findings for the River Vision Touchstones.

Hydrology

- Surface water consumption in the Subbasin is diverted for irrigation 69 percent of the time.
- By 2099, no sections of the mainstem Umatilla River will be optimal for salmonids (below 64 degrees F), only 4 miles of the river will be considered sub-lethal (between 64- and 74-degrees F), and nearly 83 miles of the river will be considered lethal (greater than 74 degrees F) for salmonids at mean summer stream temperatures.

Geomorphology

- Lateral control structures constrain 48 miles of the Umatilla River (over 44 percent of the total length of the river).
- The current 100-year flow occupies only about 40 percent of the historically available floodplain.

Connectivity

- Channel complexity has decreased by 55 percent since 1952.
- Off-channel habitat availability has decreased from 52 miles to 33 miles since 1952.
- The expected sinuosity of the mainstem Umatilla River should provide 110 miles of channel length. Instead, the mainstem channel is only 87 miles long, a 20 percent decrease.

Riparian Vegetation

- Optimal large wood pieces per mile is 32. The mainstem Umatilla River features only 14 pieces per mile on average.
- Optimal large wood volume is 316 cubic yards per mile: The mainstem Umatilla River features only 21 cubic yards of large per mile on average.
- Over 80 percent of the mainstem Umatilla River average existing canopy cover is less than 15 feet tall in the historic floodplain.

Aquatic Biota

- Chinook salmon smolt production potential has decreased 75 percent from historic conditions.
- Steelhead smolt production potential has decreased 79 percent from historic conditions.
- Bull trout smolt production potential has decreased 47 percent form historic conditions.
- Pacific lamprey production potential has decreased by 74 percent from historic conditions.

Exhibit 5. Summary of River Vision Touchstones Key Findings

The prioritization process identified subwatersheds within the Subbasin that are 1) most departed from historic conditions, 2) have the highest potential impact on focal aquatic species, and 3) are the highest priority for targeted restoration and conservation efforts.

Upland function in the subwatersheds of the Subbasin was characterized by departure from historic conditions for roads, vegetation, soils, beaver restoration assessment tools (BRAT), wetlands, and springs (Exhibit 6).

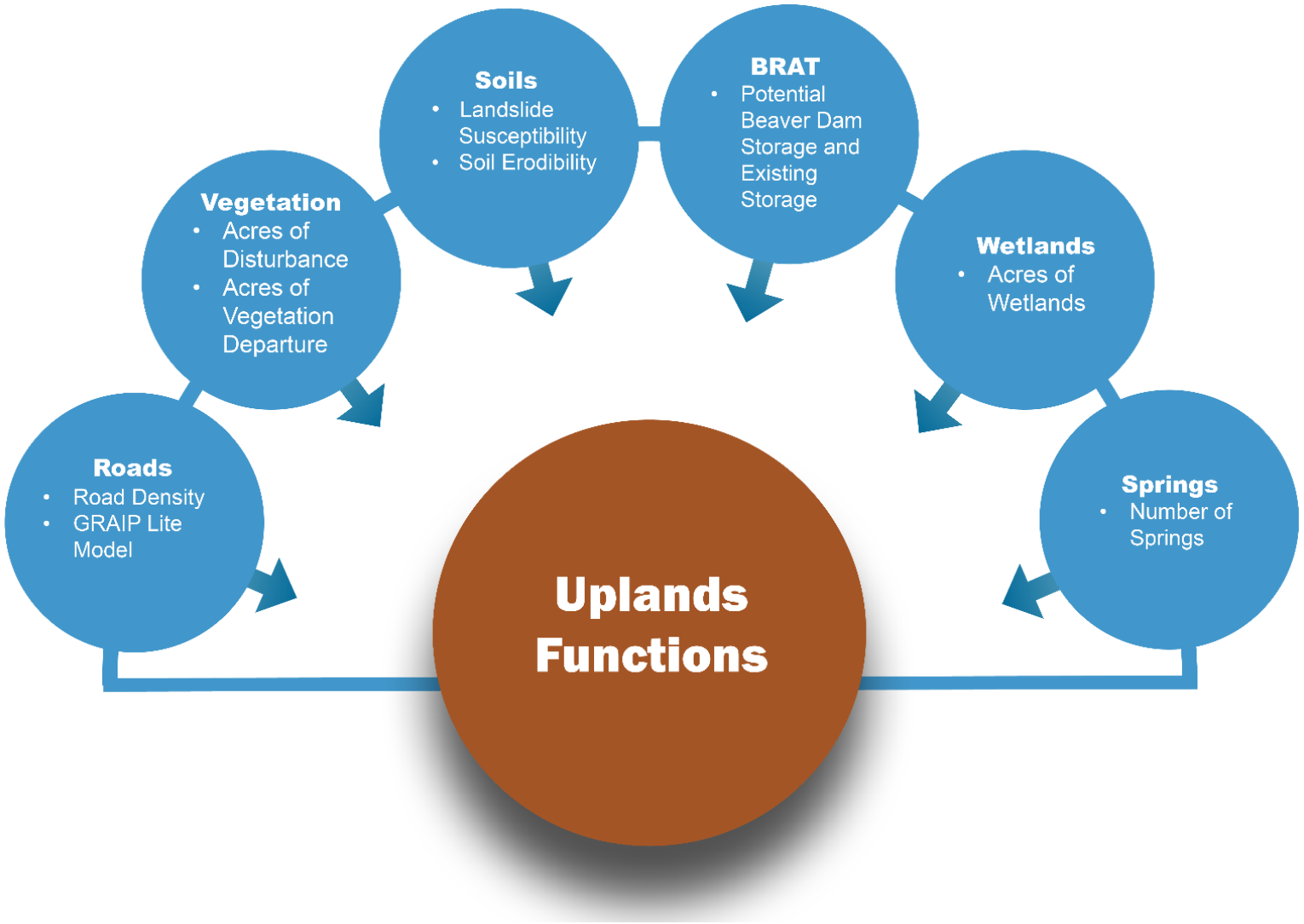

Exhibit 6. Prioritization Factors

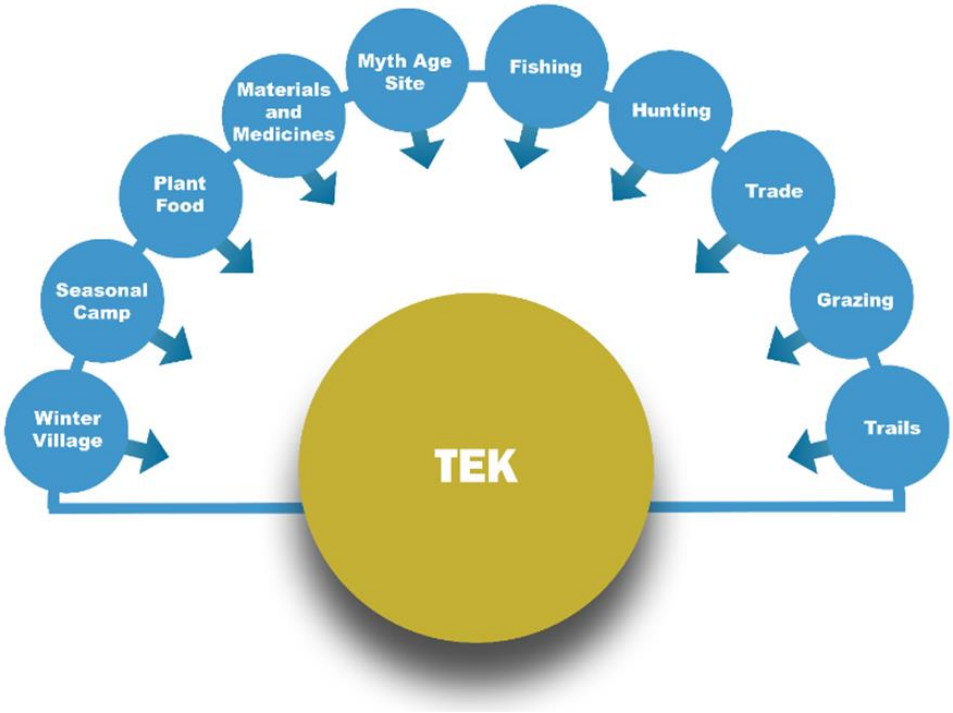

Exhibit 7. Traditional Ecological Knowledge Prioritization Factors

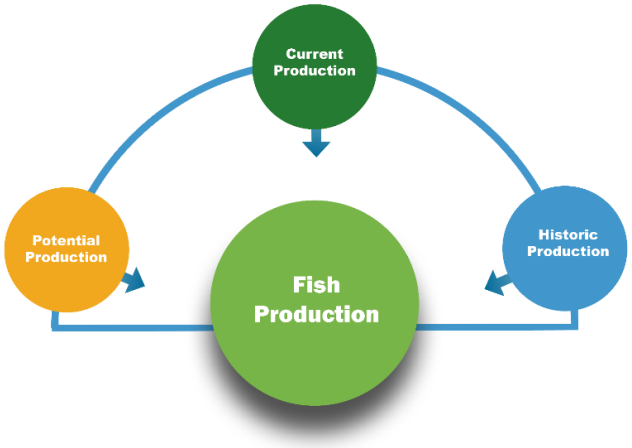

Exhibit 8. Fish Production Prioritization Factors

TEK was characterized for each subwatershed, identifying which subwatersheds were traditionally of greatest value to the CTUIR (Exhibity7). Historic, current, and potential smolt production in the tributaries in the subwatersheds was also used to identify those subwatersheds with the greatest potential impact on focal aquatic species (Exhibit 8). All these factors went into identifying the subwatersheds with the greatest potential for restoration and conservation in the Subbasin (Exhibit 9).

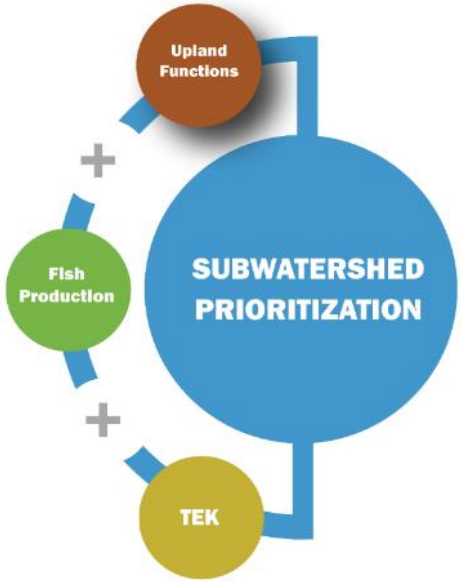

Exhibit 9. Subwatershed Prioritization Factors

The subwatersheds with the most departed conditions were identified as Tier I, subwatersheds moderately departed from historic conditions were identified as Tier II, and subwatersheds least departed from historic conditions were identified as Tier III (Exhibit 10; Exhibit 11).

The Cold Springs Canyon Watershed (gray area) is listed by the U.S. Geological Survey (USGS) as a part of the Subbasin. However, the watershed is only connected to the Umatilla River through an inter-basin transfer (Bailey et al. 2001). The watershed does not provide habitat and historically had no influence on the lower Umatilla River.

