



**U.S. Department of the Interior
Bureau of Land Management**

Valeg District Office
100 Oregon Street
Vale, Oregon 97918

September 1993



North Fork Malheur River Final Eligibility Study Report for the National Wild and Scenic Rivers System

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT

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IN REPLY REFER TO:

8354
N. F. Malheur

September 2, 1993

Dear Interested Citizen:

The Final Eligibility Study Report for the congressionally designated North Fork Malheur Study River finds the river meets the eligibility requirements for inclusion in the National Wild and Scenic River System. The report incorporates the pertinent information received during a 30-day public comment period ending October 23, 1992 on the draft study report and information we have gathered since completing the draft report.

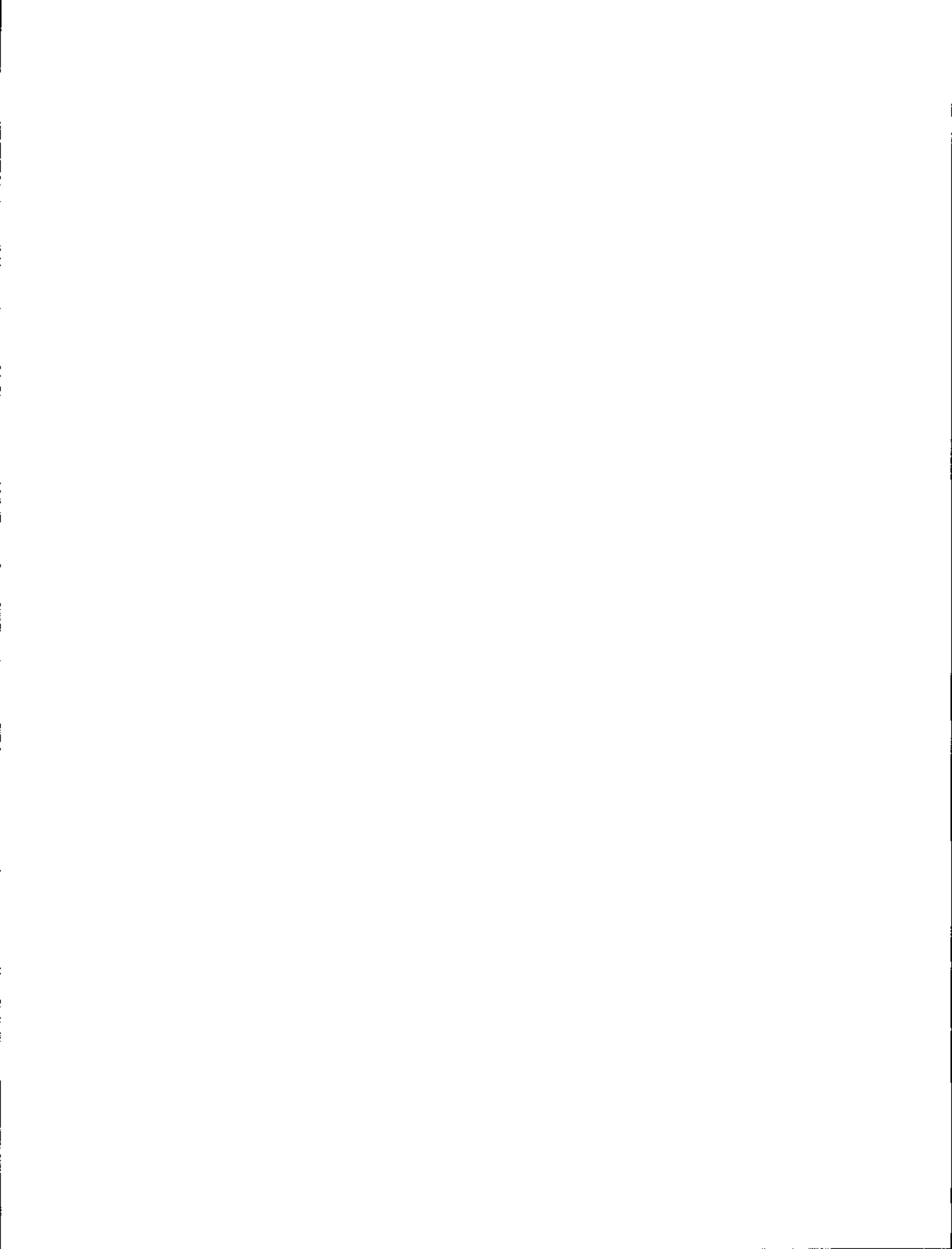
The primary purpose of the report is to determine if the study river, or any portion of it, is "free flowing" and possesses any "outstandingly remarkable values", as described in the National Wild and Scenic Rivers Act of 1968. Public input and updated information has not changed the findings in the draft.

The remaining two steps of the river study process, suitability and classification, will be conducted in the Malheur/Jordan Resource Management Plan (RMP). The RMP is scheduled to start in 1995 with completion about two years following.

Thank you for your interest in the North Fork Malheur Study River.

Sincerely,

Ralph Heft
Malheur Resource Area Manager



U.S. Department of Interior
Bureau of Land Management

Vale District Office
Malheur Resource Area
100 E. Oregon Street
Vale, Oregon 97918

September 1993

North Fork Malheur River

Final Eligibility Study Report

For The

National Wild And Scenic Rivers System



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Executive Summary

As part of the Omnibus Oregon Wild and Scenic Rivers Act of 1988, Congress designated for study a 14.8 mile segment of the North Fork Malheur River to determine if the river segment is eligible and suitable for inclusion in the National Wild and Scenic Rivers System (NWSRS). The Secretary of the Interior was designated as the responsible official to submit the river study. The Bureau of Land Management (BLM) is the lead federal agency conducting the study on the North Fork Malheur Study River (study river).

The river study process includes three phases: eligibility, classification and suitability. The purpose of this document is to accomplish the first phase: to determine if the North Fork Malheur Study River is eligible for possible inclusion in the NWSRS.

A Draft Eligibility Study Report for the study river was released for a 30 day public comment period on September 23, 1992. This Final report reflects new, additional or corrective information provided by reviewers of the draft document and by other update information the Bureau of Land Management has gathered since the draft was released.

As defined by the National Wild and Scenic Rivers Act, to be eligible for inclusion as a component of the NWSRS a river must be free-flowing and possess at least one "outstandingly remarkable value." This eligibility report documents the existing situation and the evaluation of free-flowing and river-related values of the North Fork Malheur Study River. The river-related values were evaluated using BLM and regionally developed guidelines. The specific values described and evaluated include scenic, recreational, geologic, fish, wildlife, prehistoric cultural, historic cultural, traditional use (Native American), botanic/ecological, and hydrologic/water quality.

The findings of a BLM interdisciplinary study team has determined that the study river is free-flowing and that the following river-related resources of the study river are outstandingly remarkable values: **SCENERY, RECREATIONAL, FISH, AND WILDLIFE.** Fish and wildlife values are determined outstandingly remarkable for the length of the study river and scenic and recreational values for the upper half of the study river. These findings of outstandingly remarkable values determinations coincide with most findings of Malheur National Forest on their adjacent congressional designated North Fork Malheur National Scenic River. Two variances for the study river area are the findings for recreation and geology. Geology was determined not to be an outstandingly remarkable value on the study river, and recreation was determined to be an outstandingly remarkable value of the study river area. The Congressional Record for the designated national scenic river in the national forest identifies geology and scenery as outstandingly remarkable values.

Based on these eligibility findings, the remainder of the river study process, river classification and suitability, will be completed as a component of the Malheur/Jordan Resource Management Plan. The Resource Management Plan is scheduled to begin in 1995 with a completion date approximately two years following.

Interim management of public lands within the one half mile wide study river area will include protection of the river's free-flowing condition and its identified river-related outstandingly remarkable values so the study river and its immediate environment remains eligible for possible inclusion as a component of the NWSRS.

I. Introduction

Background

In 1968 Congress enacted the National Wild and Scenic Rivers Act, establishing a system for preserving outstanding free-flowing rivers. The Omnibus Oregon Wild and Scenic Rivers Act of 1988 amended the 1968 Act by designating 40 rivers or river segments in Oregon as components of the National Wild and Scenic Rivers System (NWSRS) and listing seven Oregon rivers and river segments for study. A 14.8 mile segment of the North Fork Malheur River was one of the seven Oregon river segments designated for study for possible inclusion in the NWSRS. The Secretary of the Interior was designated as the responsible official for submitting the river study. The Bureau of Land Management (BLM) is the lead federal agency conducting the study on the North Fork Malheur Study River (study river).

Purpose and Need

The purpose of the Wild and Scenic Rivers Act (Public Law 90-542, October 2, 1968), as stated in section 1 (b), is as follows:

"It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes."

As mentioned above, the Omnibus Oregon Wild and Scenic Rivers Act (Public Law 100-557, October 28, 1988) amended the Wild and Scenic Rivers Act and added 40 rivers and/or river segments in Oregon to the NWSRS. The Omnibus Oregon act also designated seven additional Oregon rivers for study for

possible inclusion. A segment of the North Fork Malheur River was one of the seven rivers designated for study under section 5(a) of the Wild and Scenic Rivers Act:

"North Fork Malheur, Oregon. - The segment from the Malheur National Forest boundary to Beulah Reservoir; by the Secretary of the Interior."

The purpose of this eligibility report is to determine if the North Fork Malheur Study River is eligible for possible inclusion in the NWSRS.

Under the 1988 Act, a 22 mile segment of the North Fork Malheur River, abutting and extending upstream from the study river, was one of the 40 rivers added as a component of the NWSRS. Located fully within Malheur National Forest, the Forest Service has a management plan for the congressional designated North Fork Malheur National Scenic River.

Study Process

The process for studying a river for possible inclusion in the National Wild and Scenic Rivers System (NWSRS) consists of three phases—eligibility, classification and suitability. The purpose of the river study process is to provide information upon which the President can base his recommendation and Congress can make a decision about designation or non-designation of a river or river segment as a component of the NWSRS.

