CONFEDERATED SALISH AND KOOTENAI TRIBES

Jocko River Master Plan: Section 1

A guide to ecological restoration activities in the lower main stem Jocko River corridor

Section 1: Introduction

Prepared by the CSKT Fish, Wildlife, Conservation, and Wildland Recreation Program

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Jocko River Master Plan: A Guide to Ecological Restoration Activities in the Lower Mainstem Jocko River Corridor: Section 1

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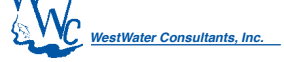

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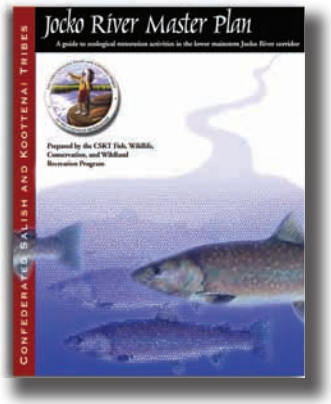
1.0 Introduction



The Jocko Restoration Plan tiers off the Clark Fork Settlement documents, Part 1 & 2.

In 1998, the Confederated Salish and Kootenai Tribes (Tribes) finalized a Consent Decree with the Atlantic Richfield Company (ARCO) to pay for the restoration, replacement, and/or acquisition of injured natural resources in the Upper Clark Fork River Basin as compensation for natural resource damages. Following an extensive natural resources inventory and restoration-suitability analysis, which is documented in the Tribes' Riparian/Wetland Habitat and Bull Trout Restoration Plan: Parts I & II (CSKT ARCO-Settlement ID Team 2000), the Tribes decided to restore the Jocko watershed. The Jocko River was chosen because it is most similar in size, streamflow, hydrology, and species composition to Silver Bow Creek and the Clark Fork River, the primary areas of injury in the Upper Clark Fork. The Jocko watershed is also a "core area" for the endangered bull trout and supports a relatively healthy population of westslope cutthroat trout, a Tribal Species of Special Consideration. The suitability analysis also shows that, among the various watersheds considered for restoration, the Jocko is at the greatest risk of further injury from future development.

Restoration measures are needed because the lower reaches of the Jocko River ecosystem have been substantially disturbed by agriculture, irrigation, livestock grazing, transportation infrastructure, and residential and commercial development. These and other water quality impacts have destabilized much of the river and substantially modified bull trout and westslope cutthroat trout habitat, particularly downstream of the town of Arlee. The combination of disturbances and impacts has also exacerbated the problem of competition for existing habitat between native and nonnative species and increased the potential for hybridization of westslope cutthroat trout with rainbow trout.

This *Jocko River Master Plan* (Master Plan) is an integral part of the Jocko watershed restoration effort. It tiers off of the *Riparian/Wetland Habitat and Bull Trout Restoration Plan; Parts I & II* (Restoration Plan). Part I of the Restoration Plan provides background information, while Part II explains the Tribes' approach to watershed restoration. It states: "The basic goal of watershed restoration is to reestablish the natural processes that existed before the watershed was disturbed. Because the Tribes believe a broad, comprehensive approach has a greater chance of succeeding, the goal includes reestablishing natural linkages between the terrestrial, riparian, and aquatic parts of the ecosystem. The focus, however, will be on the protection and restoration of riparian and wetland areas because they have the greatest influence over the health of the watershed."

The watershed restoration process the Tribes have chosen involves four key steps:

1. **Assessment**
   Determine the environmental history of the watershed. Identify areas with restoration potential and the activities that led to the degraded conditions.