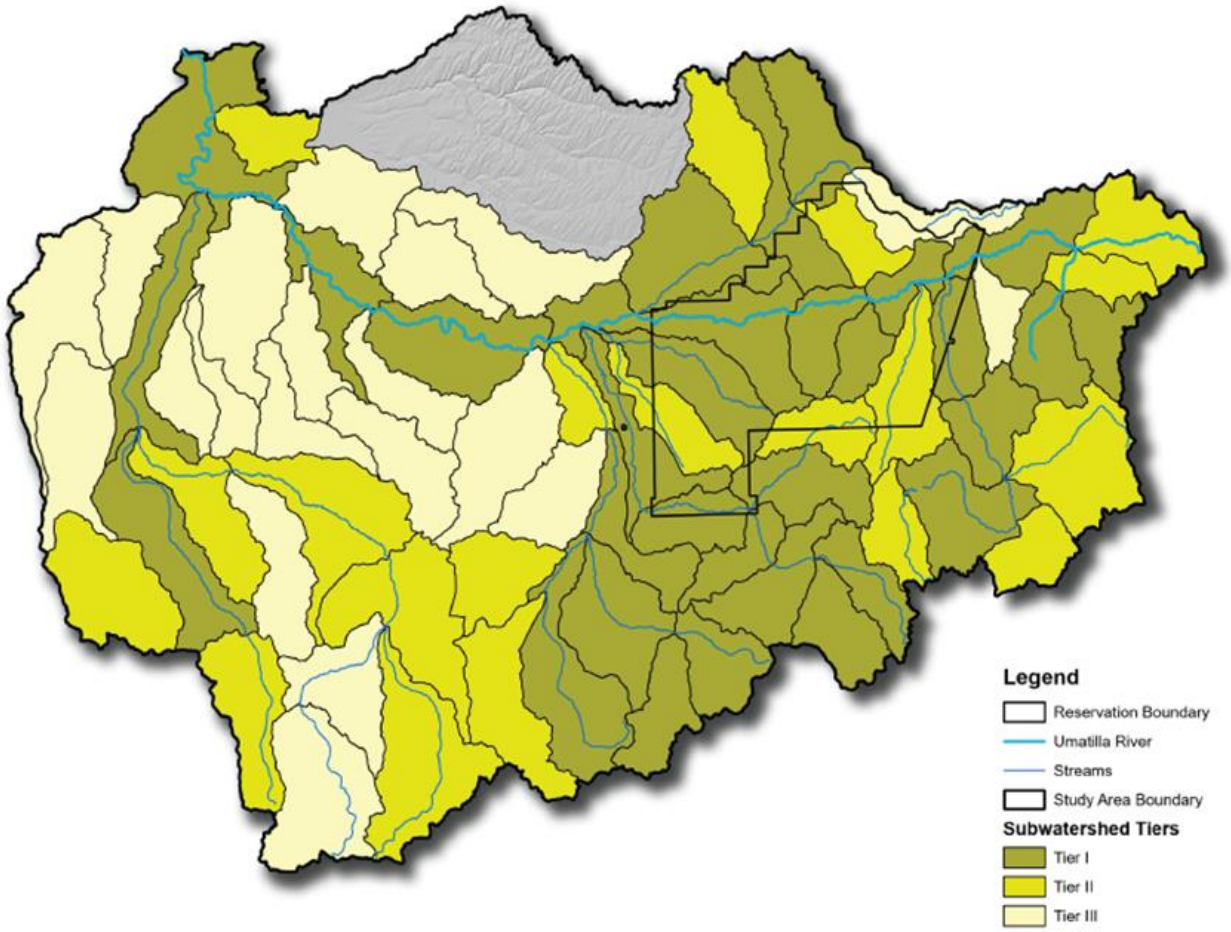

Exhibit 10. Umatilla Subbasin Subwatershed Prioritization

Exhibit 11. Umatilla Subbasin Subwatershed Prioritization Results

HUC10 Watershed	HUC12 Subwatershed	Tier
Headwaters Umatilla River	Thomas Creek	Tier I
	South Fork Umatilla River	Tier I
	Buck Creek-South Fork Umatilla River	Tier II
	North Fork Umatilla River	Tier II
	Ryan Creek	Tier III
	Bear Creek-Umatilla River	Tier I
Meacham Creek	Beaver Creek-Meacham Creek	Tier II
	East Meacham Creek	Tier II
	Butcher Creek-Meacham Creek	Tier I
	North Fork Meacham Creek	Tier II
	Camp Creek-Meacham Creek	Tier I
	Boston Canyon-Meacham Creek	Tier I
	Eagle Creek-Wildhorse Creek	Tier III
	Spring Hollow	Tier II
	Gerking Creek-Wildhorse Creek	Tier I
	Sand Hollow-Wildhorse Creek	Tier I
	Greasewood Creek	Tier II
	Spring Creek-Wildhorse Creek	Tier I
McKay Creek	Johnson Creek	Tier I
	Snipe Creek-McKay Creek	Tier I
	Wood Hollow-McKay Creek	Tier I
	Upper North Fork McKay Creek	Tier II
	Lower North Fork McKay Creek	Tier I
	Sevenmile Creek-McKay Creek	Tier I
	Little McKay Creek-McKay Creek	Tier I
	McKay Reservoir-McKay Creek	Tier I
Mission Creek-Umatilla River	Isqúulktpe Creek	Tier II
	Thorn Hollow-Umatilla River	Tier I
	Buckaroo Creek	Tier I
	Moonshine Creek-Umatilla River	Tier I
	Tutuilla Creek	Tier II
	Patawa Creek	Tier I
	Cottonwood Creek-Umatilla River	Tier I

HUC10 Watershed	HUC12 Subwatershed	Tier
Birch Creek	Pearson Creek	Tier I
	Upper East Birch Creek	Tier I
	Lower East Birch Creek	Tier I
	Bear Creek-West Birch Creek	Tier II
	Jack Canyon	Tier II
	West Birch Creek	Tier I
	George Canyon	Tier III
	Stewart Creek-Birch Creek	Tier I
	Coombs Peak-Birch Creek	Tier II
Alkali Canyon-Umatilla River	Coombs Canyon	Tier III
	Speare Creek	Tier III
	Mud Spring Canyon-Umatilla River	Tier I
	Upper Alkali Canyon	Tier III
	Lower Alkali Canyon	Tier III
	Furnish Ditch-Umatilla River	Tier I
Stage Gulch	Rew Ridge	Tier III
	Upper Stage Gulch	Tier III
	Lower Stage Gulch	Tier III
Upper Butter Creek	Johnson Creek-Butter Creek	Tier III
	East Fork Butter Creek	Tier II
	Spring Hollow-Butter Creek	Tier III
	Hog Hollow-Butter Creek	Tier II
	Matlock Canyon	Tier III
	Slusher Canyon-Butter Creek	Tier II
	Ayers Canyon-Butter Creek	Tier II
Lower Butter Creek	Upper Little Butter Creek	Tier II
	Middle Little Butter Creek	Tier I
	Lower Little Butter Creek	Tier I
Sand Hollow	Upper Sand Hollow	Tier II
	Middle Sand Hollow	Tier III
	Lower Sand Hollow	Tier III
	Fourmile Creek-Sand Hollow	Tier III
Hunt Ditch-Umatilla River	Upper Spikes Gulch	Tier III
	Service Canyon	Tier III
	170701031303	Tier III
	Lower Spikes Gulch	Tier III
	Hermiston Ditch-Umatilla River	Tier II
	Umatilla River	Tier I

Based on the prioritized subwatersheds, project actions were identified for each subwatershed in the Subbasin. Uplands restoration project action types were identified by selecting groups of restoration and habitat enhancement actions that would have the greatest impact on improving Uplands Vision function from the Bonneville Power Administration (BPA) Atlas Restoration Prioritization Framework (BPA 2017). The list of project activities (Exhibit 12) provides a wide selection of passive and active restoration approaches.

Project actions were identified for each subwatershed in the Subbasin from the list of 15 uplands treatment group and activities, arranged from passive to active (Exhibit 12). Each proposed action was identified with a specific purpose and expected uplands function benefits. Actions were identified to be the most effective and appropriate for each subwatershed. Some actions are designed to provide a restoration action for the uplands in the Subbasin such as land management, while others are designed to provide on-the-ground benefits, such as introducing beavers to subwatersheds to promote healthy ecosystems throughout the Subbasin.

The feasibility of each of the restoration activities was analyzed for each subwatershed. For example, implementing a land management plan for a subwatershed is generally feasible. For activities that were identified as highly feasible, the potential benefit to Uplands Vision function was increased. The feasibility factor also allows the user to evaluate feasibility of activities based on known factors in the subwatershed. For example, a subwatershed where the CTUIR has focused on acquisitions of lands has a higher feasibility of the restoration activities being implemented, and therefore, has a greater benefit for Uplands Vision function.

The selected actions were incorporated in the opportunities tool (Exhibit 13) that identifies potential benefit in the subwatershed based on the Uplands Vision Touchstones function factors (i.e., Hydrologic Function, Soil Stability, Landscape Pattern, and Biotic Integrity). In addition to evaluating actions based on uplands function benefits, a feasibility factor was also identified for each action. The feasibility factor is the potential benefit of implementation of each action and is weighted based on costs, intensity, and feasibility of implementation in each specific subwatershed.

Uplands Treatment Group and Activities		Uplands Functions Benefits					
Land and Water Preservation		Roads	Vegetation	Soils	BRAT	Wetlands	Springs
1	Protection: Acquisitions, Easements, Cooperative Agreements	–	++	+	+	+	++
2	Land Management: Grazing Plans, Fire Management, Etc.	–	++	+	+	+	++
Water Quality Improvements		Roads	Vegetation	Soils	BRAT	Wetlands	Springs
3	Reduce – Mitigate Point or Non-Point Source Impacts	–	–	++	–	–	+
4	Nutrients Additions (Carcasses)	–	+	++	–	–	–
5	Upland Vegetation Treatment – Management	–	+++	+	+	–	–
Sediment Reduction		Roads	Vegetation	Soils	BRAT	Wetlands	Springs
6	Road Grading – Drainage Improvements	++	–	+	–	–	–
7	Road Decommissioning or Abandonment	+++	–	++	–	–	–
Water Quantity		Roads	Vegetation	Soils	BRAT	Wetlands	Springs
8	Water Management – Improve Irrigation Efficiency	–	–	–	–	++	+++
9	Acquire or Increase Instream Flow (Lease or Purchase; Groundwater Storage)	–	–	–	–	++	+++
Riparian Restoration and Management		Roads	Vegetation	Soils	BRAT	Wetlands	Springs
10	Remove Non-Native Plants	–	+++	+	–	+	–
11	Off-Site Water Development	–	++	–	–	++	+++
12	Riparian Buffer Strip, Planting	–	++	+	+	+	–
13	Selective Thinning	–	++	–	–	–	–
14	Beaver Re-Introduction or Management	–	++	–	+++	+++	+
15	Riparian Fencing	–	+++	++	++	++	+

+++ High Benefit
++ Moderate Benefit
+ Low Benefit
– Little or No Benefit

Exhibit 12. Subwatershed Uplands Restoration Activities

Treatment Group & Activities		Uplands Functions						Activities Factors		
		ROADS	VEGETATION	SOILS	BRAT	WETLANDS	SPRINGS	COSTS	INTENSITY	FEASIBILITY
Land and Water Preservation:										
1	Protection: (Acquisitions, Easements, Coop. Agreements)	No Impact	Moderate Impact	Low Impact	Low Impact	Low Impact	Moderate Impact	Moderate	Extremely Low	High
2	Land Management: (Grazing Plans, Fire management, etc.)	No Impact	Moderate Impact	Low Impact	Low Impact	Low Impact	Moderate Impact	Low	Low	High
Water Quality Improvements:										
3	Reduce - Mitigate Point or Non-Point Source Impacts	No Impact	No Impact	Moderate Impact	No Impact	No Impact	Low Impact	Low	Low	High
4	Nutrients Additions (carcasses)	No Impact	Low Impact	Moderate Impact	No Impact	No Impact	No Impact	Moderate	Low	Extremely High
5	Upland Vegetation Treatment - Management	No Impact	High Impact	Low Impact	Low Impact	No Impact	No Impact	Moderate	Low	High
Sediment Reduction:										
6	Road Grading - Drainage Improvements	Moderate Impact	No Impact	Low Impact	No Impact	No Impact	No Impact	High	Moderate	High
7	Road Decommissioning or Abandonment	High Impact	No Impact	Moderate Impact	No Impact	No Impact	No Impact	Moderate	Low	Moderate
Water Quantity:										
8	Water Management-Improve Irrigation Efficiency	No Impact	No Impact	No Impact	No Impact	Moderate Impact	High Impact	Moderate	Moderate	High
9	Acquire or Increase Instream Flow (Lease/Purchase; GW Storage)	No Impact	No Impact	No Impact	No Impact	Moderate Impact	High Impact	Moderate	Low	Low
Riparian Restoration and Management:										
10	Remove Non-native Plants	No Impact	High Impact	Low Impact	No Impact	Low Impact	No Impact	Low	High	Moderate
11	Off--Site Water Developments	No Impact	Moderate Impact	No Impact	No Impact	Moderate Impact	High Impact	Low	Low	Low
12	Riparian Buffer Strip, Planting	No Impact	Moderate Impact	Low Impact	Low Impact	Low Impact	No Impact	Moderate	High	High
13	Selective Thinning	No Impact	Moderate Impact	No Impact	No Impact	No Impact	No Impact	Low	Moderate	High
14	Beaver Re-introduction or Management	No Impact	Moderate Impact	No Impact	High Impact	High Impact	Low Impact	Moderate	Moderate	Low
15	Riparian Fencing	No Impact	High Impact	Moderate Impact	Moderate Impact	Moderate Impact	Low Impact	Moderate	Moderate	High