The purpose of this report is to complete only the first phase of the river study: to determine if the North Fork Malheur Study River is eligible for possible inclusion in the NWSRS. In accordance with existing national guidance, the study river area includes the length of river segment authorized for study (14.8 miles) and extends in width one-quarter mile from each bank of the river.

If a river or river segment is determined eligible for possible inclusion in the NWSRS, it must then be classified and its suitability determined for Wild and Scenic River designation. Both classification and suitability for the North Fork Malheur Study River will be done at a later date. Classification is based on the degree of naturalness and extent of development of the river and the adjacent lands. The three classification categories for rivers are Wild, Scenic, and Recreational. Administrative management boundaries for any eligible portions of the study river are also established in the classification process.

In the third study phase, the study river's suitability for Wild and Scenic River designation is determined. Suitability identifies current and potential social and resource uses and values, evaluates management alternatives for the river, and makes a recommendation as to designation or non-designation.

For the North Fork Malheur Study River, based on the finding of eligibility, the classification and suitability phases of the river study process will be integrated into the development of the Malheur/Jordan Resource Management Plan (RMP). The RMP is a planning document which will provide long term (10-15

years) management direction and allocation of resources uses on BLM administered public lands located primarily in Malheur County and smaller portions of Grant and Harney counties.

Public participation is part of the RMP process. The process meets requirements of the National Environmental Policy Act with several opportunities for public comment and review. The Malheur/Jordan RMP is presently scheduled to be initiated in 1995 and completed about two years later.

Only Congress can designate a river as a component of the NWSRS or, in the case of the North Fork Malheur Study River, release it from study river status. Until Congress makes a decision, interim management of a congressional designated study river includes protection of a river's free-flowing condition and any river-related outstandingly remarkable values determined to be present. This will ensure the study river and its immediate environment remains eligible for possible inclusion as a component of the NWSRS.

Eligibility Study Phase

The determination of eligibility for the study river is the subject of this report. To be eligible for inclusion as a component of the NWSRS, as defined by the National Wild and Scenic Rivers Act, a river must meet two criteria: 1) it must be free-flowing, and 2) it must have at least one "outstandingly remarkable value."

For the eligibility study, the evaluation of river-related values is designed to provide a degree of standardization and consistency throughout the northwest. An analysis is conducted to compare resource values

with other rivers within a defined geographic region of comparison. As a basis for comparison, geographic regions defined in Oregon's Statewide Comprehensive Outdoor Recreation Plan (SCORP) are partially used (see Map 1). The eligibility evaluation is an objective process through the use of an interdisciplinary team knowledgeable of the National Wild and Scenic Rivers program, the particular resource values to be considered and the river/river area to be studied. Information from other experts is obtained through consultation, document review and/or direct involvement as needed.

The following steps or verification techniques were used to evaluate the contribution of various resource values to the North Fork Malheur Study River:

- The use of an interdisciplinary team approach;
- Consideration of uniqueness and rarity at regional and national levels;
- Consideration of values identified in previous studies and reports (see Appendix G);
- Values must be river-related in that they owe their existence or contribute to the functioning of the river system and its immediate environs;
- The use of standardized criteria against which the river values were measured to determine outstandingly remarkable value;
- Verification by other experts in the subject area, as appropriate;
- Public verification of preliminary findings of outstandingly remarkable value.

This eligibility report documents the existing situation and the evaluation of free-flowing and river-related values of the North Fork Malheur Study River. The specific values described and evaluated include scenic, recreational, geologic, wildlife, fish, prehistoric cultural, historic cultural, traditional use (Native American), botanic/ecological, and hydrologic/water quality. Information provided by this report will be used during the development of the Malheur/Jordan Resource Management Plan.

II Description Of The Study River Area

To avoid undue repetition, several resources and their values not discussed in this section are addressed in section III of this document.

Physical

The North Fork Malheur River flows from the head-water streams in the Blue Mountains, at elevations over 8,000 feet, southerly through Malheur National Forest then through predominately private lands to its confluence with the Malheur River near Juntura, Oregon. The study river area is located approximately 52 air miles west of Vale, Oregon.

The study river area (also called the study river corridor in this document) consists of 14.8 river miles within a half mile wide corridor (a quarter mile either side of the river) of approximately 4,500 acres extending from the south boundary of Malheur National Forest to Beulah Reservoir. The study river drops 630 vertical feet in elevation from 3,970 feet to 3,340 feet. See Map 2.

The upper half of the study river area is characterized by a steep sloped, V-shaped canyon with a narrow floodplain of riparian vegetation (such as dogwood, alder and choke cherry) and a few widely dispersed small meadows along the river's edge. Portions of upland benches, beyond the confined canyon, are dispersed along this portion of the study river area. Pockets of Douglas fir occur primarily along the canyon's north and west slopes. Scattered, isolated individual Douglas fir and juniper trees dot the canyon bottom, and occasional groves of pine and juniper are found. Sagebrush, bunchgrass and cheatgrass are the dominant plants on the drier east and south slopes. Few man-made features are found in this otherwise primitive and virtually pristine portion of the study river area.

The lower half of the study river area is predominately rolling terrain of moderate to gentle slopes with areas of wide canyon bottom broken by a narrow, enclosed floodplain. Natural vegetation consists mainly of scattered junipers, sagebrush, bunchgrass, cheatgrass, and dense willow along the river with some dogwood and alder. A ranchstead with multiple out buildings, several large irrigated fields of pasture grass and other support facilities are located along a

stretch of the river. A county road parallels much of this segment of the river, and several secondary vehicle routes are scattered throughout this portion of the study river area.

Upstream and abutting the study river, Congress in 1988 designated a 22 mile segment of the North Fork Malheur River fully within Malheur National Forest as a component of the National Wild and Scenic Rivers System (NWSRS) with a Scenic classification.

The study river terminates where it enters the high water storage point (3,340 feet elevation) of Beulah Reservoir. The reservoir, administered by the federal Bureau of Reclamation, stores water for seasonal irrigation of agricultural crops in Treasure Valley near Vale and Ontario, Oregon.

Land Ownership

Land ownership within the study river area is as follows (see Map 2): 61% private (2,764 acres), 32% Vale District Bureau of Land Management (BLM, 1,441 acres), and 7% Bureau of Reclamation (BoR, 301 acres). Of the study river's 14.8 mile length, 9.6 miles (65%) flows through private land, 4.5 miles (30%) through BLM administered land, and 0.7 mile (5%) through BoR administered land.

The study river area is located in three Oregon counties: Harney County (40%), Malheur County (39%) and Grant County (21%).

Private land of five different landowners is interspersed with federal land parcels throughout the 14.8 mile length of the study river area. For each landowner, the North Fork Malheur River has been an integrated element of their livelihoods, with ownership in some cases passed on between family generations. Landowners utilize their private lands along the study river primarily to support livestock operations through hay production and wherever topography allows for livestock grazing access in the river corridor.

Infrastructure

Primary access to the North Fork Malheur Study River branches from U.S. Highway 20. Starting from Juntura, Oregon, Malheur County Roads 510 and 577 provide access to the lower portion of the study river area. A primitive route branching from Public Road 3049 provides access near the confluence of

the Little Malheur River with the study river. Access near the very remote upper reaches of the study river is via a network of roads leading south in Malheur National Forest from U.S. Highway 26, or from roads extending north from U.S. 20 near the Drewsey/U.S. 20 junction. Access on private land from Forest Service, county or public roads is at the discretion of the private land owner. There are no foot or equestrian trails developed along the study river.

Climate

Annual precipitation measured near Beulah Reservoir averages 10 inches, while the area's range of precipitation is between 8 and 16 inches annually. It comes from a combination of snowfall from winter storms and rain which mostly occurs from spring to fall, including localized severe thunder storms. Temperatures range from well below 0 degrees fahrenheit during winter to over 100 degrees fahrenheit in the summer months.

Air quality is generally good since it is far removed from any population centers or industrialized areas.

Economic

Grazing

Domestic livestock grazing along the North Fork Malheur River likely occurred as early as the 1870's. In the past, livestock grazing consisted of cattle, sheep and horse use. Current grazing use is primarily by cattle.

The study river area is covered by three grazing allotments administered by the BLM Vale District, the Castle Rock Allotment, the Beulah Allotment and the Whitley Canyon Allotment. Original application for grazing privileges on public lands in these allotments were made as early as 1935 and 1936, in concurrence with the federal Taylor Grazing Act.

The Castle Rock Allotment includes the lower approximately 75 percent of the study river area. Three of the allotment's fenced pastures include portions of the study river area: House, North Rockpile and Fenced Federal Range. The three pastures have a combined grazing preference of 3,612 Animal Unit Months (AUMs)—1,212 AUMs on BLM public land and 2,400 AUMs on private land.

The study river area occupies a minor portion of each of the pastures, with nearly all of it accessible by cattle.

As determined by BLM in 1983, the existing upland ecological status (seral stage), vegetation condition trend and management objective for each of the three pastures is as follows: House (1,177 BLM acres, 1,222 private acres)—early seral stage with a static vegetation trend and a management objective to improve range conditions of the pasture; North Rockpile (1,360 BLM acres, 2,200 private acres)—middle seral stage with a static vegetation trend and a management objective to improve range conditions of the pasture; and Fenced Federal Range (414 BLM acres, 2,962 private acres)—middle seral stage with a static vegetation trend and a management objective to establish late seral ecological status for the pasture.

Grazing use in each pasture is: House pasture—3/20 - 7/15 in even years and 7/16 - 11/15 during odd years; North Rockpile—one year rest, alternate year 3/20 - 6/15; and grazing in Fenced Federal Range determined each year.

Portions of the Fenced Federal Range pasture contain irrigated timothy hay fields within the study river area. A total of approximately 4.8 river miles at two locations have adjacent hay fields on either or both sides of the study river. These hay fields are seasonally flood irrigated with river water using a system of four diversion works and irrigation ditches.