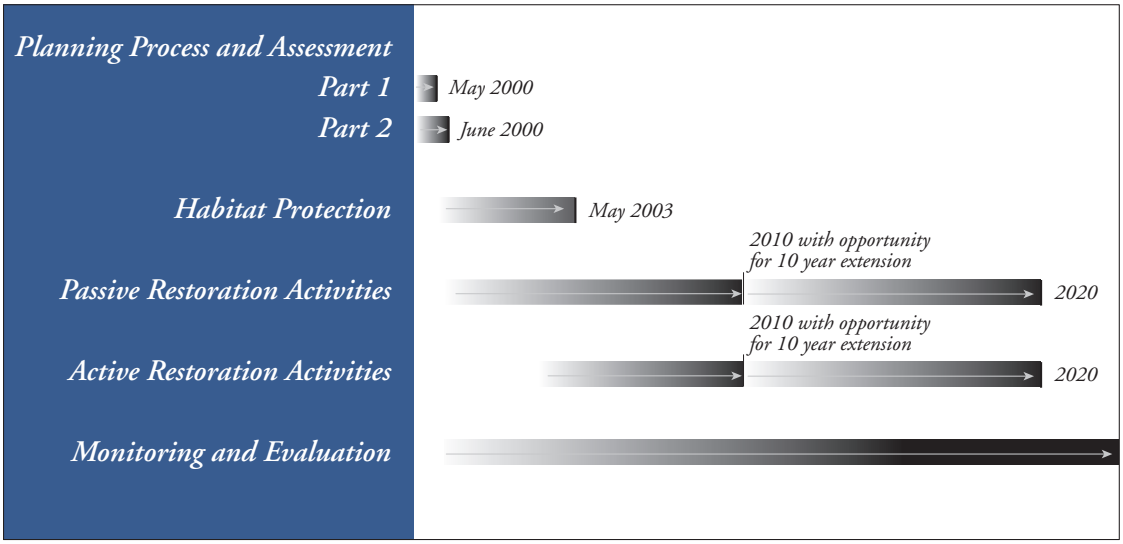


Figure 1.0-1.
Planning and implementation schedule for the Jocko River.

2. **Protection**
Identify and protect the best available remaining habitats. Protection of intact ecosystems is typically less expensive and is often of greater importance to the overall restoration effort than restoring degraded systems.

3. **Passive Restoration**
Modify the activities that are causing the degradation or that are preventing the ecosystem from recovering. Many riparian areas are capable of rapid recovery with a modification of land use.

4. **Active Restoration**
Actively reconstruct hydrologic, physical, geomorphic, or chemical processes and patterns. In some situations, the impacts to an ecosystem have been so great that simply modifying or stopping the damaging activity is not enough. Without some kind of active restoration the ecosystem will remain degraded indefinitely.

We intend this plan to be an adaptive, living document that will, over time, incorporate new information.

Restoration efforts target the lower 22 miles of the Jocko River from approximately four river miles upstream of Arlee to the confluence with the Flathead River (hereafter referred to as the lower main stem). In contrast to the headwater sections, the lower main stem tends to have extensive alluvial-floodplain reaches alternating with more constricted reaches. Groundwater upwelling occurs upstream of floodplain constrictions and initiates gaining stream reaches, spring brooks, and saturated soils. The lower 22 miles also have a heavy overprint of floodplain encroachment, riparian land conversion, and floodplain restriction, including levee construction and transportation rights-of-way.

The Tribes are advancing several other conservation and restoration efforts in the Jocko Drainage. Those efforts, while separate, dovetail with the objectives of this plan, and are reported upon in other, site-specific documents and ARCO annual reports, the latter of which record all efforts in the larger Jocko restoration