1 Potential benefit to uplands function chosen by CTUIR for each uplands restoration action.

2 Feasibility for each uplands restoration action chosen by CTUIR.

POTENTIAL SUBWATERSHED ACTIONS			ACTIVITY SCORES BY UPLANDS FUNCTION					
ACTIVITY NO.	ACTIVITY	ACTIVITY FEASIBILITY	ROADS	VEGETATION	SOILS	BRAT	WETLANDS	SPRINGS
1	Protection: (Acquisitions, Easements, Coop. Agreements)	Moderate	0.0	0.1	0.1	0.1	0.0	0.1
2	Land Management: (Grazing Plans, Fire management, etc.)	Moderate	0.0	0.1	0.1	0.1	0.0	0.1
4	Nutrients Additions (carcasses)	High	0.0	0.1	0.3	0.0	0.0	0.0
7	Road Decommissioning or Abandonment	Low	1.8	0.0	0.3	0.0	0.0	0.0
	ACTIONS SCORE		1.8	0.4	0.8	0.1	0.1	0.2
	EXISTING SCORE		3.5	2.1	3.9	1.0	1.0	1.0
	POTENTIAL SCORE		1.8	1.8	3.1	0.9	0.9	0.8

EXISTING CUMULATIVE SCORE	22.5
EXISTING TIER	Tier I
POTENTIAL IMPACT	3.2
POTENTIAL SCORE	19.3
COST FACTOR	0.5
INTENSITY FACTOR	0.3
FEASIBILITY FACTOR	1.0
FEASIBLE SCORE	19.0
POTENTIAL TIER	Tier II

3 Subwatershed uplands restoration actions chosen by CTUIR. Feasibility chosen by CTUIR for each action within a particular subwatershed.

4 Cumulative benefits of uplands restoration actions on the subwatershed are calculated.

Exhibit 13. Subwatershed Opportunities Tool Components

The opportunities tool compares the uplands function benefits and feasibility of certain actions in a subwatershed to the current function in the subwatershed to inform practitioners of the potential benefits of implementing actions in the subwatershed (Exhibit 14). The action types identified for each subwatershed have also been compiled in a geodatabase and map book.

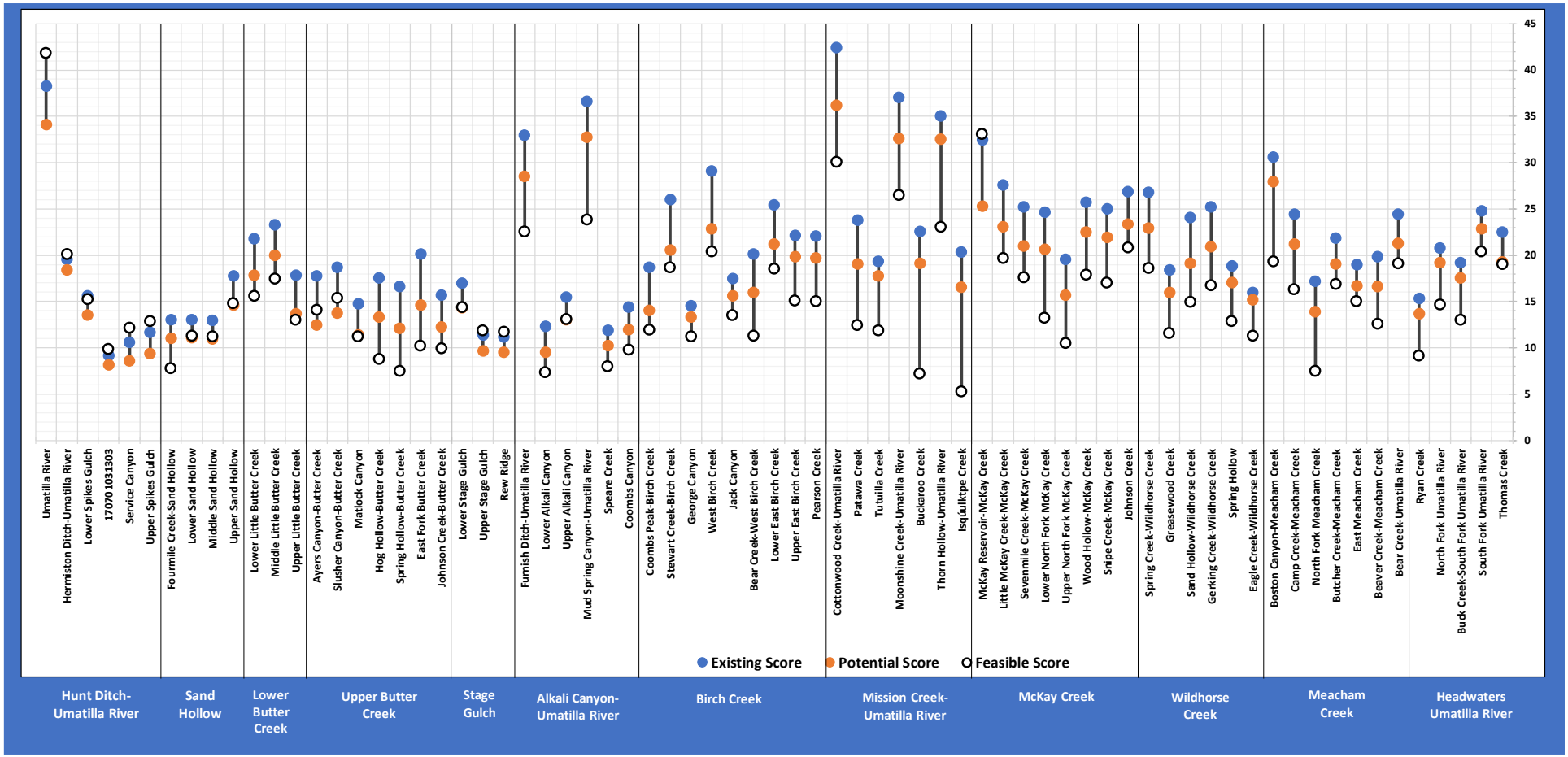

Exhibit 14. Umatilla Subbasin Subwatersheds Restoration Opportunities Comparison

Umatilla River Reach Prioritization

The prioritization process identified reaches on the Umatilla River that are 1) most departed from historic conditions, 2) have the highest potential impact on focal aquatic species, and 3) are the highest priority for targeted restoration and conservation efforts. River Vision function in the reaches of the Umatilla River was characterized by departure from historic conditions for each of the Touchstones: Hydrology, Geomorphology, Connectivity, Riparian Vegetation, and Aquatic Biota (Exhibit 15).

Historic, current, and potential smolt production in the reaches of the Umatilla River was also used to identify which reaches have the greatest potential impact on focal aquatic species (refer back to Exhibit 8). TEK (refer back to Exhibit 7) was also characterized for each reach of the Umatilla River, identifying which reaches were traditionally of greatest value to the CTUIR. All of these factors went into identifying the reaches of the Umatilla River with the greatest potential for restoration and conservation (Exhibit 16).

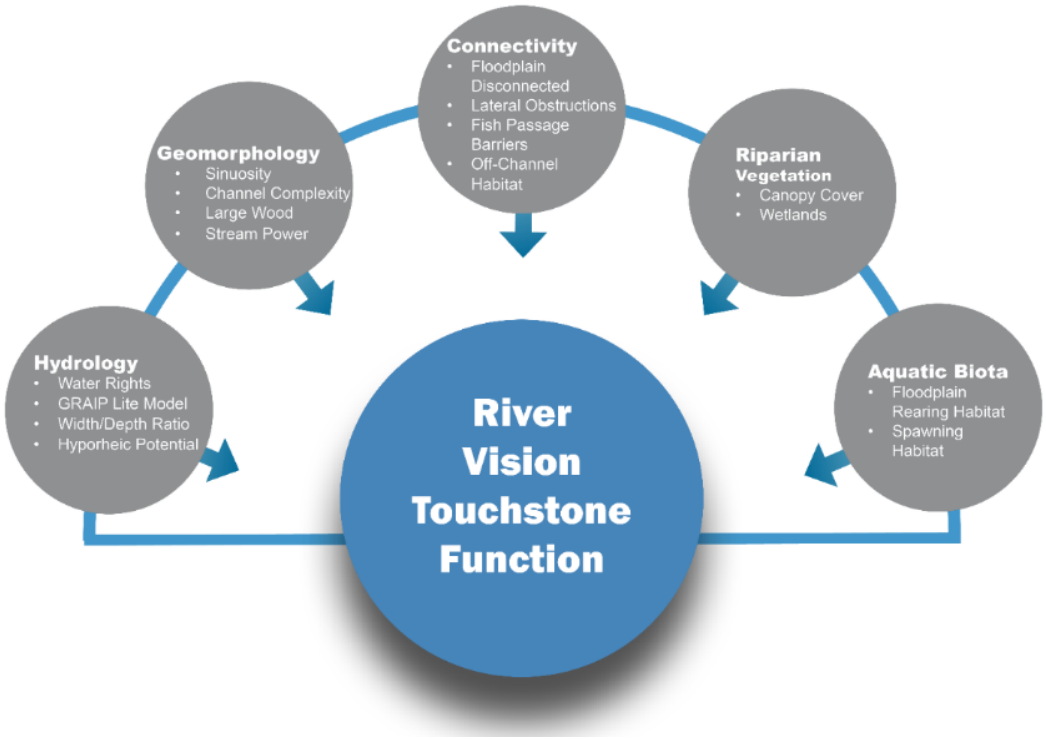

Exhibit 15. River Vision Function Prioritization Factors

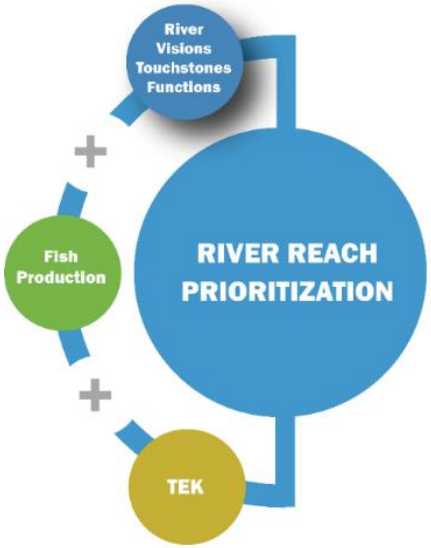

Exhibit 16. Umatilla River Reach Prioritization Factors

The highest priority reaches are those most departed from historic conditions and have been identified as Tier I, reaches moderately departed from historic conditions have been identified as Tier II, and reaches least departed from historic conditions have been identified as Tier III (Exhibit 17; Exhibit 18). The North Fork and South Fork Umatilla River have been prioritized as "Conservation" or "Restoration" rather than Tiers because of the lack of data available for analyses in these reaches.