The upper approximate 25 percent of the study river area has about ten percent, total, of the MJ Field and River pastures of the Beulah Allotment. The two pastures have a total grazing preference of 552 AUMs—249 AUMs on BLM public land and 209 AUMs on private land. Both pastures are in a static upland vegetation condition trend and have a riparian management objective. The MJ Field pasture (1,197 acres BLM, 924 acres private land) is in a middle seral stage, and the River pasture (294 acres BLM, 294 acres private land) is in a late seral stage.

The BLM is in the process of developing an allotment management plan for the Beulah Allotment. Presently, the two pastures are in a rotation grazing system with 17 other allotment pastures where both pastures are grazed seasonally one year followed by two years rest. Grazing periods are determined by availability and condition of grass. About 50 percent of the River pasture and approximately 30 percent of the MJ Field pasture are within the study river area.

In both pastures, cattle grazing access is irregularly distributed in the steep sloped canyon, depending upon the topography and features such as rock scree, talus, rim walls and other vertical relief.

An uppermost segment (about two percent) of the study river area has less than two percent of the 4,690 acre Little Malheur pasture of the Whitley Allotment. Most of the study river area of the pasture is inaccessible to livestock due to steep canyon terrain. The pasture has a total grazing preference of 1,115 AUMs—615 AUMs on public land and 500 AUMs on private land. The pasture is in middle seral stage with a static vegetation trend and a management objective to improve range condition. The allotment's grazing management plan defines a three year deferred grazing system for the Little Malheur pasture—7/1 -10/31, 5/15 - 7/31 and 8/1 - 10/31.

Timber

Inadequate timber volume exists in the scattered pockets of timber on public lands to establish a harvest program. Some private land owners in the upper third of the study river area indicate that their forested stands are accessible and they intend to harvest the timber.

Minerals

As of August 1993 no mineral leases or lease applications affect the study river area. Potential for occurrence of geothermal resources is high due to the presence of a hot spring within the river corridor. Potential for oil and gas is low.

No active mining claims are within the study river area. Active diatomite claims exist 2.5 miles southwest of the southern end of the study river area. A geothermal hot springs is located within the study river area. Based on the known affiliation of geothermal hot springs and their associated minerals, the potential for locatable mineral occurrence is considered moderate, particularly in the lower reaches of the study river area. Approximately 840 acres of split estate (private surface/federal minerals) located on 13 sections are scattered throughout the study river area.

III Eligibility Determination

Introduction

The Wild and Scenic Rivers Act states that to be considered for inclusion in the National Wild and Scenic Rivers System a river or river segment must be free flowing and, with its immediate environment, must possess one or more outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.

This section of the study report: 1) discusses the definition of free-flowing and whether or not the study river fits that definition; 2) gives the criteria for evaluating outstandingly remarkable values; and 3) describes resource values, assesses each of them, and determines what resource values are outstandingly remarkable. In addition, those river-related values that are not assessed as outstandingly remarkable but contribute significantly to the functioning of the river system and/or river setting are identified and their significance indicated.

Free-Flowing

As defined by section 16(b) of the Wild and Scenic Rivers Act, a river is considered free-flowing if it is "existing in a flowing or natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway." Free-flowing should not be confused with naturally flowing, which is flowing without any upstream manipulation except by nature. The presence of impoundments above or below the study river area and existing minor dams and diversion structures within a study river reach will not by themselves render a river ineligible. If a resource is water dependent, there must be water flow sufficient to maintain any outstandingly remarkable values identified within the study river area.

Free Flowing Evaluation

Presently the study river segment of the North Fork Matheur River is free from impoundments and has four small diversion works. These diversions are for the purpose of irrigation of hay fields for a private landowner.

The four diversions are located at approximately river miles 1.5, 2.5, 6.3 and 7.3 (whole river miles are on Map 2). Each of the diversions consist of rock material which is annually placed into the river's channel to the extent needed to divert a small volume of the river into irrigation ditches during the hay growing season. Excess water is returned to the river. Each diversion is removed from the river before winter to prevent them from being washed out by high river run-off flows caused by springtime snow-melt. The size of each diversion is dictated annually by what is the level of natural river flow. None of the diversions alter the natural course of the study river, with the nominal amount of diverted water fluctuating at each of the diversion sites during the growing season.

It is determined that the entire length of the study river meets the definition of free-flowing. The diversions are only present seasonally, with the amount of water diverted considered minimal and fluctuating during the growing season. The river's volume of flow is sufficient to maintain the outstandingly remarkable values identified throughout the entire 14.8 miles of study river area.

Outstandingly Remarkable Values

Introduction

The second criteria that a river must meet to be eligible for inclusion in the NWSRS is that it must possess one or more outstandingly scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The term "outstandingly remarkable" is not precisely defined in the Wild and Scenic Rivers Act. Consequently, following passage of the Omnibus Oregon Wild and Scenic Rivers Act, a process was developed by government agencies with input from knowledgeable organizations and individuals which established recommended minimum criteria for each resource value to meet in order for the resource value to be considered outstandingly remarkable. The criteria are designed as guidelines and are not necessarily all inclusive. Using the criteria as a basis, the determination of whether or not a river area contains outstandingly remarkable values is based on available data and information and the informed professional judgement of the interdisciplinary study team and responsible BLM managers.

The outstandingly remarkable criteria developed are incorporated in BLM's guidance for assessing the outstandingly remarkable values identified in the Wild and Scenic Rivers Act (BLM Manual 8351—Wild and Scenic Rivers - Policy and Program Direction for Identification, Evaluation, and Management). In addition, for the North Fork Malheur Study River, three other resource values were assessed—traditional use (Native American) cultural, botanic/ecological and hydrologic/water quality. The criteria used to assess these additional three resources are the same used by Malheur National Forest when the forest service previously conducted a resource assessment for determination of outstandingly remarkable values of the congressionally designated North Fork Malheur National Scenic River, which abuts and extends upstream for 22 miles from the study river.

The resource values, which must be directly river-related or owe their location or existence to the river ecosystem, are considered outstandingly remarkable if they are unique or exemplary compared to similar values of other rivers within a geographic region of comparison.

The region used for comparison in this study is the same used by Malheur National Forest (see Map 1) when it previously developed a resource assessment for determining outstandingly remarkable values on the North Fork Malheur National Scenic River. The region is based partially on the eight geographic regions described in the 1989 Statewide Comprehensive Outdoor Recreation Plan (SCORP) for Oregon. By using the same geographic region previously established by Malheur National Forest, continuity is maintained for comparing and assessing resource values of the study river relative to those same resource values of the designated scenic river segment. Other rivers in the geographic region of comparison include the Malheur and South Fork John Day, (both components of the NWSRS), the Owyhee (below Owyhee Reservoir), Middle Fork John Day, Silvies, and Powder Rivers.

For each resource value addressed, the entire study river area is discussed and evaluated. When appropriate for a resource value, the study river area is divided into two or more segments or reaches, described by river miles, to aid the discussion, evaluation and determinations of significance of the resource value, based on the guiding criteria for outstandingly remarkable. Refer to Map 2 for river mile locations on the study river.

Ten resource values of the study river area are individually described, evaluated and given a determination of whether or not they are outstandingly remarkable. The ten resource values are scenic,

recreational, geologic, fish, wildlife, prehistoric cultural, historic cultural, Native American tradition use, botanic/ecological, and hydrologic/water quality. Following is the description and evaluation of each of these resource values.

Summary

The findings of the BLM interdisciplinary study team has determined that the following river-related resources of the study river are outstandingly remarkable values: SCENERY, RECREATIONAL, FISH and WILDLIFE. Outstandingly remarkable fish and wildlife values exist along the entire length of the study river area. Outstandingly remarkable scenic and recreational values exist in the upper half of the study river area.

Discussion of River-Related Values

SCENIC

Criteria for Outstandingly Remarkable Value Rating

The landscape elements of land form, vegetation, water color and related factors result in notable or exemplary visual features and/or attractions within the geographic region. The BLM Visual Resource Inventory Handbook, H-4810-1 may be used in assessing visual quality and in evaluating the extent of development upon scenic values. The rating area must be scenic quality "A" as defined in the BLM Visual Resource Inventory Handbook, H-4810-1. When analyzing scenic values, additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed may be considered. Scenery and visual attractions may be highly diverse over the majority of the river segment length and not common to other rivers in the geographic region.

Evaluation of the Present Situation

A scenic quality inventory and evaluation was completed by a BLM visual resource assessment team in June of 1992 in accordance with the agency's Visual Resource Management guidelines. Visual characteristics assessed included landform, vegetation, water, color, adjacent scenery, scarcity and cultural modifications.

The study river corridor was first divided into two homogeneous subunits based upon landform and

vegetation. The upper scenic segment, a steep sloped V-shaped canyon, extends from approximately 1.5 miles below the confluence of the Little Malheur River with the North Fork Malheur River (river mile 7.3) up river to the Malheur National Forest/BLM administrative boundary (river mile 14.8). The lower scenic segment extends from the mouth of the steep-walled canyon (river mile 7.3) to Beulah Reservoir through a broader, more open canyon environment.

Upper Scenic Segment

This scenic segment of the study river includes approximately 7.5 miles of river canyon. The viewshed (or area seen from the river and its canyon) extends, in most cases, to the top of the slope or the rim of the canyon encompassing approximately 2,000 acres. In a few confined locations the seen area only extends part way up the canyon slope. Near the confluence of the Little Malheur River occasional views of Castle Rock, a major geologic feature in the region, are possible.

This river segment's landform consists of steep canyon walls with vertical relief of over 500 feet (average 30-45% slope). The flat canyon bottom (floodplain) is narrow, averaging less than 200 feet across, and sometimes consists solely of the width of the river channel. Numerous basalt rock outcrops, pinnacles, spires, cliff/rim walls, and talus slides add variety and interest to the narrow, steep canyon slopes.

A wide diversity of vegetation representative of both the Blue Mountain and Owyhee Uplands plant communities is found within the canyon. The narrow floodplain offers a thin strip of riparian vegetation along the river (such as dogwood, alder and choke cherry) and a few widely dispersed small meadows. Pockets of ponderosa pine, Douglas fir and juniper and scattered isolated individual trees dot the canyon, mostly on the west and north slopes. Sagebrush, bunchgrass and cheatgrass are the dominant plants on the drier east and south slopes. This diversity of vegetation results in an interesting variety of forms, patterns, contrasts and textures.