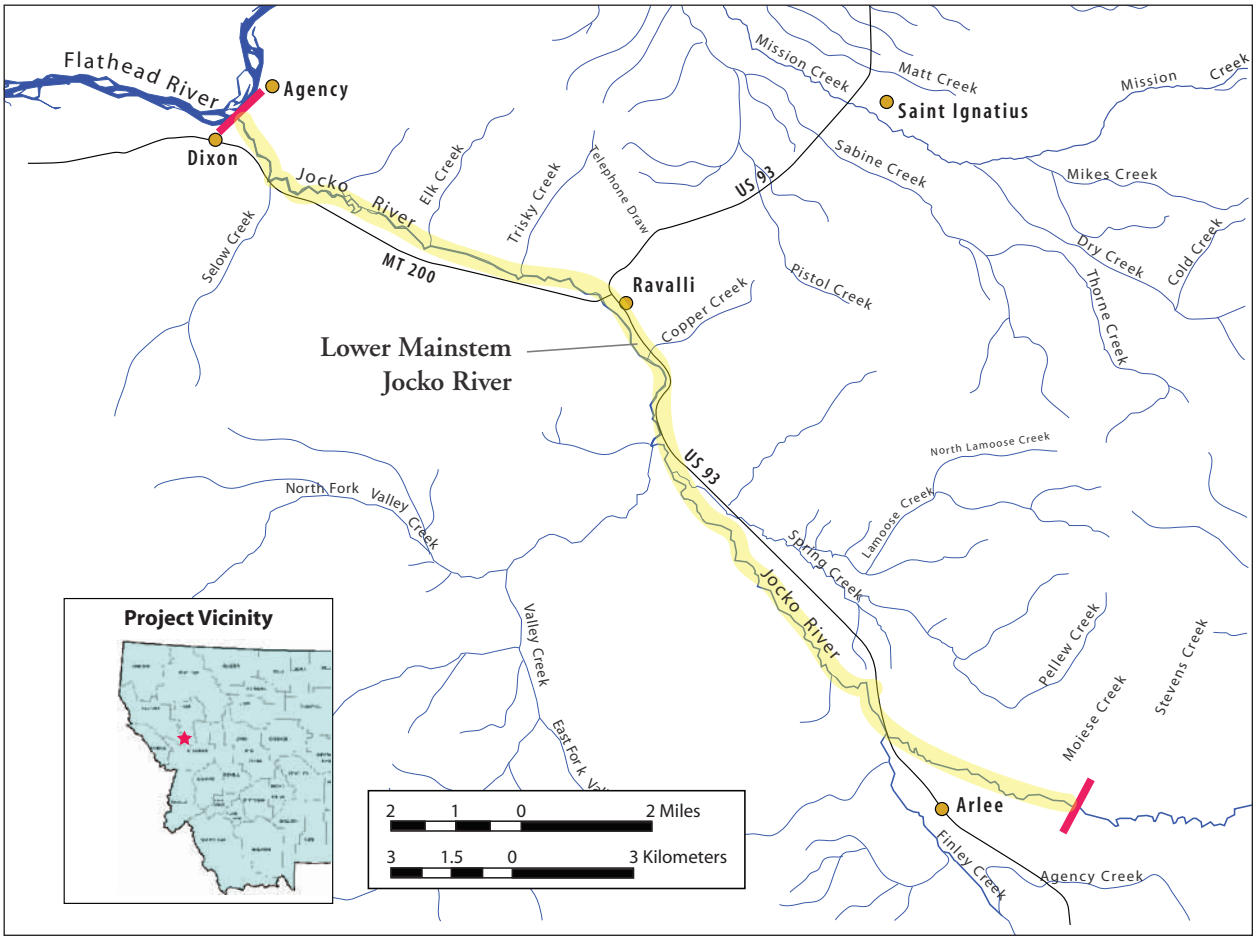


Figure 1.0-2.
The geographic scope of this document is the lower 22 miles of the Jocko River (the area highlighted in yellow), referred to here as the lower main stem.

program. Figures 1.0-1 and 1.0-2 are an overview of the schedule for restoration and protection activities and a map of the lower main stem of the Jocko, respectively.

1.1 Purpose and Scope

The purpose of this document is to guide ecological restoration activities within the corridor of the lower main stem of the Jocko River. We synthesize scientific ecological information about the watershed, focusing on the river flows and river's geomorphic relation to the floodplain. We also outline how restoration projects will be identified, planned, implemented, and monitored over time. Specifically, we describe:

1. **Changes within the Jocko River system**
We describe the changes that have occurred that led to the need for restoration. We do this by describing historical conditions and how land management and changes in flow regimes have led to the existing conditions.

2. **Restoration strategies and techniques**
We present strategies for restoring the Jocko River that are based on sound principals of restoration ecology and that are tied specifically to the historical and existing conditions along the Jocko River.

3. **Desired future condition**
We document restoration targets (our desired future conditions) and identify how they take into account infrastructure limitations imposed by roads, railroads, and the irrigation system.

4. **The restoration process**
We provide a specific framework for how projects will be planned, funded, permitted, implemented, and evaluated over time.