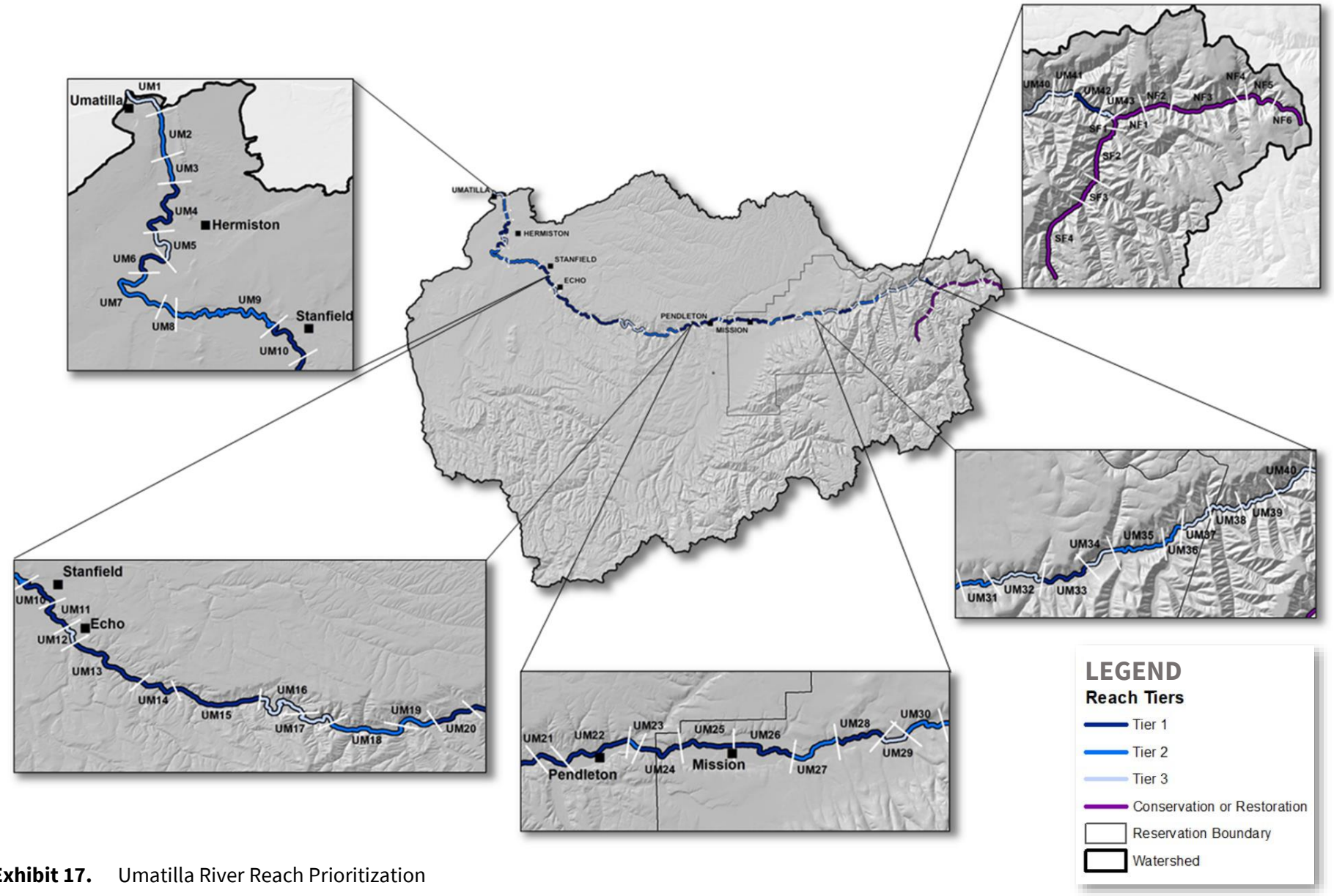

Exhibit 17. Umatilla River Reach Prioritization

Exhibit 18. Umatilla River Reach Prioritization Results

River	Start RM	End RM	Reach	Tier
Umatilla River	0.0	1.8	UM1	Tier III
	1.8	3.6	UM2	Tier II
	3.6	4.8	UM3	Tier II
	4.8	8.3	UM4	Tier I
	8.3	10.0	UM5	Tier III
	10.0	11.6	UM6	Tier I
	11.6	15.1	UM7	Tier II
	15.1	15.9	UM8	Tier II
	15.9	21.7	UM9	Tier II
	21.7	23.9	UM10	Tier I
	23.9	26.1	UM11	Tier I
	26.1	27.2	UM12	Tier III
	27.2	31.5	UM13	Tier I
	31.5	33.5	UM14	Tier I
	33.5	37.7	UM15	Tier I
	37.7	41.6	UM16	Tier III
	41.6	43.7	UM17	Tier III
	43.7	47.5	UM18	Tier II
	47.5	49.4	UM19	Tier II
	49.4	51.3	UM20	Tier I
	51.3	52.6	UM21	Tier I
	52.6	55.5	UM22	Tier I
	55.5	55.9	UM23	Tier II
	55.9	57.9	UM24	Tier I
	57.9	60.1	UM25	Tier I
	60.1	62.8	UM26	Tier I
	62.8	64.9	UM27	Tier II
	64.9	67.1	UM28	Tier I
	67.1	68.2	UM29	Tier III
	68.2	69.9	UM30	Tier II
	69.9	71.3	UM31	Tier II
	71.3	73.6	UM32	Tier III
	73.6	75.9	UM33	Tier I
	75.9	77.1	UM34	Tier III
	77.1	79.3	UM35	Tier II
	79.3	79.4	UM36	Tier II
	79.4	80.5	UM37	Tier III
	80.5	82.0	UM38	Tier III
Umatilla River	82.0	83.5	UM39	Tier III
	83.5	85.2	UM40	Tier III
	85.2	87.0	UM41	Tier III
	87.0	87.9	UM42	Tier I
	87.9	89.5	UM43	Tier III
North Fork Umatilla River	0.0	1.5	NF1	Restoration
	1.5	2.8	NF2	Conservation
	2.8	6.0	NF3	Restoration
	6.0	6.4	NF4	Conservation
	6.4	7.8	NF5	Restoration
	7.8	---	NF6	Conservation
South Fork Umatilla River	0.0	0.6	SF1	Restoration
	0.6	3.3	SF2	Conservation
	3.3	4.6	SF3	Restoration
	4.6	---	SF4	Conservation

RM = River Mile; UM = Mainstem Umatilla River; SF = South Fork Umatilla River; NF = North Fork Umatilla River
--- = Upstream extent of river

Umatilla River Reach Opportunities

Based on the prioritization of reaches, project actions were identified for each reach of the Umatilla River. Restoration project action types were identified by selecting groups of restoration and habitat enhancement actions that would have the greatest impact on improving River Vision function the BPA Atlas Restoration Prioritization Framework (BPA 2017). The list of project activities (Exhibit 19) provides a wide selection of passive and active restoration approaches.

Project actions were identified for each reach in the Umatilla River from the list of 40 restoration treatment group and activities, arranged from passive to active (Exhibit 19). Each proposed action was identified with a specific purpose and expected river function benefits. Actions were identified to be the most effective and appropriate for each reach. Some actions were designed to encourage aggradation and reconnection of the floodplain while others are designed to increase channel complexity, provide cover, and catch mobile debris or provide infrastructure protection where needed. The action types identified for each reach were also compiled in a geodatabase and a reach-by-reach map book.

The feasibility of each of the restoration activities was analyzed for each reach. For example, large wood placement for restoration projects is generally feasible. For activities that are identified as highly feasible, the potential benefit to River Vision function was increased. The feasibility factor also allows the user to contemplate feasibility of activities based on known factors in the reach of the Umatilla River. For example, a particular reach where the CTUIR has acquired lands has a higher possibility of the restoration activities being more feasible, and therefore, has a greater benefit for River Vision function.

Exhibit 19. River Reach Restoration Activities

Floodplain Treatment Group and Activities	River Vision Function Benefits				
Land and Water Preservation	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
1 Protection: Acquisitions, Easements, Cooperative Agreements	++	++	++	++	++
2 Land Management: Grazing Plans, Fire Management, etc.	++	++	++	++	++
Water Quality Improvements	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
3 Reduce – Mitigate Point or Non-Point Source Impacts	++	+	+	+	++
4 Nutrients Additions (Carcasses)	+	+	+	++	++
5 Upland Vegetation Treatment – Management	++	+	+	++	++
Sediment Reduction	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
6 Road Grading – Drainage Improvements	++	+	+	+	++
7 Road Decommissioning or Abandonment	+++	+++	++	++	++
Water Quantity	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
8 Water Management – Improve Irrigation Efficiency	++	+	+	+	+
9 Acquire or Increase Instream Flow (Lease or Purchase; GW Storage)	+++	+	+	+	+
Riparian Restoration and Management	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
10 Remove Non-Native Plants	++	++	+	+++	++
11 Off-Site Water Development	++	++	+	++	++
12 Riparian Buffer Strip, Planting	++	++	++	+++++	++
13 Selective Thinning	++	++	+	+++	++
14 Beaver Re-introduction or Management	+++	+++	++	++	+++
15 Riparian Fencing	+	++	+	+++	++
Bank Restoration or Modification	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
16 Bank Shaping and Stabilization	+	+++	+++	++	++
17 Removal of Bank Armoring	+	+++	+++	+++	++
18 Restore Banklines with LWD - Bioengineering	+	+++	++	+++++	+++
Instream Structures and Habitat Complexity	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
19 Boulder Placements	+	++	+	+	++
20 LWD Placements – Individual Whole Trees, Logjams, etc.	+	+++++	++	++	+++++
21 Weirs for Grade Control	+	++	+	+	++
Floodplain Reconnection:	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
22 Levee Modifications: Removal, Setback, Breach	++	+++	+++++	++	++
23 Remove and/or Relocate Floodplain Infrastructure	+	++	+++	++	+
24 Restoration of Floodplain Topography and Vegetation	++	+++	+++++	+++	++
25 Floodplain Excavation: Benching	++	++	++	++	++
Side Channel/ Off-Channel Habitat Restoration	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
26 Improve Thermal Refugia: Reconnect cold springs, winter temps	+++++	++	++	++	+++
27 Perennial Side Channel	+++	++	+++	++	+++
28 Secondary Channel (non-perennial)	++	++	++	++	++
29 Floodplain Pond	+++	++	+++	++	++
30 Wetland	+++	++	++	+++	++
31 Alcove	++	++	++	++	+++
32 Hyporheic Off-Channel Habitat (Groundwater)	++	++	++	++	+++
Stream Channel Modifications	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
33 Spawning Gravel Augmentation	++	+++	+	+	+++++
34 Pool Construction	++	++	+	++	+++
35 Riffle Construction	++	+++	+	+	+++
36 Meander (Oxbow) Re-connect - Reconstruction	++	+++	++	++	+++
37 Channel Reconstruction	++	+++++	++	++	+++
Fish Passage Restoration	Hydrology	Geomorphology	Connectivity	Riparian vegetation	Aquatic Biota
38 Structural Passage (Diversions, Screening)	++	+++	+++	++	++
39 Barrier or Culvert Replacement or Removal	++	+++	+++	++	+++
40 Dam Removal or Breaching	+++	+++++	+++	++	+++++

Project action types were identified by selecting groups of restoration and habitat enhancement actions that would have the greatest impact on improving River Vision function. Project actions will promote the development of natural channel processes including channel complexity, floodplain connectivity, and improvements to riparian health. Restoring these processes will aid in the formation of habitat features for aquatic species and will enhance geomorphic process. The list of project activities provides a wide selection of passive and active restoration approaches. However, the list is not all-inclusive as other potential approaches might be identified.

+++++ Highest Impact ++ Low Impact
+++ High Impact + Lowest Impact
++ Moderate Impact

The selected actions were incorporated into the opportunities tool (Exhibit 20) that identifies potential benefit in the reach based on the River Vision Touchstones function factors (i.e., Hydrology, Geomorphology, Connectivity, Riparian Vegetation, and Aquatic Biota). In addition to evaluating actions based on river function benefits, a feasibility factor was also identified for each action. The feasibility factor is the potential benefit of implementation of each action is weighted based on costs, intensity, and feasibility of implementation in each specific reach.