The swift flowing river is a dominant visual factor within the confined canyon with cascading ripples interrupted by occasional pools. The water is cool and is comparatively quite clear and clean relative to most other rivers in the

geographic region of comparison. While the water quality of the study river has been determined to be moderately impacted (refer to Hydrologic/Water Quality narrative), the river's turbidity visually appears low.

A variety of diverse, rich color combinations present in the soil, rock, vegetation and water provide a harmony of contrast. Spring flowers, lush summer riparian vegetation, fall colors and snow in winter display distinct seasonal variations. The dark grayish-black basalt rock, brown shades of soil, hues of green, yellow and brown in the vegetation, the red, orange and yellow from lichen on the rock outcrops and the clear bluish-green of the water all contribute to a very colorful landscape.

The adjacent scenery has little influence on the visual quality of the canyon, since in most places a person cannot see out of the canyon. Two exceptions may be noted in the lower part of this river scenic segment. Near the mouth of the Little Malheur River, Castle Rock can be seen from the canyon, greatly enhancing the view. Castle Rock is a regional landmark. It is a very striking, large and unique volcanic plug situated on top of a major ridge. The second exception occurs if someone were to look into the canyon from the rim of the canyon, instead of looking up from the river. The adjacent scenery would then significantly enhance the visual quality due to the surrounding natural, diverse terrain and variety of vegetation.

While this scenic segment of the study river is not one of a kind or unusually rare, it is notably distinctive. There are few other canyons with similar features and a river of this quality in the geographic region of comparison.

No discordant cultural modifications within this river segment exist, except for livestock use within the canyon and in the riparian area. Associated with this use are two barbed wire fences. Sparse remnants of a small, old log cabin are located on a private parcel in the canyon. Other than these cultural modifications, the segment of the study river area is natural, very primitive and virtually pristine.

The scenic quality rating average score by the evaluation team was "A" scenic quality. An "A" scenic quality rating is the highest possible under the BLM's Visual Resource Inventory guidelines.

Lower Scenic Segment

The lower scenic segment includes approximately 7.3 miles of river corridor. The viewshed (or area seen from the river and its canyon) extends to Castle Rock ridge to the east and to Agency Mountain and the surrounding ridges and drainages to the west encompassing approximately 15,000 acres.

The landform consists of a more open canyon than the upper scenic segment, dominated with gentle to moderate slopes (10-40%). Numerous side drainages enter the relatively wide (300-600 feet) canyon bottom. In places the canyon bottom narrows to less than 150 feet wide. Rim rock and scree slopes add to the variety and interest of the landscape. The rock outcrops, spires and pinnacles of the upper scenic segment are lacking in this segment. The overall landform is interesting but not exceptional or dominant.

Vegetation consists mainly of scattered junipers, sagebrush, bunchgrass, cheatgrass, dense willow along the river with some dogwood and alder, and several large fields of irrigated pasture grass.

The river is no longer as dominant as it was in the upper confined canyon, but still attracts attention as it travels through the hay meadows and along the adjacent county road. It slows down and becomes warmer than in the upper scenic segment.

A variety of brown, green and yellow color combinations are present in the soil, rock, vegetation and water. The lush green irrigated pastures add to the intensity of color present. However, some of the diversity of colors found in the more varied vegetation of the upper canyon is missing, along with some of the swift flowing water.

The adjacent scenery moderately enhances the visual quality of the lower segment. Castle Rock can be seen from most of the lower open canyon, greatly enhancing the view. The remaining surrounding landscape is not very distinct, varied or interesting. Numerous cultural modifications detract from the natural setting.

The scenery of this segment is interesting within its setting but fairly common within the geographic region of comparison. The river flowing

through irrigated hay meadows is somewhat distinctive.

There are numerous discordant cultural modifications within this segment related to ranching and livestock grazing. They include the hay meadows, hay barns, water ditches, fences, irrigation pipes, feed bins, grain silos, power lines, signs marking a buried telephone line, roads, borrow pits, heavy equipment, piles of logs, and rancher houses with affiliated out structures. Extending into the river are four boulder-constructed water diversions structures associated with water ditches which are annually built and dismantled. While some of these developments add variety to the visual landscape, most are discordant and promote disharmony in the natural landscape. Livestock grazing occurs throughout this segment of the study river corridor.

The scenic quality rating average score by the evaluation team was "B" scenic quality. A "B" rating is the mid-range scenic quality rating possible under the BLM's Visual Resource Inventory guidelines.

Finding

The upper scenic segment contains outstandingly remarkable scenic values due to the striking landforms, notable variety of vegetation, dominant rushing water, rich color combinations and distinctive harmony of all these visual elements in a virtually undisturbed natural setting.

While the scenic quality of the lower scenic segment contributes significantly to the river's setting, it is not found to be outstandingly remarkable. The landscape is interesting but is not unique within the geographic region of comparison.

RECREATIONAL

Criteria for Outstandingly Remarkable Values Rating

Recreational opportunities are or have the potential to be unique enough to attract visitors from outside of the geographic region. Visitors are willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but are not limited to sightseeing, wildlife observation, camping, photography, hiking, fishing, hunting and boating. Interpretive opportunities may

be exceptional and attract or have the potential to attract visitors from outside the geographic region. The river may provide or have the potential to provide settings for national or regional commercial usage or competitive events. In addition, the river may be eligible if it is determined to provide a critically important regional recreation opportunity, or be a significant component of a regional recreational opportunity spectrum setting.

Evaluation of the Present Situation

Recreational opportunities are numerous and diverse within the study river area. For purposes of discussion and evaluation of recreational values and opportunities, the study river corridor is divided into two segments—the upper and lower river segments. The setting and the character of the recreational resources varies from the upper river segment (river mile 7.3 to 14.8) with its relatively undisturbed, confined canyon to the lower river segment (river mile 0.0 to 7.3) with its more open and developed corridor. Recreational activities and experiences of the two segments vary accordingly and are described separately.

Use is light in both segments. For the lower segment, this is largely due to restricted access on to private property (75 percent of this lower segment is in private ownership with the only public land located within the first mile immediately upstream from Beulah Reservoir and another half mile segment near the middle of this lower segment). The upper segment is very remote, inaccessible and rugged which tends to limit the number of recreationists. The study river area is a long distance from any large population area and has not received significant notoriety. There have been no formal recreational use surveys. Approximately 9 miles south of the study river is Chukar Park, a BLM campground on the North Fork Malheur River. It typically receives between 5,000 to 8,500 visitors per year. Most campground use occurs during the fall hunting season and throughout the summer, with heaviest use on holidays and weekends.

Upper River Segment

The upper segment (river mile 7.3 to river mile 14.8) is very remote and inaccessible by motorized vehicles, resulting in a natural, primitive setting, being nearly pristine in character. Nearly half of the study river corridor in this river segment is in private ownership. Primary access is from up river off the Malheur National Forest's developed hiking trail along the river,

which ends at the Forest Service/BLM administrative boundary, or from the downstream end at the terminus of a primitive jeep road near the confluence of the Little Malheur River with the North Fork Malheur River (river mile 8.9). There are also a couple of less used jumping off places from primitive jeep trails near the canyon rim. The BLM's Recreation Opportunity Spectrum Class for this section is "primitive", characterized by essentially an unmodified natural environment. The area contains outstanding scenic quality, interesting geologic landforms and diverse flora and fauna, all in a natural and virtually undisturbed setting.

Fishing for wild native redband trout and bull trout is considered excellent in this upper river segment. Visitors originating from distant western Oregon, Idaho and northeastern Oregon repeatedly return to this area as their destination to pursue this recreational activity. Redband and bull trout are both listed as Federal Category 2 candidates under the Endangered Species Act. Present regulations restrict fishing for bull trout to catch and release only. Even though the North Fork Malheur River is a very productive fishery and is one of the better producers of wild trout in southeast Oregon, it could not sustain much fishing pressure without adversely impacting fishing quality. Due to the study river's small size, it could be easily overharvested.

Day hiking is most commonly associated with fishing. The developed hiking trail along the river located on adjacent Forest Service administered land does not continue into the study river corridor. Hiking this river segment is extremely rough through the riverside brush and over talus slopes. Backpacking opportunities are available, with numerous good camp locations on small level meadows along the river, and in the shade of conifer trees. Signed private property mixed with the public land parcels makes legal access across the entire upper segment of the study river difficult.

There are opportunities for sightseeing, photography and nature study of the interesting landforms, diverse plants and variety of wildlife. Hunting of deer, elk and small game is available, but limited within the confined canyon.

Rafting, kayaking, tubing and swimming are not pursued due to the area's remoteness, difficult physical access, and low water flow. During spring runoff kayaking may be possible. How-

ever, access on the high elevation Malheur National Forest would be difficult because of muddy roads. Winter sports such as crosscountry skiing is marginal in most years within the canyon because of limited snow depth and access concerns. The rugged, narrow and brushy nature of the canyon would make skiing and horseback riding very difficult. There are no opportunities for commercial recreational uses or competitive recreation events in this river segment.

Down river from the confluence of the Little Malheur River with the study river, near river mile 8 on private land, is the river crossing of the 1845 Meeks Cutoff route from the historic Oregon Trail. Except for the grave site of Sarah King Chambers, located further down river on private land, there remains no known evidence of the ill-fated Meeks wagon train party or the route they established within the study river corridor. Interpretive opportunities are not considered exceptional and would not commonly attract visitors from outside the geographic region of comparison.

Lower River Segment

Less is known about the recreational opportunities in the lower river segment (river mile 0.0 to 7.3), since it is predominately (75 percent) private property with access restricted. A county road does parallel much of the stretch, terminating at a ranchstead near river mile 6.0. Considerable development associated with ranching and livestock grazing occurs along the river. The BLM's Recreation Opportunity Spectrum Class for this lower river segment is "roaded natural", characterized by alteration of the natural environment that does not significantly detract from the setting and has road access.