1.2 Goals and Objectives

The chief goal of this plan is to present an analysis of all information relevant to the lower main-stem ecosystem and use that analysis to guide the implementation of wetland-riparian restoration activities. Objectives include:

1. Characterize the existing and desired future conditions of the floodplain.

2. Outline an interdisciplinary planning and adaptive management process that can guide restoration activities.

3. Describe restoration strategies and techniques.

4. Present a framework for developing channel and floodplain designs appropriate for a restored system.

5. Assist in prioritizing project reaches.

6. Facilitate construction planning for priority reaches.

7. Facilitate environmental permitting processes.

8. Assist in public awareness and education about our goals.

9. Provide information that can be used in grant writing.

The Tribes envision the restoration of the Jocko River as a watershed-scale effort that will identify and assess linkages between sources of impact and ecological responses.

The Confederated Salish and Kootenai Tribes (Tribes) envision the restoration of the Jocko River drainage as a watershed-scale effort focused on identifying and assessing the links between impacts and the environmental responses to those impacts. We believe that a sound understanding of those linkages is essential to a successful restoration effort. Therefore, that understanding forms the basis for the restoration strategies and reach-specific recommendations presented.

1.3 Organization

Section 1 is an introduction that sets forth the purpose and scope, goals and objectives, organization, technical systems used, and general concepts.

Section 2 integrates assessment information and provides a framework for describing the historical, existing, and desired future condition of the river corridor. Broad topical areas include hydrology and flood-series analysis, channel morphology and geomorphic assessment, vegetation assessment, wetlands and off-channel springs, fish habitat conditions, fisheries and wildlife resources, cultural resources, and infrastructure effects.

Throughout this and subsequent sections, we have used two different geographical scales: general material is presented at the scale of the lower main stem, while more detailed information is presented at the reach scale. The eight reaches that make up the lower main stem and that are introduced below are defined based on unifying geomorphic attributes.

Section 3 identifies a procedure for moving from the assessment of a site to specific restoration designs. Restoration strategies are linked to the ecological processes they are intended to repair. Site assessment and planning are presented as an interdisciplinary team approach.

Section 4 is a description of monitoring protocols and other data collection methodologies that we will use during project implementation. This section will be tied to performance standards agreed upon during consultations with agencies having jurisdiction over different aspects of the project.

Appendices A through D include the following: Restoration Techniques (A), Best Management Practices (B), The Jocko River Demonstration Reach Monitoring Plan (C), Plan View Figures (D), Plant Pallets by HGM Cover Type, Hydrologic Zone, and Scour Zone (E), and Reach Succession Scenarios (F).

1.4 Technical Systems and General Concepts Used

1.4.1 Technical Systems

We selected the following technical systems because they are standard within each of their particular disciplines. Some were developed regionally, while others have been universally applied independent of geography. Some integrate multiple watershed components and therefore offer effective ways of describing broader ecological processes. The technical systems used include:

- **Rosgen's river morphology and channel classification system**, compiled in *Applied River Morphology* (Rosgen 1996), is used to describe and differentiate among river channel types in the context of dynamic river processes. The Rosgen system also embodies a river channel restoration philosophy that is reflected to some degree in Sections 3 and 4 of this plan.
- A **stream classification** tool that focuses on the relationship of a stream system to its valley margins (Rosgen 1996) is also used to describe river reaches. This system classifies valleys from Type I through X.
- The ***Hydrogeomorphic Approach to Assessing Wetland Functions of Riverine Floodplains in the Northern Rocky Mountains*** (Hauer et al. 2002) is used to quantify floodplain function and describe floodplain processes. In addition, this system (commonly referred to as HGM)

provides a basis for mapping floodplain cover types.

- ***Classification and Management of Montana's Riparian and Wetland Types*** (Hansen et al. 1995) is a vegetation-based ecological classification system based on the dual concepts of ecological potential (habitat types) and disturbance process driven potential (community types). As a result, Hansen's approach provides a useful language for discussing desired future condition and understanding how restoring natural processes may influence vegetation communities on the landscape.
- **Soil survey** information is adapted from the published NRCS soil surveys for Lake and Sanders Counties.
- A transect-based approach for **fish habitat sampling** is used where specific habitat features are sampled at 60-meter intervals. Pool characteristics, bank condition, and woody debris are also measured continuously along the habitat survey length. Fish habitat sampling methods are presented in Subsection 4.3.5 and Appendix C (Demonstration Reach Monitoring Plan).