Treatment Group & Actions	Touchstones				
	Hydrology	Geomorphology	Connectivity	Riparian Vegetation	Aquatic Biota
Land and Water Preservation:					
1 Protection: (Acquisitions, Easements, Coop. Agreements)	Moderate Impact	Moderate Impact	Low Impact	Low Impact	Low Impact
2 Land Management: (Grazing Plans, Fire management, etc.)	Moderate Impact	Moderate Impact	Low Impact	Moderate Impact	Low Impact
Water Quality Improvements:					
3 Reduce - Mitigate Point or Non-Point Source Impacts	Low Impact	Lowest Impact	Lowest Impact	Lowest Impact	Low Impact
4 Nutrients Additions (carcasses)	Lowest Impact	Lowest Impact	Lowest Impact	Moderate Impact	Low Impact
5 Upland Vegetation Treatment - Management	Moderate Impact	Lowest Impact	Lowest Impact	Moderate Impact	Low Impact
Sediment Reduction:					
6 Road Grading - Drainage Improvements	Moderate Impact	Lowest Impact	Lowest Impact	Lowest Impact	Low Impact
7 Road Decommissioning or Abandonment	High Impact	High Impact	Moderate Impact	Low Impact	Low Impact
Water Quantity:					
8 Water Management-Improve Irrigation Efficiency	Moderate Impact	Lowest Impact	Lowest Impact	Lowest Impact	Lowest Impact
9 Acquire or Increase Instream Flow (Lease/Purchase; GW Storage)	High Impact	Lowest Impact	Lowest Impact	Lowest Impact	Lowest Impact
Riparian Restoration and Management:					
10 Remove Non-native Plants	Low Impact	Low Impact	Lowest Impact	High Impact	Low Impact
11 Off--Site Water Developments	Moderate Impact	Low Impact	Lowest Impact	Moderate Impact	Low Impact
12 Riparian Buffer Strip, Planting	Low Impact	Moderate Impact	Low Impact	Highest Impact	Moderate Impact
13 Selective Thinning	Low Impact	Low Impact	Lowest Impact	High Impact	Low Impact
14 Beaver Re-introduction or Management	High Impact	High Impact	Low Impact	Moderate Impact	High Impact
15 Riparian Fencing	Lowest Impact	Moderate Impact	Lowest Impact	High Impact	Low Impact
Bank Restoration or Modification					
16 Bank Shaping and Stabilization	Lowest Impact	High Impact	High Impact	Moderate Impact	Low Impact
17 Removal of Bank Armoring	Lowest Impact	High Impact	High Impact	High Impact	Moderate Impact
18 Restore Banklines with LWD – Bioengineering	Lowest Impact	High Impact	Moderate Impact	Highest Impact	High Impact
Instream Structures and Habitat Complexity:					
19 Boulder Placements	Lowest Impact	Moderate Impact	Lowest Impact	Lowest Impact	Moderate Impact
20 LWD Placements - Individual Whole Trees, Logjams, etc.	Lowest Impact	Highest Impact	Low Impact	Low Impact	Highest Impact
21 Weirs for Grade Control	Lowest Impact	Low Impact	Lowest Impact	Lowest Impact	Low Impact
Floodplain Reconnection:					
22 Levee Modifications: Removal, Setback, Breach	Low Impact	High Impact	Highest Impact	Low Impact	Moderate Impact
23 Remove and/or Relocate Floodplain Infrastructure	Lowest Impact	Moderate Impact	High Impact	Low Impact	Lowest Impact
24 Restoration of Floodplain Topography and Vegetation	Low Impact	High Impact	Highest Impact	High Impact	Moderate Impact
25 Floodplain Excavation: Benching	Low Impact	Moderate Impact	Moderate Impact	Moderate Impact	Low Impact
Side Channel / Off-Channel Habitat Restoration:					
26 Improve Thermal Refugia (reconnect cold springs, winter temps)	Highest Impact	Low Impact	Moderate Impact	Low Impact	High Impact
27 Perennial Side Channel	High Impact	Moderate Impact	High Impact	Moderate Impact	High Impact
28 Secondary Channel (non-perennial)	Moderate Impact	Moderate Impact	Moderate Impact	Low Impact	Moderate Impact
29 Floodplain Pond	High Impact	Low Impact	High Impact	Moderate Impact	Low Impact
30 Wetland	High Impact	Moderate Impact	Moderate Impact	High Impact	Moderate Impact
31 Alcove	Low Impact	Low Impact	Low Impact	Moderate Impact	High Impact
32 Hyporheic Off-Channel Habitat (Groundwater)	Moderate Impact	Low Impact	Low Impact	Low Impact	High Impact
Stream Channel Modifications:					
33 Spawning Gravel Augmentation	Low Impact	High Impact	Lowest Impact	Lowest Impact	Highest Impact
34 Pool Construction	Low Impact	Moderate Impact	Lowest Impact	Low Impact	High Impact
35 Riffle Construction	Low Impact	High Impact	Lowest Impact	Lowest Impact	High Impact
36 Meander (Oxbow) Re-connect - Reconstruction	Low Impact	High Impact	Moderate Impact	Moderate Impact	High Impact
37 Channel Reconstruction	Low Impact	Highest Impact	Low Impact	Moderate Impact	High Impact
Fish Passage Restoration:					
38 Structural Passage (Diversions, Screening)	Moderate Impact	High Impact	High Impact	Low Impact	Moderate Impact
39 Barrier or Culvert Replacement or Removal	Low Impact	High Impact	High Impact	Low Impact	High Impact
40 Dam Removal or Breaching	High Impact	Highest Impact	High Impact	Moderate Impact	Highest Impact

1 Potential benefit to River Vision Touchstone function chosen by CTUIR for each river restoration action.

Exhibit 20. Reach Opportunities Tool Components

	Treatment Group & Actions	Costs	Intensity	Feasibility
	Land and Water Preservation:			
1	Protection: (Acquisitions, Easements, Coop. Agreements)	Moderate	Extremely Low	High
2	Land Management: (Grazing Plans, Fire management, etc.)	Low	Low	High
	Water Quality Improvements:			
3	Reduce - Mitigate Point or Non-Point Source Impacts	Low	Low	High
4	Nutrients Additions (carcasses)	Moderate	Low	Extremely High
5	Upland Vegetation Treatment - Management	Moderate	Low	High
	Sediment Reduction:			
6	Road Grading - Drainage Improvements	High	Moderate	High
7	Road Decommissioning or Abandonment	Moderate	Low	Moderate
	Water Quantity:			
8	Water Management-Improve Irrigation Efficiency	Moderate	Moderate	High
9	Acquire or Increase Instream Flow (Lease/Purchase; GW Storage)	Moderate	Low	Low
	Riparian Restoration and Management:			
10	Remove Non-native Plants	Low	High	Moderate
11	Off--Site Water Developments	Low	Low	Low
12	Riparian Buffer Strip, Planting	Moderate	High	High
13	Selective Thinning	Low	Moderate	High
14	Beaver Re-introduction or Management	Moderate	Moderate	Low
15	Riparian Fencing	Moderate	Moderate	High
	Bank Restoration or Modification			
16	Bank Shaping and Stabilization	Moderate	Moderate	High
17	Removal of Bank Armoring	Moderate	Moderate	High
18	Restore Banklines with LWD – Bioengineering	Moderate	Moderate	High
	Instream Structures and Habitat Complexity:			
19	Boulder Placements	Low	Moderate	High
20	LWD Placements - Individual Whole Trees, Logjams, etc.	Moderate	Moderate	High
21	Weirs for Grade Control	Low	Moderate	Moderate
	Floodplain Reconnection:			
22	Levee Modifications: Removal, Setback, Breach	High	High	Extremely Low
23	Remove and/or Relocate Floodplain Infrastructure	High	High	Extremely Low
24	Restoration of Floodplain Topography and Vegetation	Moderate	High	Moderate
25	Floodplain Excavation: Benching	Moderate	Moderate	High
	Side Channel / Off-Channel Habitat Restoration:			
26	Improve Thermal Refugia (reconnect cold springs, winter temps)	Moderate	Moderate	Moderate
27	Perennial Side Channel	Moderate	Moderate	Moderate
28	Secondary Channel (non-perennial)	Moderate	Moderate	Moderate
29	Floodplain Pond	Moderate	Moderate	Moderate
30	Wetland	Moderate	Moderate	Moderate
31	Alcove	Moderate	Moderate	High
32	Hyporheic Off-Channel Habitat (Groundwater)	Moderate	Moderate	High
	Stream Channel Modifications:			
33	Spawning Gravel Augmentation	Moderate	High	Moderate
34	Pool Construction	Moderate	High	Moderate
35	Riffle Construction	Moderate	High	Moderate
36	Meander (Oxbow) Re-connect - Reconstruction	Moderate	High	Low
37	Channel Reconstruction	High	High	Low
	Fish Passage Restoration:			
38	Structural Passage (Diversions, Screening)	High	High	Moderate
39	Barrier or Culvert Replacement or Removal	High	High	Moderate
40	Dam Removal or Breaching	Extremely High	Extremely High	Extremely Low

2 Feasibility for each river restoration action chosen by CTUIR.

POTENTIAL REACH ACTIONS		
ACTIVITY NO.	ACTIVITY	ACTIVITY FEASIBILITY
	Protection: (Acquisitions, Easements, Coop. Agreements)	Low
2	Land Management: (Grazing Plans, Fire management, etc.)	Moderate
37	Channel Reconstruction	Extremely Low
16	Bank Shaping and Stabilization	Low
17	Removal of Bank Armoring	Extremely Low
18	Restore Banklines with LWD - Bioengineering	Low
9	Acquire or Increase Instream Flow (Lease/Purchase; GW Storage)	Extremely High

TOTAL ACTIONS	ACTIONS SCORE
7	EXISTING SCORE
	POTENTIAL SCORE

3 River reach restoration actions chosen by CTUIR. Feasibility chosen by CTUIR for each action within a particular reach of the Umatilla River.

ACTIVITY SCORES BY TOUCHSTONE				
HYDROLOGY	GEOMORPHOLOGY	CONNECTIVITY	RIPARIAN VEGETATION	AQUATIC BIOTA
0.7	0.8	0.3	0.4	0.4
0.7	0.8	0.3	0.6	0.4
0.4	1.6	0.3	0.6	1.1
0.1	1.2	0.7	0.6	0.4
0.1	1.2	0.7	0.9	0.7
0.1	1.2	0.4	1.2	1.1
1.1	0.2	0.1	0.1	0.1
3.3	6.9	2.6	4.5	4.5
8.0	9.0	5.0	7.0	8.5
4.7	2.1	2.4	2.5	4.1

EXISTING SCORE	50.5
EXISTING TIER	Tier III
POTENTIAL IMPACT	21.7
POTENTIAL SCORE	28.8
COST FACTOR	3.6
INTENSITY FACTOR	3.0
FEASIBILITY FACTOR	-11.7
FEASIBLE SCORE	47.0
POTENTIAL TIER	Tier III

4 Cumulative benefits of river restoration actions on the reach calculated and benefits to River Vision Touchstones calculated.

Exhibit 20. Reach Opportunities Tool Components (Cont.)

The opportunities tool compares the river function benefits and feasibility of certain actions in a reach to the current function in the reach to inform practitioners of the potential benefits of implementing actions in the reach (Exhibit 21; Exhibit 22).