Fishing is believed to be good, but cannot be confirmed due to limited access on private properties. Bull trout frequent this segment less as the river's water temperature increases seasonally. Few ideal places to camp, outside the irrigated meadows or along the narrow canyon where the road closely follows the river, exist. The primary exception is on Bureau of Reclamation administered land near the mouth of the study river on Beulah Reservoir.

Deer frequent the hay meadows to feed and rest along the river in the riparian cover. Dove

congregate along the county road and river. Some waterfowl breed within the river corridor. Large flocks of ducks and Canada geese use Beulah Reservoir in the fall and spring. Both chukar and quail are present. Most hunting pressure occurs adjacent to the private property. People originating from both within and outside the region camp and hunt in the surrounding area.

The county road provides good access along the river for vehicle tours, sightseeing and photography. Excellent views of Castle Rock outside the study river corridor are provided along most of the road's length. Mountain bike and horseback riding would be possible using the county road.

Rafting and kayaking would be difficult due to low water flow. During spring runoff, kayaking may be possible. Tubing requires less water and some of the deeper pools may accommodate swimming. There are no substantial opportunities for regional commercial recreational uses, competitive events, or interpretation within the study river area.

Finding

In the upper river segment of the study river, good populations of native wild trout and light fishing pressure resulting from the rugged, remote and inaccessible nature of this river stretch provides outstandingly remarkable recreational values due to the excellent fishing opportunities in an unspoiled natural setting. The fishing attracts visitors from outside the geographic region.

In the lower river segment of the study river, there is insufficient information about fishing to determine its level of significance as a recreational activity. There are other recreational opportunities available, but none are considered to be outstandingly remarkable, individually or collectively.

GEOLOGIC

Criteria for Outstandingly Remarkable Values Rating

The river or the area within the river corridor contains an example(s) of a geologic feature, process, or phenomenon that is rare, unusual or unique to the geographic region. The feature(s) may be in an unusually active stage of development, represent a

textbook example and/or represent a unique or rare combination of geologic features (erosional, glacial, and other geologic structures).

Evaluation of the Present Situation

The Strawberry Volcanics is the major rock unit exposed throughout the study river's canyon walls from the confluence of Bear Creek and the North Fork Malheur River at the Malheur National Forest/BLM administrative boundary (river mile 14.8) to Beulah Reservoir (river mile 0.0). This unit is a complex series of silicic to mafic lava flows more than 2,700 feet thick with 400 to 600 feet exposed in the river canyon.

The North Fork Malheur River follows a north-northwest faulted syncline from its headwaters near Baldy Mountain to within 2.5 miles north of the mouth of Bear Creek within Malheur National Forest. The high-angle normal fault then loses its displacement and passes into an open asymmetrical syncline plunging 12 degrees to the southeast with axial plane steeply inclined eastward. From the mouth of Bear Creek, the syncline continues southeast for 15 river miles, including the entire study river segment, and terminates at the downthrown faulted block containing Beulah Reservoir. The North Fork Malheur River is an example of subsequent drainage developed from the consequent streams that follow the dip-slopes of the syncline.

Basalt flows are the main geologic feature present in the study river area. Weathering, rock debris, and developed soil with vegetative cover makes individual flow count difficult in the river canyon. The flows do not form continuously exposed outcrops and ledges over any great distance. Blocky and platy talus slopes are numerous with the blocky type being the more stable. The platy basalt jointing may represent direction of viscous flow while the lava was solidifying. Small slump blocks occur as a result of mass wasting which alters the stream course as the water flows around the land slides.

No vertebrate fossils have been found within strata of the Strawberry Volcanics, but some undatable fossil leaves and fronds were discovered by W. D. Lowry in 1968.

One active hot spring, on private land, flows from river gravels near river mile 1. This one hot spring in the corridor and three others located in the river's drainage, including an area of hydrothermal alteration, indicate that deep-seated thermal activity is not totally inactive. The hot springs are characteristic of

hot springs found elsewhere in the study river's geographic region of comparison.

Finding

No rare, unusual, or unique geologic feature, process, or phenomenon occurs in the study river area. The basalt flows, talus slopes, faults, hot spring, and land slides are not unique to the geographic region of comparison, nor do they offer an outstandingly remarkable example of the Strawberry Volcanics formation. While the study river area displays the formation in a canyon environment, a better example of the Strawberry Volcanics in a canyon environment can be found in the Middle Fork Malheur River, which is deeper and more bare rock is exposed.

FISH

Criteria for Outstandingly Remarkable Values Rating

Fish values may be judged on the relative merits of either fish populations or habitat, or a combination of these river-related conditions.

Populations - The river is nationally or regionally one of the top producers of resident, indigenous, and/or anadromous fish species. Of particular significance may be the presence of wild or unique stocks, or populations of State or federally listed, or candidate threatened and endangered species.

Habitat - The river provides exceptionally high quality habitat for fish species indigenous to the region. Of particular significance is habitat for State or federally listed, or candidate threatened and endangered species.

Evaluation of the Present Situation

Populations

The following fish species are present within the study river: redband trout, bull trout, rainbow trout, mountain whitefish, northern squawfish, longnose dace, speckled dace, redband shiner, chiselmouth, mottled sculpin, bridgelip sucker, and largescale sucker. Two native wild trout species, bull trout and redband trout, are federal candidate species for listing under the Endangered Species Act (also see Appendix A). They are the two most important fishery management species in the study river and are discussed separately. The other fish species present have no special management status and are

commonly represented in other rivers within the geographic region of comparison.

The North Fork Malheur River above Beulah Reservoir, including the study river segment, is one of the better producers of wild trout in southeastern Oregon. Access difficulties, requiring extended hikes over remote and rough terrain to reach prime fishing locations, have likely helped protect fish from excessive angling which can result in low populations.

Redband Trout

Redband trout are a wild, self-sustaining fish species present throughout the study river. They are tolerant of comparatively warm summertime water temperatures and specially adapted to inhabiting the desert environments associated with the study river. Redband trout larger than the 6 inch minimum legal keep size are common to abundant and 12 to 16 inch fish are found. Most other populations of redband trout in the geographic region of comparison are not nearly as productive in terms of size and diverse age classes as are the redband trout present in the study river.

The degree to which redband trout hybridize with Oregon Department of Fish and Wildlife hatchery rainbow trout stock is currently a problematic topic of discussion throughout eastern Oregon. It is an issue on the study river since some hatchery rainbow trout are stocked in the North Fork Malheur River, both upstream from the study river and downstream in Beulah Reservoir. Some stocked rainbow trout from Beulah Reservoir are known to spawn in the study river and present a source for potential hybridization. Hybridization changes native fish gene pools and may affect the survival of the species as a distinct stock.

The amount of hybridization in the study river, if any, between native redband stock and hatchery rainbow stock released above and below the study river segment is uncertain. Behnke (1982) reported that redband type fish in the Little Malheur River, which enters the study river at river mile 8.9, showed little evidence of hybridization based on physical characteristics. Based on that observation, it is reasonable to conclude that the redband trout present in the study river would also be pure since they occupy a similar and proximate area of the watershed and are also subject to hybridization from hatchery rainbow trout planting programs. Ongoing research including genetic analysis is expected to resolve the hybridization issue.

Bull Trout

Bull trout are a native fish species present, at least seasonally, throughout the study river. There are very few other rivers in the geographic region of comparison occupied by seasonal or yearlong bull trout populations. Their numbers have declined regionally and within the North Fork Malheur River watershed, at large, as a result of habitat degradation. Their decline has prompted the State of Oregon to restrict angling of bull trout to catch and release only for this species. There is a high likelihood that U.S. Fish and Wildlife Service will be petitioned for listing the bull trout as Threatened or Endangered.

Bull trout require cold water temperatures and deep pools as part of their life history. Water temperatures in excess of 72 degrees Fahrenheit which have been recorded in the lower reaches of the study river are too high for bull trout to spawn successfully, so recruitment occurs upstream on the Malheur National Forest. However, adult bull trout are found throughout the study river from late fall to late spring, providing habitat for them to live and grow for roughly half of the year.

Habitat

The study river offers diverse habitat for both the game and the nongame fish species present. This includes riparian habitat (the vegetative communities associated with the wetted zone along the study river) and instream habitat (the features within the aquatic environment which provide food, cover, resting areas and opportunities for escapement for fish present).

The study river as a whole is a very productive fishery with good to excellent instream and riparian habitat conditions. While the river's pool to riffle ratio is low, bedrock and abundant boulders create numerous small holding areas to support a variety of sizes and age classes of fish. The stream bottom possesses relatively clean gravels for fish spawning and the production of aquatic invertebrates which are food sources for trout and other fish.

Water quality in the study river is moderately impaired from a variety of sources (refer to the Hydrologic/Water Quality narrative) and therefore does not contribute to outstandingly remarkable conditions. In addition to the limitations identified in the hydrology narrative, ODFW has reported high bacteria levels from water samples taken within the study river. Bacterial presence tends to reduce recruitment of young as a result of disease.

The best quality cold water fishery habitat is found in the upper reaches of the study river, and is a natural extension of the high quality fish habitat found on the adjacent Malheur National Forest. Dominant woody riparian vegetation is mainly comprised of Douglas fir, dogwood, and alder which provide a good river canopy for moderating summer and winter water temperature extremes. Constant, cool water temperatures are a fundamental habitat need for the primary fish species analyzed in the study river. Although it is true that redbands can tolerate high water temperatures, they are more productive and healthy at the mid and lower temperature zones they are able to occupy. Fallen trees within the river provide an important source of large woody debris for varied pool formation and fish habitat.

In the lower reaches of the study river, the dominant woody riparian vegetation changes and fish habitat quality diminishes from that found upriver. The trees and shrubs are predominantly juniper, willow, alder, and mock orange. Their smaller dimensions and canopy volume offer less value for thermal protection and large woody debris deposition which fosters quality pool development. This habitat is less preferred by fish during periods of extreme heat or cold. In spite of these limitations, this part of the study river is still heavily used by redband trout yearlong and by bull trout from late fall through the early spring.