1.4.2. Key Concepts

Time Frames

We use three general time frames to describe the condition of natural resources:

- **Historical condition** refers to conditions as they existed in the past, prior to most development. The lengths of the descriptions differ by watershed component because the amount of information available varies. For example, aerial photos from 1937 provide information about the extent of woody vegetation within the floodplain but offer less insight into the historical distribution of wetlands. Historical descriptions extend as far back as either oral or written records are available for a given subject.
- **Existing condition** refers to conditions as they exist today or as they existed in the recent past. Descriptions are generally based on data and other information collected within the last 15 to 20 years, although the majority of data are from within the last five years. HGM, Rosgen, and Hansen classifications are examples of methodologies used to describe the existing condition.
- **Desired Future Condition** refers to the condition that will exist once restoration goals have been achieved. Those goals were determined by the ARCO Interdisciplinary Team, which is comprised of hydrologists, wildlife and fisheries biologists, restoration ecologists, botanists, wetland scientists, and other specialists. Selecting a Desired Future Condition required a consideration of natural processes, how those processes have changed over time, and how feasible (both technically and economically) various actions are relative to the benefits they offer.

The Reference Condition Concept

Parts of Section 2 rely on the application of a reference-condition approach. Ideally, a reference river reach is an integrated channel and floodplain system that is in dynamic equilibrium under the current hydrologic regime. It has high quality, diverse, and interconnected channel and floodplain habitat. A *hydraulic* reference reach has a channel in dynamic equilibrium under the current hydrologic regime. A *habitat* reference reach has diverse, complex, and relatively intact habitat features.

We identified and surveyed several reference river reaches in the field in order to fully characterize their morphological features. Those features provide a partial template or tool to guide development

of specific restoration proposals (Rosgen 2001). Because the lower main stem is generally a disturbed system, reference-reach channel surveys are probably most useful in providing a template for the design of active channel geometry.

Another tool used to get observe reference conditions is historical information such as aerial photography. We use air photos taken in 1937 to determine the extent of broad vegetative cover types and channel planform during that year. There was a fairly high level of disturbance within the watershed by 1937, and so this imagery provides only a partial picture of what channel and floodplain characteristics were prior to human disturbances.

We describe river hydrology both in its current state and as naturalized hydrology. We define the naturalized hydrology as the river flow pattern in the absence of irrigation depletions. This pattern provides an approximation of the reference flow condition.

We determined reference plant communities by combining vegetative information from the Jocko River with regionally relevant plant community structure and composition information. Reference plant communities will guide much of the riparian and upland vegetation restoration.

1.5 Overview of the Lower Main Stem and Reach Descriptions

From its confluence with Big Knife Creek to its mouth, the Jocko River is an alluvial river system. Table 1.5-1 gives the reach breaks referred to in later sections and provides the rationale for their

Table 1.5-1.
Reach length and descriptions

Reach	Description
Reach 1 1,170 feet long	Reach 1 is the full delta environment where backwater from the Flathead River may affect channel processes.
Reach 2 2,804 feet long	Reach 2 is a transitional reach located at the upstream end of the river delta, but out of the influence of backwater from the Flathead River.
Reach 3 36,513 feet long	Reach 3 is a long reach where the active channel is partially confined due to very long levees or channelization efforts. Channel length has been shortened and most of the floodplain plant communities converted to agricultural land.
Reach 4 15,911 feet long	Reach 4 is located in Ravalli Canyon and is characterized as a fully confined transport reach where the floodplain has been heavily modified.
Reach 5 23,527 feet long	Reach 5 is a wide alluvial section bounded on the downstream end by a bedrock constriction. As with Reach 8, there has been long-term sediment storage in the floodplain and significant volumes of groundwater upwelling in the floodplain.
Reach 6 13,281 feet long	Reach 6 is a transitional reach where the valley width and accessible floodplain are increasing. Final downstream remnants of glacial outwash terrace are visible in this reach.
Reach 7 2,709 feet long	Reach 7 is a short transitional reach that occurs in a narrow bedrock canyon downstream from the confluence with Finley Creek
Reach 8 15,764 feet long	Reach 8 is located upstream of a bedrock constriction that has lead to long-term sediment storage and groundwater upwelling. The upper part of the reach has been disturbed through levee construction and incision is isolating the floodplain from the active channel