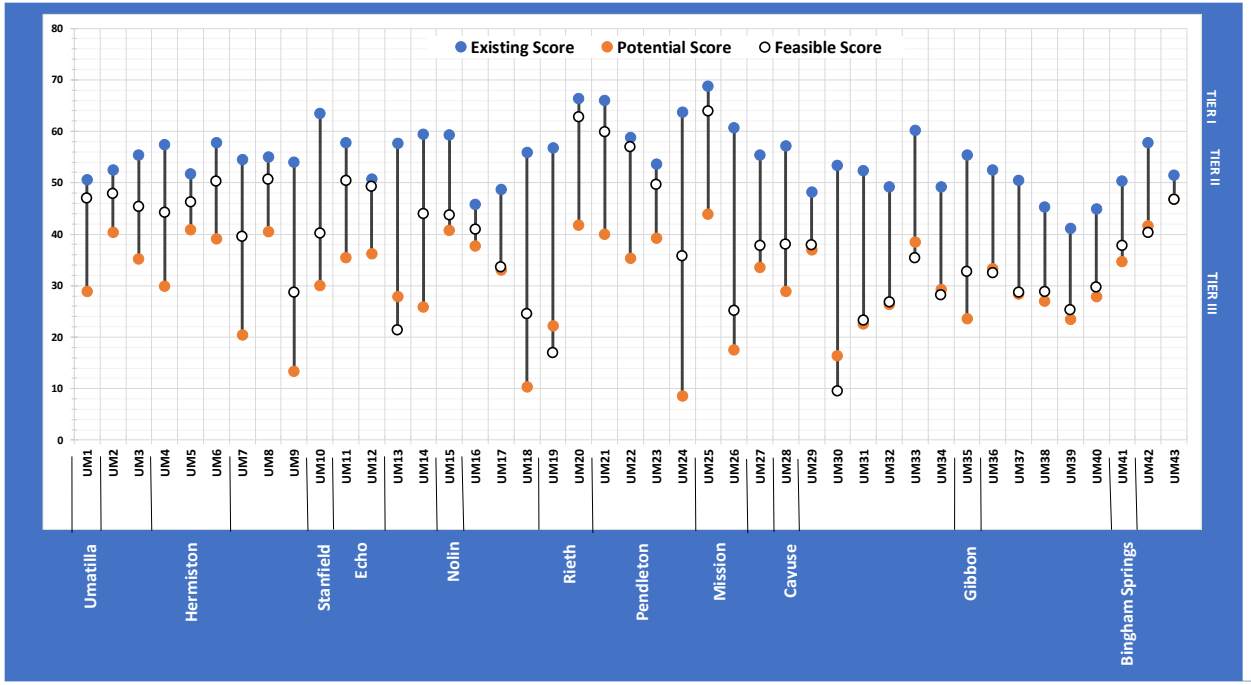

Exhibit 21. Mainstem Umatilla River Reach Restoration Opportunities Comparisons

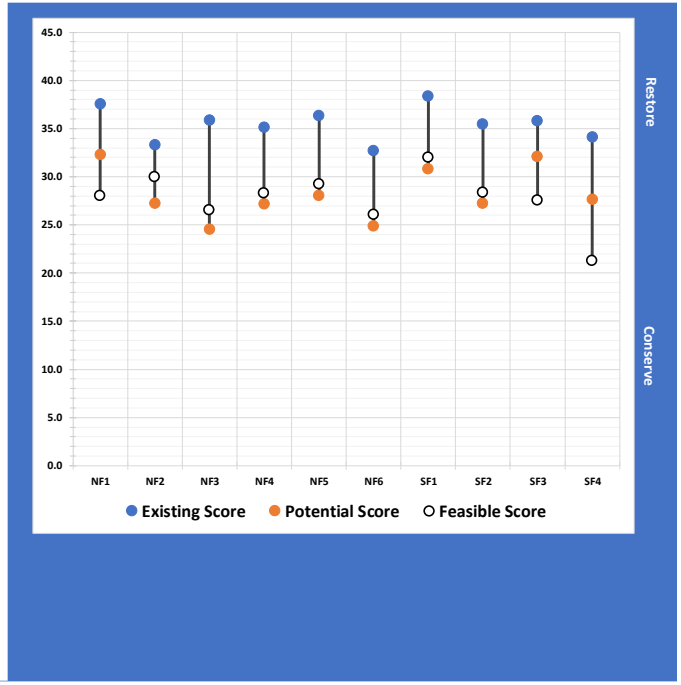

Exhibit 22. North and South Fork Umatilla River Reach Restoration Opportunities Comparisons

The Action Plan provides in-depth project information, including the purpose and need of the project, the vision, goals, and objectives, more details of the project area and assessment process, and lists the data gaps identified in the existing data. The Action Plan also includes a summary of the historic and existing conditions in the Subbasin and provides more detail on the prioritization process for the subwatersheds of the Umatilla Subbasin and river reaches of the Umatilla River . The Action Plan also provides details on the Umatilla Subbasin Uplands Restoration Plan (USURP) (Exhibit 23) and the Floodplain Monitoring Plan (FpMP) (Exhibit 24).

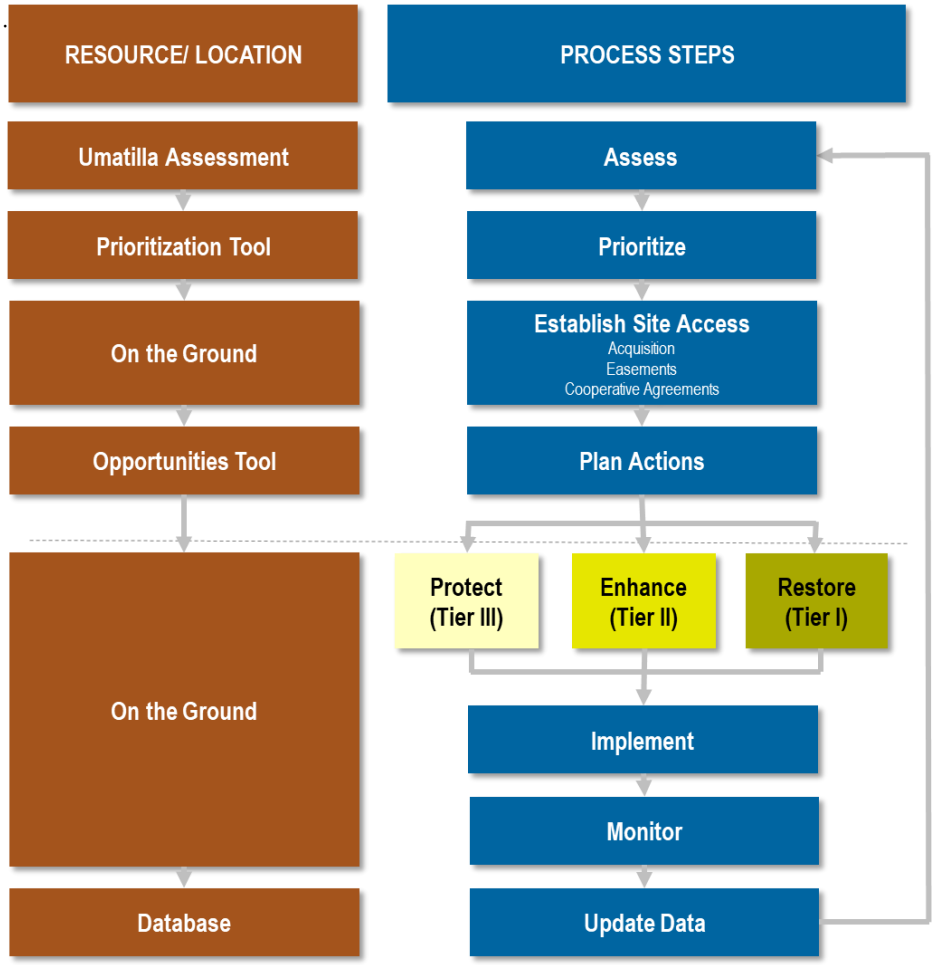

Exhibit 23. Umatilla Subbasin Uplands Restoration Plan (USURP)

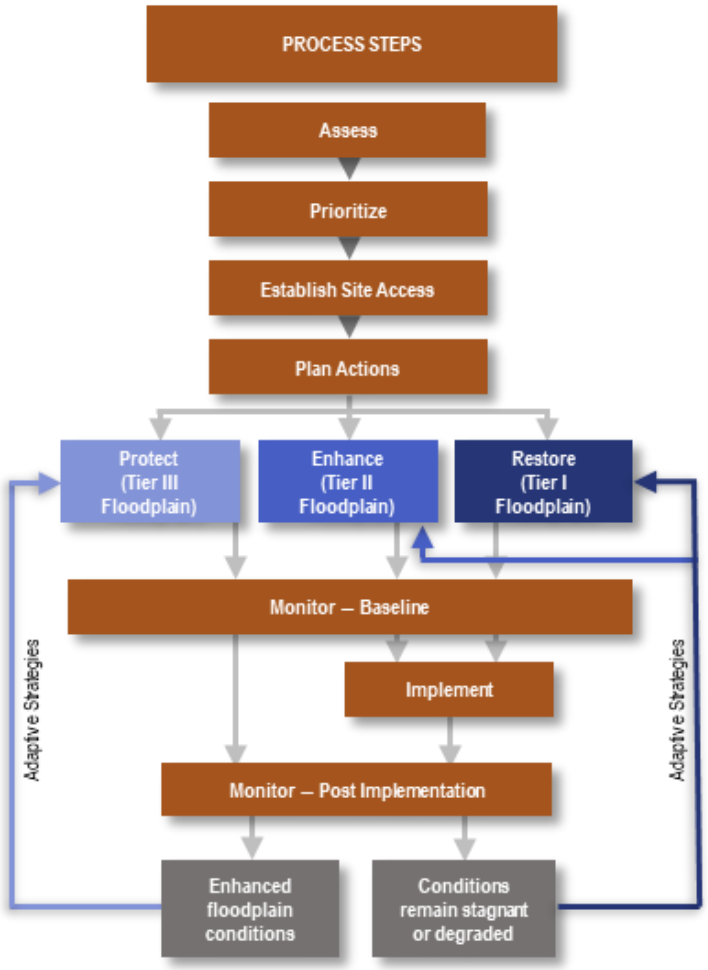

Exhibit 24. Floodplain Monitoring Plan (FpMP)

The Action Plan also provides details on the Fisheries Monitoring Plan (FshMP) (Exhibit 25), and provides conceptual opportunities for six high priority sites. Finally, the Action Plan provides implementation pathways for uplands and river restoration projects, as well as a strategic planning process and timeline.

The Action Plan describes the types of actions that can be taken at the subwatershed level to improve Uplands Vision function in the Umatilla Subbasin as well as the actions that can be taken at the reach level to improve River Vision function in the Umatilla River. A selection of 15 action types were identified for the uplands and 40 action types were identified for the Umatilla River.

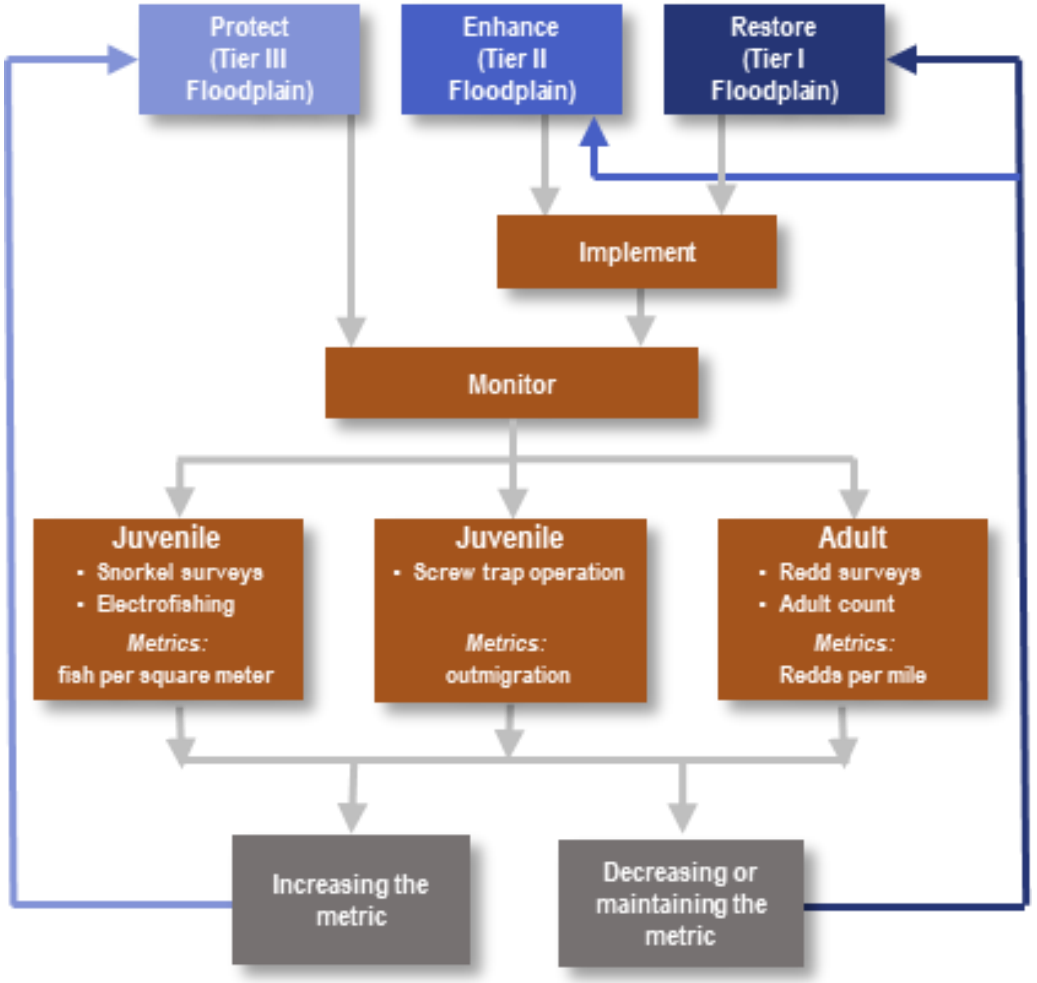

Exhibit 25. Fisheries Monitoring Plan (FshMP)

Reach by reach actions were identified for each reach of the Umatilla River and provided in a map book (and geodatabase) that is provided as Appendix A of the Action Plan. Based on the prioritization of the Umatilla River reaches, six concepts were identified for conceptual designs (Exhibit 26).