Information about fishery habitat located on private land in the lower reaches of the study river is limited (over 75 percent of the lower study river area is private land with restricted access). No detailed fishery or fish habitat studies have been conducted so there is some uncertainty about the condition of the fish habitat present. River stretches where water is diverted on private land for hay field irrigation may be limiting fishery habitat quality, but the extent to which this is occurring is not clear.

Findings

Populations - Fishery populations are determined to be outstandingly remarkable, resulting from a combination of factors and considerations associated with the native species of redband trout and bull trout. Yearlong, self-sustaining wild stocks of redband trout and seasonal populations of adult bull trout are present within the study river. There are very few other rivers in the geographic region of comparison occupied by seasonal or yearlong bull trout populations. The larger sizes, productivity and diverse age classes of the redband trout present contribute to this

outstandingly remarkable determination. Both species are federal candidates for listing under the Endangered Species Act. Trout populations of varied age classes and size provide outstanding opportunities for recreational fishing in the upper half of the study river.

Habitat - Fishery habitat is determined to be an outstandingly remarkable value of the study river. Contributing factors include the relatively reliable water volume, good channel structure, the presence of adequate pools and riffles for fish habitation, and the direct linkage with a quality riparian system used by fish on the adjacent National Forest. While water quality within the study river is moderately impaired from a variety of impacts, the impacts do not outweigh the contributing factors that make fisheries habitat an outstandingly remarkable value.

The entire study river is viewed as an important fisheries habitat system which is a direct extension of and compliments values on the adjacent watershed of the Malheur National Forest. Fish habitat values on the National Forest have already been recognized as outstandingly remarkable on their own merits. The two river reaches, respectively, combine to form an outstanding fish habitat complex that is 37 miles long.

WILDLIFE

Criteria for Outstandingly Remarkable Values Rating

Wildlife values may be judged on the relative merits of either wildlife populations or habitat, or a combination of these conditions.

Populations - The river or area within the river corridor contains nationally or regionally important populations of resident or indigenous wildlife species dependent on the river environment. Of particular significance may be species considered to be unique or populations of State, federally listed, or candidate threatened or endangered species.

Habitat - The river or area within the river corridor provides exceptionally high quality habitat for wildlife of national or regional significance, or may provide unique habitat or a critical link in habitat conditions for State, federally listed, or candidate threatened or endangered species. Contiguous habitat conditions are such that the biological needs of the species are met.

Evaluation of the Present Situation

Populations

Wildlife species associated with forests and rangelands occur on the North Fork Malheur study reach since both kinds of habitat are available in a series of adjoining plant community complexes. Resident wildlife are listed in Appendix B based on field observations of professional and amateur wildlife observers, the judgement of professional biologists familiar with the area and other technical information sources noted in Appendix G. There are 212 species of wildlife identified within the study river area including 141 birds, 12 fish, 17 reptiles and amphibians and 42 mammals.

There are 11 species of wildlife within the study river corridor that have some form of special management status as assigned by the U.S. Fish and Wildlife Service or Oregon Department of Fish and Wildlife (see Appendix A).

There are no listed threatened or endangered species of wildlife known to be present in the study river corridor.

Popular hunted species or those that would likely be of special interest to the general public include elk, mule deer, cougar, bobcat, river otter, beaver, blue grouse, chukar and mourning dove.

Specific, detailed inventories to assess populations of wildlife have not been conducted within the study river corridor. However, there is no reason to believe that wildlife populations present on the study river are exceptionally different in contrast to populations within the geographic region of comparison. None of the 11 state or federal candidate species are solely dependent upon the river environment. They could be found elsewhere in similar or higher numbers within their preferred habitats available in the geographic region of comparison. Their preferred habitats do not necessarily include the presence of a river system like the North Fork Malheur River.

The diverse profile of species present is the result of merging rangeland and forestland habitat types. It is not due to some unique feature of the area which cannot be found elsewhere in the geographic area of comparison.

Habitat

The study river occurs entirely within the Ochoco, Blue and Wallowa Mountains (OBW) Physiographic

Province as identified in the Oregon Natural Heritage Program. Detailed information on vegetation, and therefore major wildlife habitat types, is described in Franklin and Dyrness (1973) and the botanical portion of this document. The Blue Mountains of eastern Oregon have been described as an area with great vegetative diversity for wildlife (Thomas et al, 1979).

The general setting for the river system is one of transition between forest and range wildlife habitats of eastern Oregon. These "edge" areas, where different and distinct upland plant communities merge, support and enhance diversity of habitat niches in contrast to isolated range or forest types alone.

The study river's permanent surface water further enriches wildlife habitat quality by supporting a wide variety of vegetative communities associated with the riparian zone (plants growing within the influence of permanent water). These riparian communities support three layers of vegetation including trees, shrubs and forb/grass complexes. Due to this complex vegetative layering, the study river provides a contiguous corridor of wildlife habitat up and down the stream as well as between the riparian zone and upland habitats of the rangelands and forestlands. This concept of connectivity and contiguous habitat has also been described favorably for the North Fork Malheur River on the Malheur National Forest.

Habitat security for wildlife is excellent on most of the study river segment because of limited road access and rugged topography which discourages high volume public use. Human encroachments upon wildlife are very limited along the study river except where the county road closely parallels the river between river miles 1.8 and 5.3. Controlled access on private land contributes to the overall level of freedom from human disturbance of wildlife.

Riparian

The upper reach of the study river is a confined canyon environment which supports douglas fir, ponderosa pine, western juniper, red alder and dogwood/willow vegetation complexes. Conifers are limited to some north slopes and river bottoms where moisture conditions are suitable to support them. These stands are the last stringers of forest habitat which is common on the Malheur National Forest. Continuous old growth timber stands present on the North Fork Malheur Scenic River on the Malheur National Forest are not present along the study river.

The lower reaches of the study river generally support a more diverse vegetative community in contrast to the upper reach. This area primarily supports willow complexes with a mixed assortment of other woody species including red alder, black cottonwood, western juniper, water birch, mock-orange, chokecherry and ponderosa pine. Conifers such as ponderosa pine are much more limited in contrast to the adjoining Malheur National Forest and upstream from river mile 11. The complexity of the woody vegetation present provides exceptionally good habitat for wildlife in the region.

Meadows

Throughout the study river segment meadow complexes provide a key habitat type for wildlife present. Meadows are comprised of herbaceous plant communities immediately adjoining the river that provide important foraging areas and cover for wildlife throughout the year. This habitat element is a key for many species present during the summer and fall when upland habitats have dried out and succulent, nutritious forage is in short supply. This is particularly true for big game and upland game birds.

Meadow habitats in the upper area of the study river corridor are limited in their size and distribution since the steep, rocky canyon does not favor soil deposition and meadow development. In contrast, the lower portion of the study river supports well developed native meadows and extensive irrigated Timothy hay fields which supply a high volume of quality forage and cover. Irrigation practices for livestock forage production have probably expanded the extent of meadow types at the lower end of the study river in contrast to historic native conditions.

Cattle grazing impacts to native meadow plant compositions and, in some cases, bank stability have occurred where topography and fencing allows access for livestock use.

Upland

Upland wildlife habitat is characterized as a complex of sagebrush/bluebunch wheatgrass communities and irregular stands of douglas fir, ponderosa pine and western juniper. These upland habitats include all the plant communities outside the direct moisture influence of the river. Sagebrush and juniper are the dominant tree/shrub cover types. The river's location at

the southern extremity of the OBW province places it in a transitional zone with vegetation and landform features that are also present in the Owyhee Uplands (OU) Physiographic Province.

The fragmented and transitional character of conifer forest, juniper woodland and sagebrush steppe in the study river corridor is considered an important and valuable habitat attribute that makes the corridor especially valuable for wildlife. An excellent variety of horizontal and vertical wildlife habitat structure is present. The landforms associated with the study river provide excellent topographic relief that contributes to the diverse plant community types and niches for wildlife to occupy.

Findings

Populations - Wildlife populations are notable within the study river corridor because there are so many different species that can be observed within a relatively small area. However, they are not considered outstandingly remarkable when contrasted with other areas within the geographic region of comparison. The diversity of wildlife populations described is the result of commingling of forest and rangeland habitats, not the result of some particularly unique features that cannot be found elsewhere within the region.

Of the 212 species of wildlife that occur within the study river corridor, there are 11 with special management status as defined by the U.S. Fish and Wildlife Service and/or the Oregon Department of Fish and Wildlife. The wildlife species that can be observed within the study river corridor are not solely dependent upon the study river's setting for their existence. They could be observed in similar or higher numbers in their preferred habitats outside of the river corridor but within the OBW Province. The diversity of species contributes substantially to the river's setting by enhancing recreational activities such as wildlife observation and hiking.

Habitats - The study river's wildlife habitat is determined to be an outstandingly remarkable value because it supports an exceptional variety of upland and riparian wildlife habitat types. Viewed in its entirety, the study river area crosses the boundaries of forest and rangeland environments and serves as a connective corridor between the two. Wildlife habitat diversity is exceptionally high due to the combined availability of water, forage and multi-layered vegetation including trees, shrubs, grasses

and forbs. The multi-layered vegetation aspect is particularly important in providing the needs for nesting, hiding and feeding for the wide variety of species present in the study river corridor. The study river area is an excellent example of habitat "edge" and transition between the OBW and OU Provinces identified by the Oregon Natural Heritage Program.

Although a different array of habitats occur on this study river as compared to those upstream on the Malheur National Forest, the overall habitat diversity and value to wildlife is very similar to that found in the adjoining Forest Service river corridor. Habitat found in the study river area represents a continuation of the quality habitat found on the Malheur National Forest. This is particularly true for the values of connectivity among the variety of habitats found in the study river corridor. In combination, the Forest Service and BLM river segments constitute a contiguous 37 mile river corridor of high value wildlife habitat.