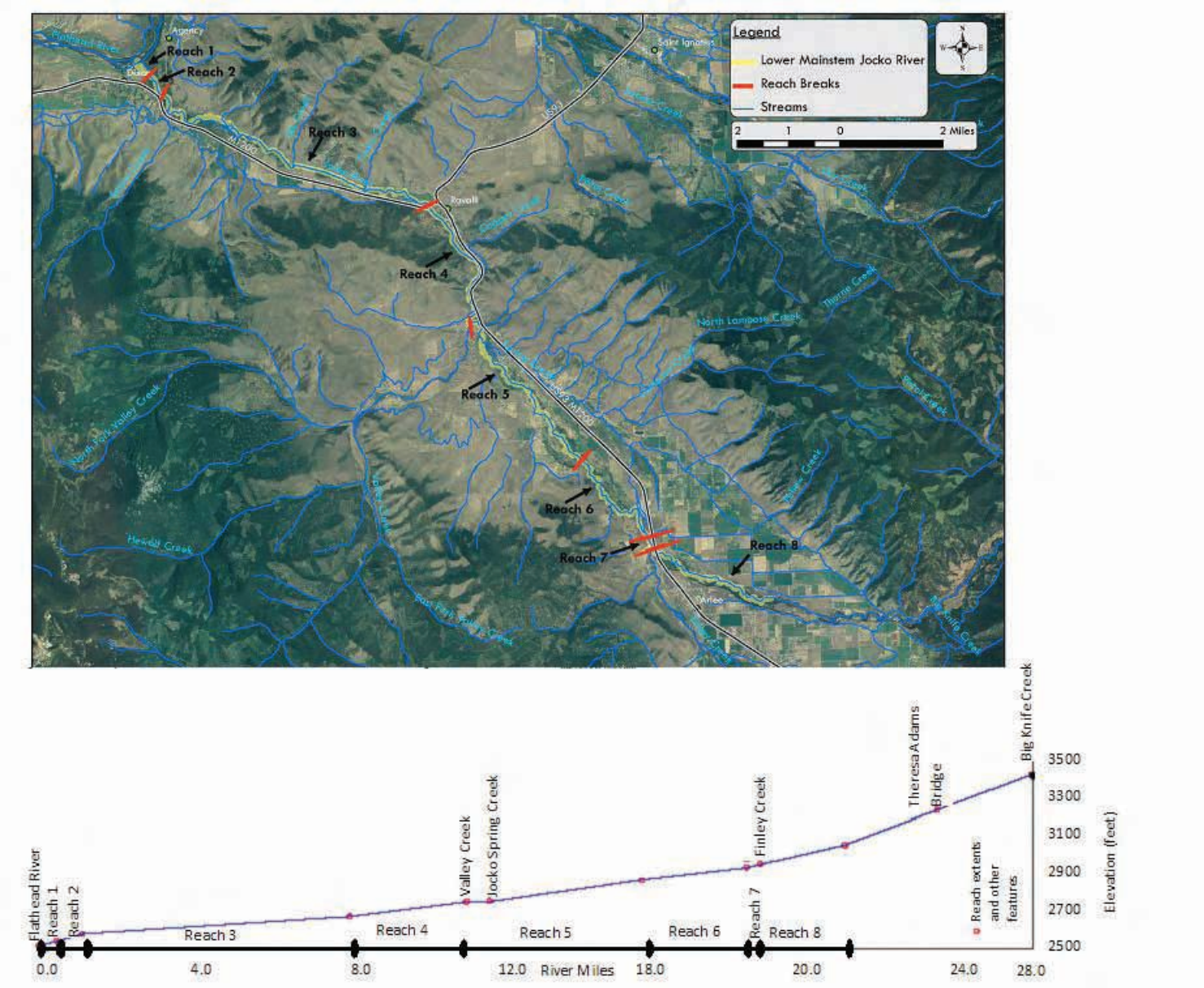


Figure 1.5-1.
Overview of the project area with reaches delineated and a longitudinal profile.

designation. Figure 1.5-1 shows an overview of the project area and identifies the eight river reaches within the project area. The figure also shows a longitudinal profile of the lower mainstem Jocko River throughout the project area.

1.6 Literature Cited

For references to this section, go to the Literature Cited Section.