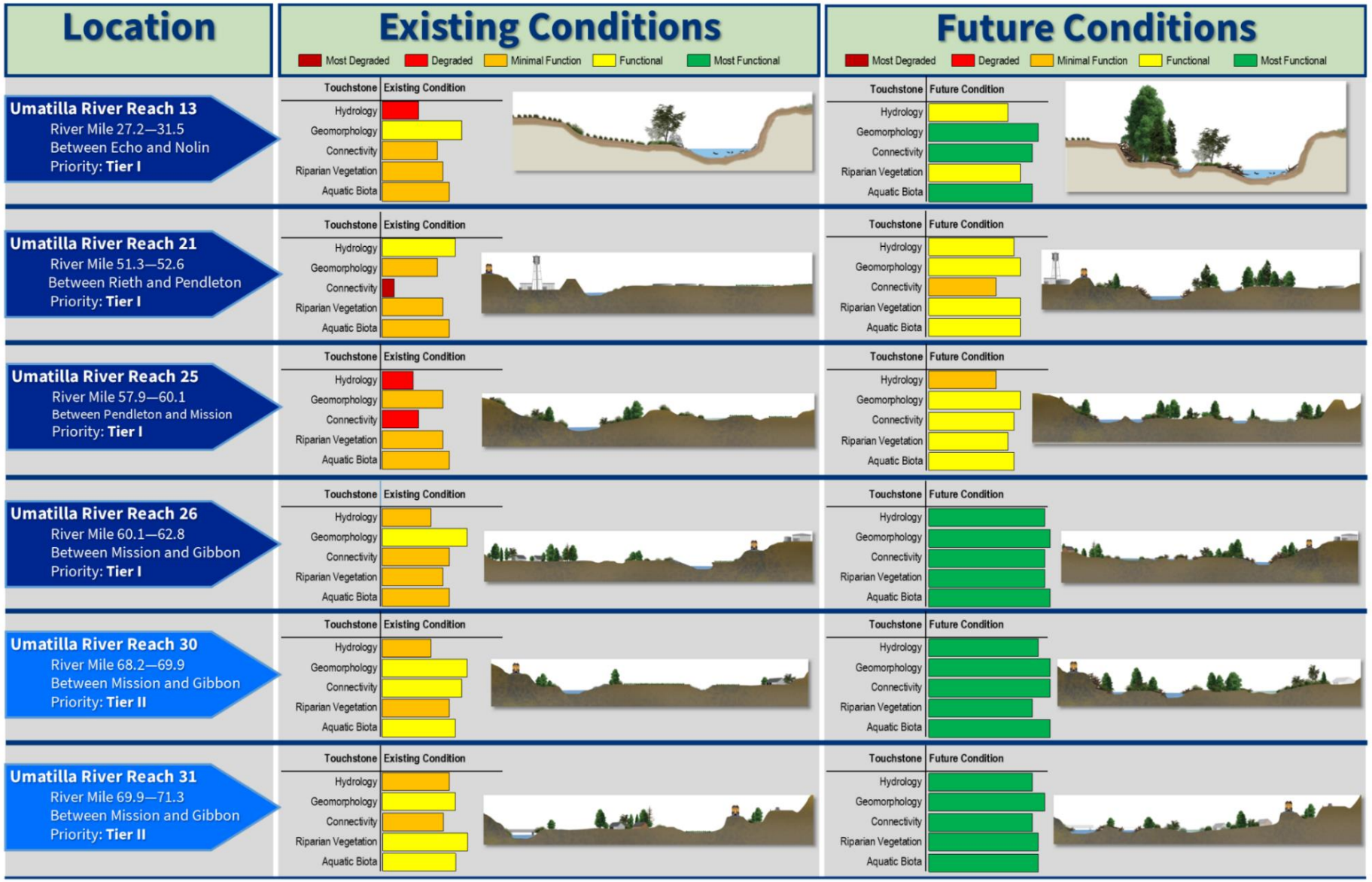

Exhibit 26. Summary Information and Conceptual Diagrams

The concepts include isometric and cross-section views of existing and potential future conditions and potential future benefits for habitat availability and smolt production (Exhibit 27). The actions depicted in the conceptual designs are not specific to the reaches but can be implemented throughout the Umatilla River on reaches that have similar benefits to River Vision function. The reaches where these concepts can be implemented are listed in the Action Plan. The following information is provided for the six high priority sites:

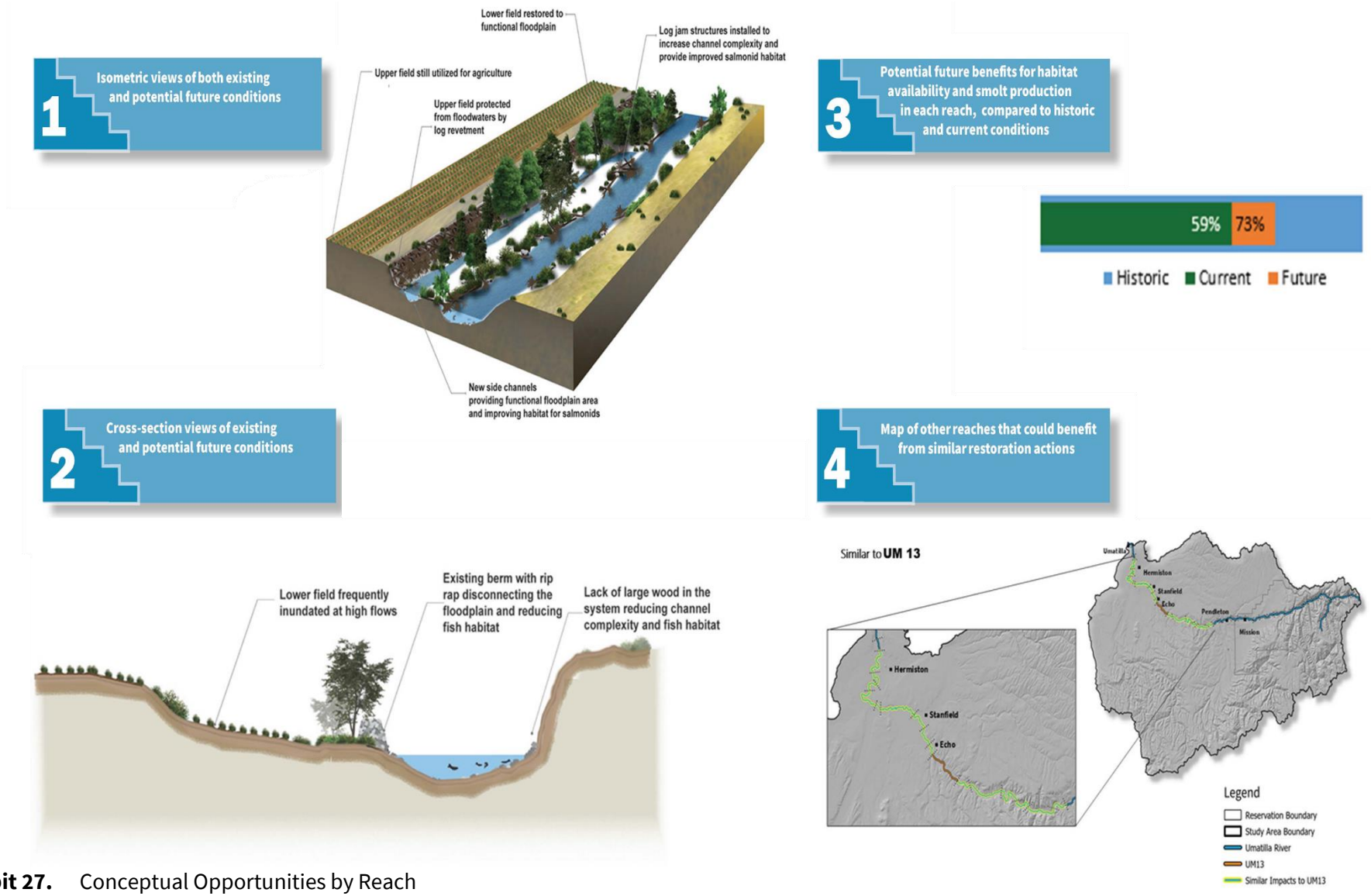

Exhibit 27. Conceptual Opportunities by Reach

The Action Plan concludes with next steps as well as implementation pathways for uplands projects (Exhibit 28) that ties together the information presented in the Action Plan, the action types, and the resource plans including the USURP, FpMP, and FshMP. The Assessment and Prioritization steps have been completed, but will need to be updated in 20 to 30 years as a result of monitoring. Considering departure from historic conditions, implementing uplands restoration projects that aim to improve landscape resiliency and mimic historic conditions by improving Uplands Vision Touchstones will require unique implementation pathways and schedules. However, timelines for implementation will vary depending on environmental, social, and regulatory complexities.

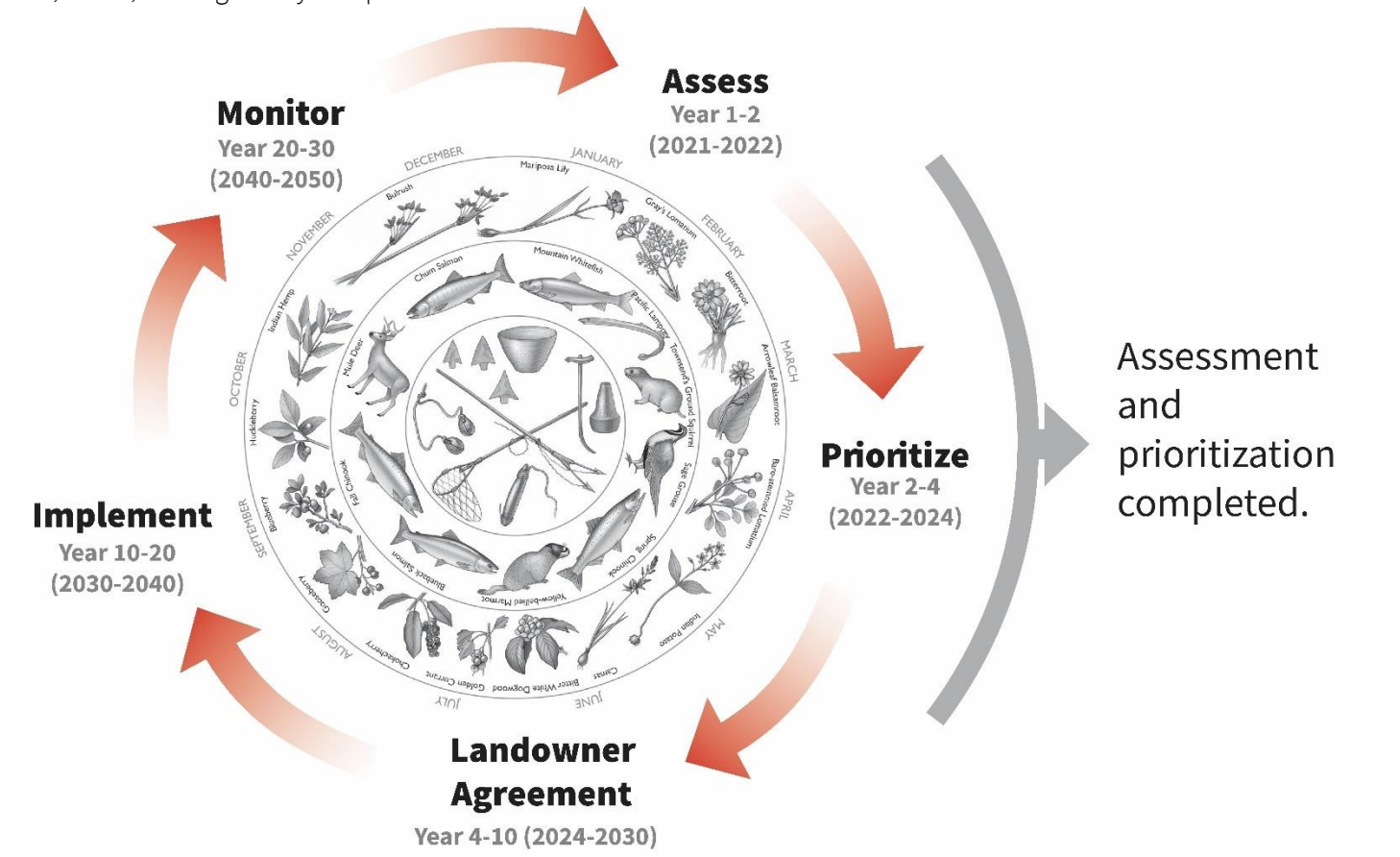

Exhibit 28. General Uplands Project Implementation Pathway and Timeline
Used with permission, Lynn Kitagawa

Similar to the uplands projects, implementation of river restoration projects that aim to improve River Vision Touchstones and improve smolt production will require unique implementation pathways and schedules, and timelines for implementation will vary depending on environmental, social, and regulatory complexities. Exhibit 29 illustrates a typical pathway and timeline for implementation of a river restoration project.