PREHISTORIC CULTURAL

Criteria for Outstandingly Remarkable Values Rating

The river or area within the river corridor contains a site(s) where there is evidence of occupation or use by Native Americans. Sites must be rare, have unusual characteristics, or exceptional human interest value(s). Sites may have national or regional importance for interpreting prehistory; may be rare; may represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; or may have been used by cultural groups for rare or sacred purposes.

Evaluation of the Present Situation

The study river corridor was used for hunting and fishing in prehistoric times. One prehistoric lithic scatter, which may have been a temporary hunting camp, has been recorded within the river corridor. While no other sites within the study area are known, the survey which located this lithic scatter was designed to characterize human use patterns of the area and the types of sites which may be expected without necessarily locating all sites. Therefore, sites similar to the one located are expected. Known and discovered sites are protected under existing statutes, regulations, and policy.

Finding

Although the study river corridor contains one known site with evidence of occupation or use by Native Americans, this site does not seem to have unusual characteristics or exceptional human interest value. While other similar sites in the corridor may exist, it is expected that they would not have unusual characteristics or exceptional human interest value.

The prehistoric resource values of the North Fork Malheur Study River are determined to not be outstandingly remarkable.

HISTORIC CULTURAL

Criteria for Outstandingly Remarkable Values Rating

The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare or unusual in the region. A historic site(s) and/or feature(s) in most cases is 50 years old or older. Sites or features listed in, or eligible for inclusion in, the National Register of Historic Places may be of particular significance.

Evaluation of the Present Situation

A portion of the 1845 Meek's Cut-Off wagon train route from the historic Oregon Trail passes through the study river corridor. Historic sites within the study river area associated with this route include the grave of Sarah King Chambers, and the confluence of Meek's Gulch and the North Fork Malheur River at river mile 8, where the wagons of this ill-fated wagon train, which had divided into smaller trains, reunited as they traveled west. Sarah King Chamber's cause of death was not related to the North Fork Malheur River.

The study river corridor was within the Malheur Indian Reservation, established in 1872. Following the Bannock War of 1878, which resulted in the removal of the Indian inhabitants from the reservation, the reservation was restored to the public domain in 1883. Subsequently, farmers and ranchers have occupied and used these lands.

Finding

The study river corridor contains the river crossing at Meek's Gulch and grave site, both associated with

the Meek's Cut-Off wagon route from the Oregon Trail. While the overland migration of which this was a part was a significant event in the history of this country, the study river corridor is not rich in locations where significant events, important people, or rare or unusual cultural activities are known to have occurred. The grave site is not a river related value.

The study river corridor was within the Malheur Indian Reservation. No known historic properties associated with this reservation occur within the study river corridor. The reservation was not a river related value.

The historic resource values of the North Fork Malheur Study River are determined to not be outstandingly remarkable.

TRADITIONAL USE (NATIVE AMERICAN) CULTURAL

Criteria for Outstandingly Remarkable Values Rating

The river or area within the river corridor contains regionally unique location(s) of importance to Indian tribes (religious activities, fishing, hunting, and gathering). Locations may have unusual characteristics or exceptional cultural value being integral to continued pursuit of such activities. Locations may have been associated with treaty rights on ceded lands or activities unprotected by treaty on ceded lands or in traditional territories outside ceded lands.

Evaluation of the Present Situation

The general area of the study river corridor is known to have been used for many years by Native Americans. Primary uses of the area were hunting, fishing and gathering of foods, with transportation corridors along ridges and water courses likely. It has been mentioned that sacred sites exist in the nearby area, but none have been identified within the study river corridor.

The study river corridor was contained within the Malheur Indian Reservation. General interest about the North Fork Malheur River drainage has been expressed by the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs, and the Burns Paiute Tribe.

Finding

Regionally unique locations of importance for traditional use or cultural activities to Indian tribes have not been identified within the study river corridor. This being the case, traditional use/cultural values are not considered to be outstandingly remarkable within the study river corridor.

BOTANIC/ECOLOGICAL

Criteria for Outstandingly Remarkable Values Rating

The river, or river corridor, contains nationally or regionally important populations of indigenous plant species. Of particular significance are species considered to be unique or populations of federally listed or candidate threatened and endangered species. Additional factors such as diversity of species, numbers of plant communities, and cultural (existing and Native American) importance of plants may be considered.

Evaluation of the Present Situation

With respect to both plant communities and plant numbers, a broad diversity is exhibited in the study river corridor (see Appendix C). The junction of two floristic zones, the Blue Mountains and the Owyhee Uplands, at this geographical location contributes significantly to the area's ecological diversity. The study river corridor includes the merging of the forested Blue Mountains zone with the sagebrush/salt desert shrub communities of the Owyhee Uplands zone. Climate is typical of the interior west, with cold, moist winters and warm, dry summers. Effective moisture falls as snow and early spring rains.

For discussion, the study river corridor is divided into three vegetative segments—the upper, middle and lower segments. Along the upper river vegetative segment, from 1.5 miles below the Little Malheur River/North Fork Malheur River confluence (river mile 7.3) to the Malheur National Forest/BLM administrative boundary (river mile 14.8), vegetation reflects the greatest affinities for mesic conditions, with associations of Douglas fir and ponderosa pine along the steep canyon walls. North-facing slopes provide particularly favorable habitat for the stands of mixed-age trees.

Where the canyon is particularly narrow and the river gradients are steeper, little development of riparian communities has been made. The stream margins are densely vegetated with red-osier dogwood and other shrubs, including alder and currant. Mock orange is also well established, with willow present but not common.

In the more open areas of the canyon, sedges and rushes occur sporadically, with big sagebrush the major component of the drier terraces. Historical livestock grazing has resulted in the creation of open niches readily occupied by such exotic species as cheatgrass.

The unforested open slopes of the canyon are vegetated with mountain big sagebrush and bunchgrass communities, with western juniper scattered throughout. On some of the most harsh, rocky sites, curl-leaf mountain mahogany pockets occupy small areas. Also on the higher plateaus where little soil formation has occurred, stiff sagebrush grows with many flowering plants which present a colorful picture in early spring. An association of sagebrush, bunchgrasses and squaw apple add to the diversity of the uplands at scattered locations along the upper river segment. Because of the steepness of the canyon walls, livestock grazing has been restricted to the bottom areas, resulting in some near pristine and pristine conditions of the grass and shrub associations on the tables and plateaus, particularly along the east side of this upper vegetative segment of the study river. The change in seral stages is readily apparent on the lower canyon edges.

Open rock talus areas are intermittent. These strands of rubble cascade down the steep slopes and are mostly devoid of vegetation except at their edges, which are occupied by serviceberry and chokecherry.

In the middle vegetative segment, between river miles 4.8 and 7.3, the steep canyon walls widen to reveal a broad flood plain. The extensive soil deposition and development has resulted in fertile ground for native grass meadows and hay fields of timothy and alfalfa. The river is heavily lined with both willow and alder as it courses through the hayed area. Bogs on the flats support dense stands of rushes and sedges with false hellebore a component of these communities.

In the lower vegetative river segment, starting at about river mile 4.8, the river again narrows approximately two miles after flowing through the open meadows of the middle vegetative segment. The shallow, gentle corridor supports the most arid of plant associations in this segment, with scattered

individuals of spiny hopsage, a salt desert shrub, on the first plateau above the riparian zone. A mix of all riparian shrub species, including currant, rose, chokecherry and mock orange, are found in this segment, with willow and alder predominant.

The riparian zone narrows for a portion of this lower segment, with poor development of the typical sedge/rush communities found in areas of soil deposition. Where widening of the corridor occurs, small hay meadows are harvested annually. As the river approaches Beulah Reservoir, a dense stand of willows gives way to a cocklebur flat along the reservoir's edge.

Upland vegetation of this third vegetative segment consists of big sagebrush and bunchgrasses, with western juniper and squaw apple components of many associations. This stretch of the river corridor is highly accessible to man's activities. It is grazed extensively by livestock, and both riparian and upland communities are in lower seral stages.

No rare, threatened or endangered plant species which are either state or federally listed or candidate species have been identified within the study river corridor. Although plants within the river corridor were probably of cultural value to prehistoric peoples, there is little known about the importance or locations of areas where collections may have been routinely made. The expansive meadows have been used historically for hay by local ranchers.

Finding

The entire study river corridor is an area with many different plant associations and species diversity. These characteristics appear to be typical of many rivers and streams present within the geographic region of comparison which have ecotones between forested areas and the flora more typical of the Great Basin. The pristine conditions of some upland communities in the upper river segment are unusual for the region. No regionally important populations of plant species or communities have been identified in the study river corridor.

The wide diversity of communities resulting from the ecotone between two floristic zones gives rise to unusual vegetative values, but the study river corridor possesses no botanical or ecological values determined to be outstandingly remarkable. The diversity of vegetation types associated with the two floristic zones does contribute substantially to the study river's setting by enhancing its scenic values and supporting diverse wildlife habitats.

HYDROLOGIC/WATER QUALITY

Criteria for Outstandingly Remarkable Values Rating

The river has exceptionally pure, clean, and/or clear water. The river is known for its water quality regionally or nationally. It provides, or has the potential to provide, exceptionally high water quality for a variety of beneficial uses including, but not limited to, fish and wildlife, recreation, and communities. The river, or the area within the river corridor, contains an example(s) of a hydrologic feature, process, or phenomena that is rare, unusual, one-of-a-kind, or unique to the geographic region. The feature(s) may be in an unusually active stage of development, represent a textbook example and/or represent a unique or rare combination of hydrologic phenomena (large aquifers, springs, or other features).

Evaluation of the Present Situation

The North Fork Malheur River Basin drains approximately 355 square miles from its headwaters originating in the Malheur National Forest to its confluence with Beulah Reservoir. The mainstem of the North Fork Malheur River is enjoined upstream by its major tributaries the Little Malheur River (river mile 8.9 on the study river segment), and Bear and Crane Creeks (in the National Forest).