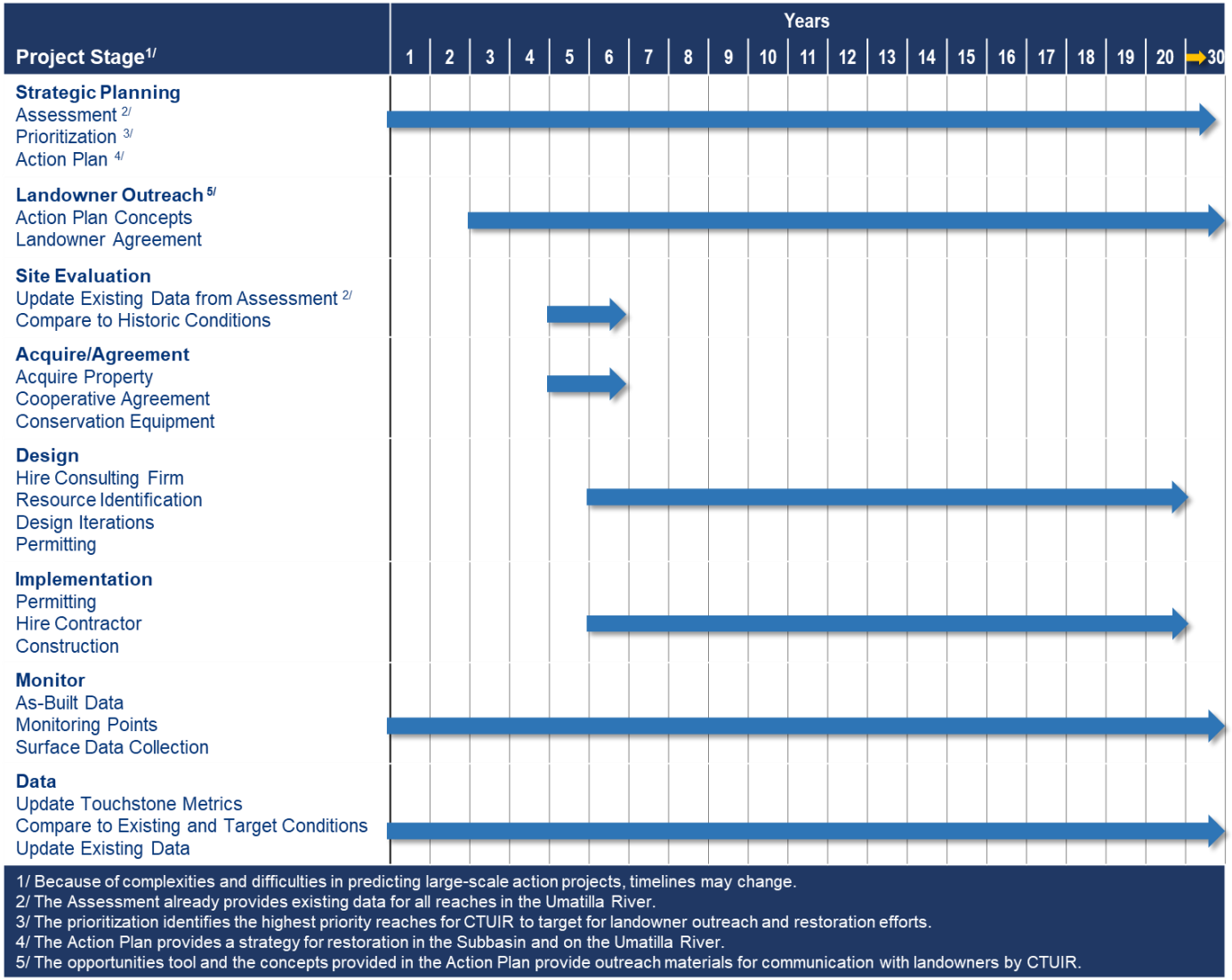

Exhibit 29. Typical River Restoration Project Implementation Pathway and Timeline

Planning for landscape improvements must be strategically executed to incorporate details and nuances associated with uplands and river restoration plans across the intended 30-year span of the Action Plan. The CTUIR can use updated data from post-implementation monitoring and any associated data gaps that are filled to re-prioritize using the prioritization tool. The updated prioritization will provide the CTUIR with an adapted strategic plan for restoration actions across the Subbasin and along the Umatilla River. The opportunities tool can then be used to re-evaluate potential actions to be taken that will improve conditions in the uplands of the Subbasin and in the Umatilla River (Exhibit 30). The development of the Assessment and Action Plan provides a foundational, scientifically defensible, and strategic approach to protect, enhance, and restore sustainable and functional river-floodplain systems that support and sustain healthy aquatic habitat conditions and populations of focal aquatic species.

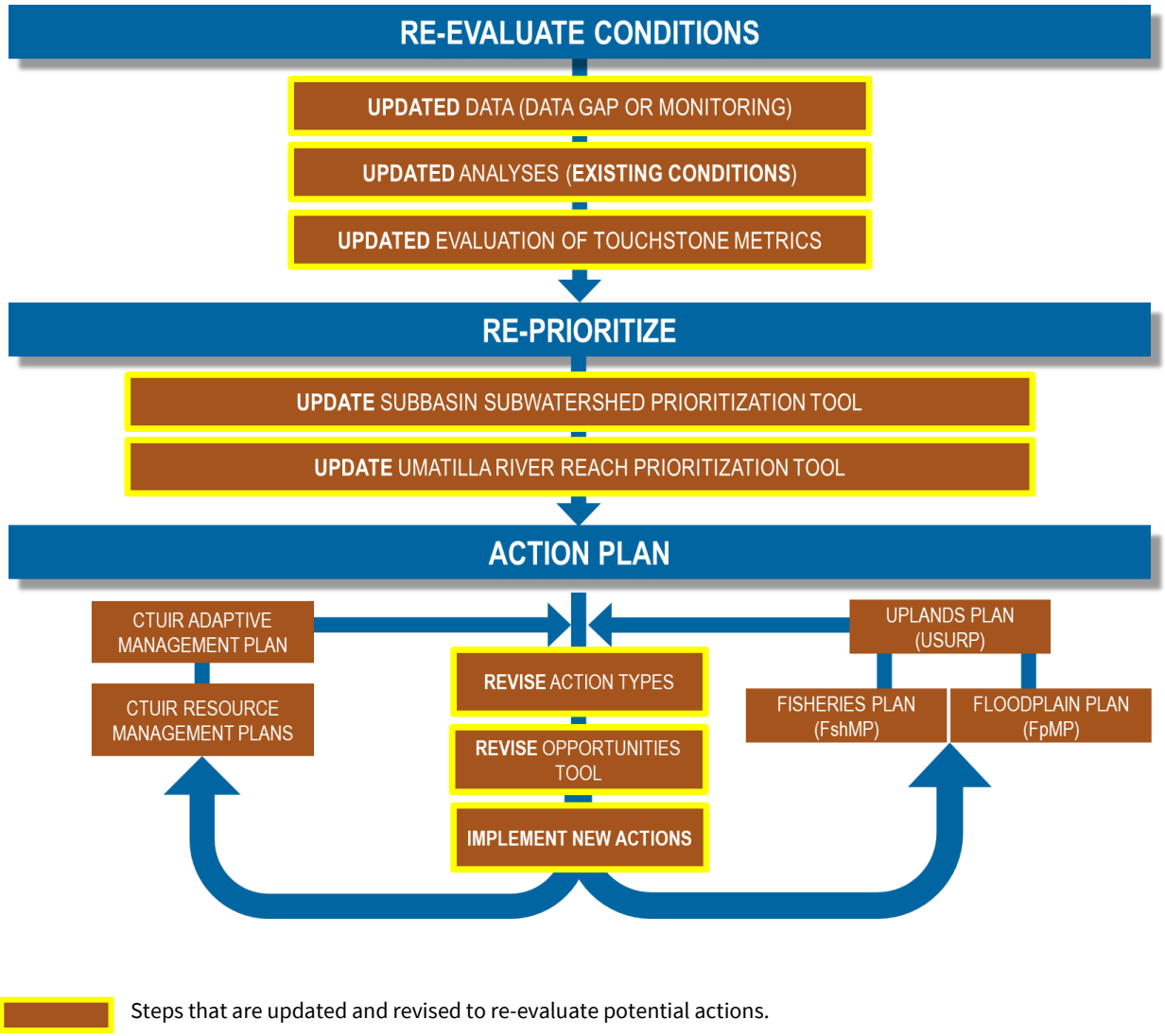

Exhibit 30. Strategic Planning Process for the Umatilla Subbasin and Umatilla River

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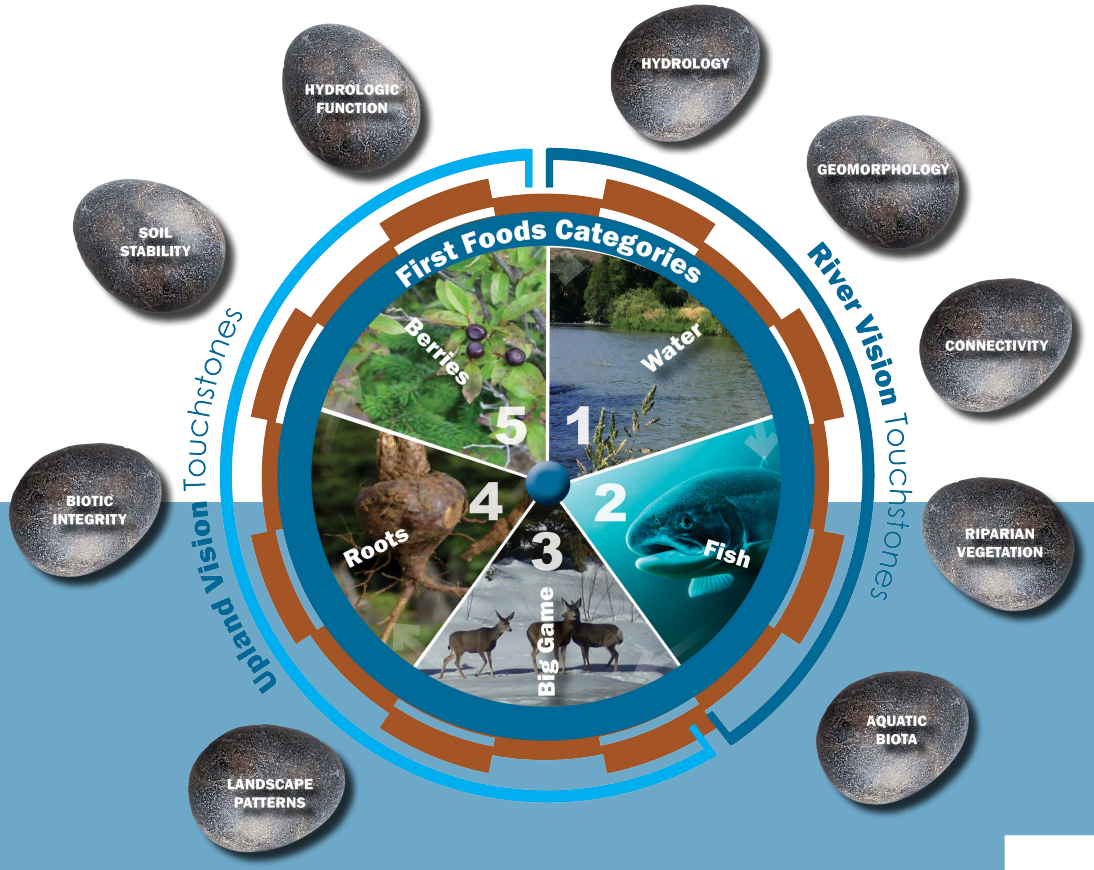

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