Water gaging station 13216500, located at river mile 0.2 on the study river segment, has recorded an average discharge over the past 55 years of 134 cubic feet per second (ft³/s) or 97,080 acre feet per year. Extreme discharges for the period are a maximum discharge of 3,970 ft³/s December 23, 1964, and a minimum discharge of 2.0 ft³/s December 5, 1984, a result of freezeup.

Surface runoff in the perennially flowing North Fork drainage system is mostly from winter snowpack accumulations in the higher mountainous areas to the north, supplemented by groundwater base flow and high intensity, short duration thunder storms throughout the remainder of the year. Snowpack in the higher elevations varies from year to year because of the aridity of the basin, influencing both the amount and duration of high spring runoff. The river flows continuously throughout the year with highest runoff occurring usually from March through May. Once spring snowmelt and runoff has occurred, flows subside and taper off over the summer months and well into winter.

The drainage system within the North Fork Basin is characterized by steep river canyon slopes, a series of perennial to intermittent tributary flow systems, and narrow steeply incised side canyons which empty directly into the main channel. Management of streamflow in the basin consists of the impoundment or diversion of waters for livestock operations and irrigation. Ownership and management of the reservoirs located in the basin is scattered among several private, public and federal entities.

One active hot spring, on private land, flows from river gravels near river mile 1 within the study river corridor. The one hot spring, and three others within the North Fork Malheur River drainage, including an area of hydrothermal alteration, indicate that deep-seated thermal activity is not totally inactive. The hot spring in the study river corridor is characteristic of many hot springs found within the geographic region of comparison.

The 14.8 mile study river falls approximately 670 feet, from 3,990 feet mean sea level (msl) at the upper end of the study river (river mile 14.8) to 3,320 feet msl at the confluence with Beulah Reservoir (river mile 0.0). The main river channel bottom in many reaches is confined and flows directly over bedrock, while other areas in the lower reaches of the study river are broader, with adjacent irrigated hay meadows and four affiliated seasonally constructed boulder diversion structures along its course. Riparian vegetation is limited to a narrow band immediately adjacent to the stream channel along most of the study river. Where stream gradients lessen, the riparian zones along the channel broaden providing a lush and diverse vegetative community. Areas adjacent to irrigated fields bordering the river channel also support a variety of species indigenous to riparian zones. Appendix D shows the physical profile of the North Fork Malheur River to Beulah Reservoir.

Instream Flows and Water Rights

The Oregon Department of Fish and Wildlife has filed or is in the process of filing for instream flow rights on eight segments (Table, below) of the North Fork Malheur River system above Beulah Reservoir that may have a direct bearing on future water development in the entire North Fork Malheur River basin. These instream flow rights are to provide optimum flow for the maintenance, reproduction, and growth of three trout fish species (rainbow, redband and bull trout), and for the recreation and aesthetic benefits associated with these stream segments. Stream segment 4 (Little Malheur

River) of the table is a tributary that enjoins the North Fork Malheur River (stream segment 8), in the study river corridor. Stream segment 6 also includes the study river from the U.S. Forest Service/BLM administrative boundary to the Little Malheur River confluence.

Water Quality

Nominal historic site-specific water quality data is available for the Malheur River drainage. Existing data suggest that runoff water probably contains a few hundred milligrams per liter total dissolved solids and a pH within the 7.0-9.0 range. During 1988, the Oregon Statewide Assessment of Nonpoint Sources of Water Pollution Report from Oregon State's Department of Environmental Quality identified and rated the entire study river segment as having moderate nonpoint source water quality problems. The report identifies cold water fisheries, other aquatic life and esthetics as resource values impacted by the water quality conditions. The Little Malheur River, a tributary which enters the study river at river mile 8.9, is noted as having severe nonpoint water quality problems which somewhat lowers the water quality of the study river below that point.

The nonpoint source problems for the study river segment are turbidity, low dissolved oxygen, sediment, and low flow volumes affecting aquatic biota. The probable causes to impaired water quality from disturbances is from variable levels of surface erosion, changes in flow pattern and timing, and riparian vegetation and bank disturbance.

Although the study river segment has some nonpoint source pollution impacts, its water

quality is good when the river is not influenced by hydrologic events such as intensive thunderstorms and snowmelt. During recent years, lower water flow resulting from drought conditions and minimal springtime snowmelt flushing of the study river segment has contributed to a gradual increase of sediment load found in the river. In 1993, extensive springtime snowmelt flushing lessened this sediment load.

Finding

The study river does not possess outstandingly remarkable features for flow, and no rare, unusual or unique hydrologic characteristics are exhibited within the study river corridor. The hydrologic features of the study river, though significant for river function, are commonly found in the region. Water quality in the entire study river segment has been identified as being moderately impacted. Because of the existing conditions of isolated eroding streambanks, some impaired riparian vegetation, and the use of irrigation diversions, its water quality is determined to not be outstandingly remarkable.

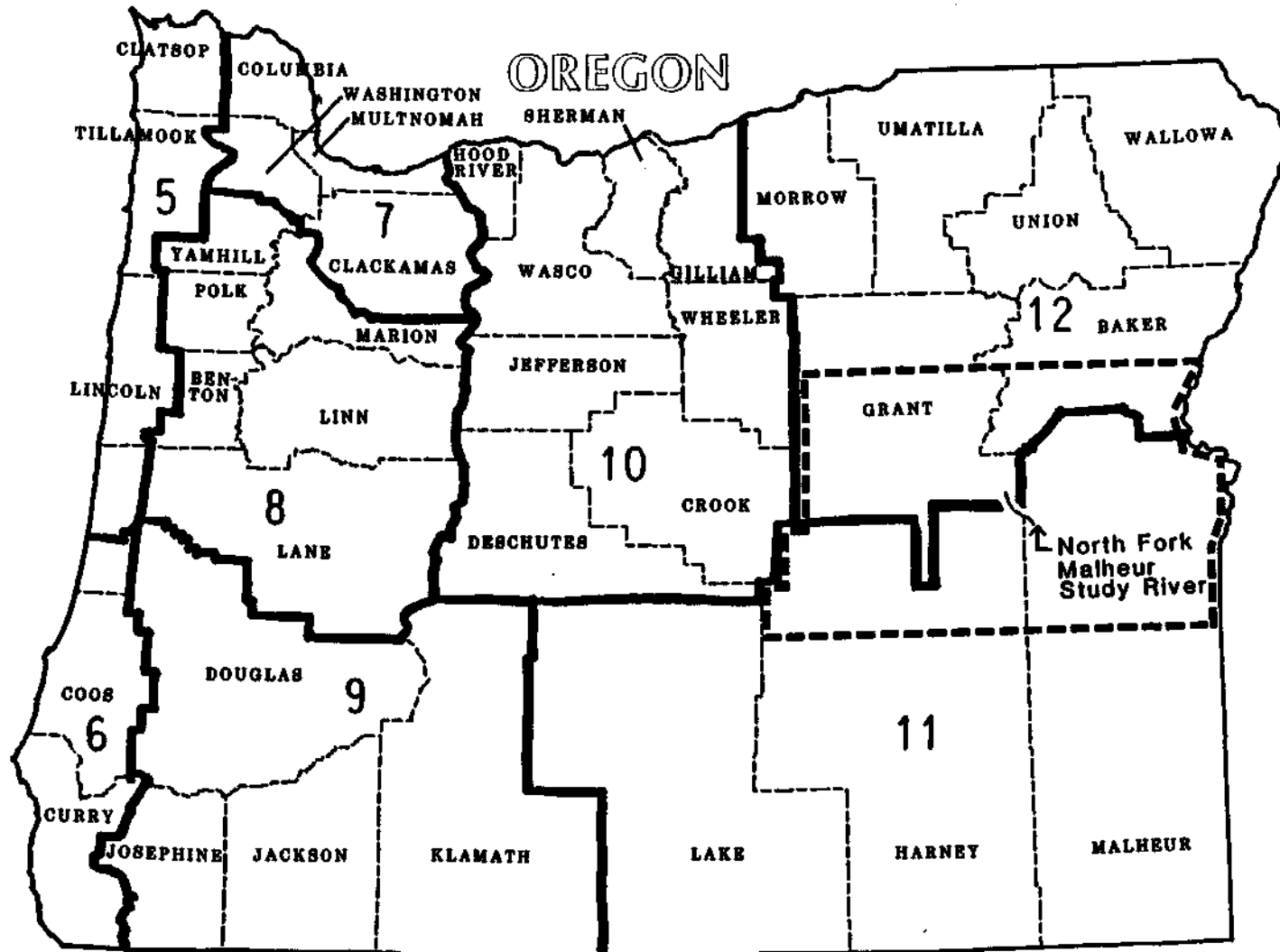
The water of the study river is normally clean and clear when not influenced by severe hydrologic events. During these events, water turbidity is elevated by increased erosion and sediment loading which temporarily lowers the river's water quality. Overall, the river's water quality contributes substantially to the functioning of the river system by supporting good habitat for fish species and other aquatic life. The river water quality is a significant attribute to supporting wildlife populations and habitat, and sufficient to enhance scenic values and recreational opportunities such as fishing, botanical and wildlife viewing, and photography within the study river corridor.

Table

Stream/Parent Stream	Upstream Limit	Downstream Limit	Species
1. L Crane Creek/Crane Creek	Headwaters	Mouth	BUT, RB
2. Crane Creek/N Fk Malheur R	L Crane Creek	Mouth	BUT, RB
3. Elk Creek/N Fk Malheur R	Headwaters	Mouth	BUT, RB
4. L Malheur R/N Fk Malheur R	USFS RD 19 X	Mouth	RT, RB
5. L Malheur R/N Fk Malheur R	Headwaters	USFS RD 16 X	RB
6. N Fk Malheur R/Malheur R	Crane Creek	L Malheur R	BUT, RB
7. N Fk Malheur R/Malheur R	USFS RD 16 X	Crane Ck	BUT, RB
8. N Fk Malheur R/Malheur R	L Malheur R	Beulah Res	RT, BUT, RB

RB—rainbow trout; RT—redband trout; BUT—bull trout
X—Road crossing

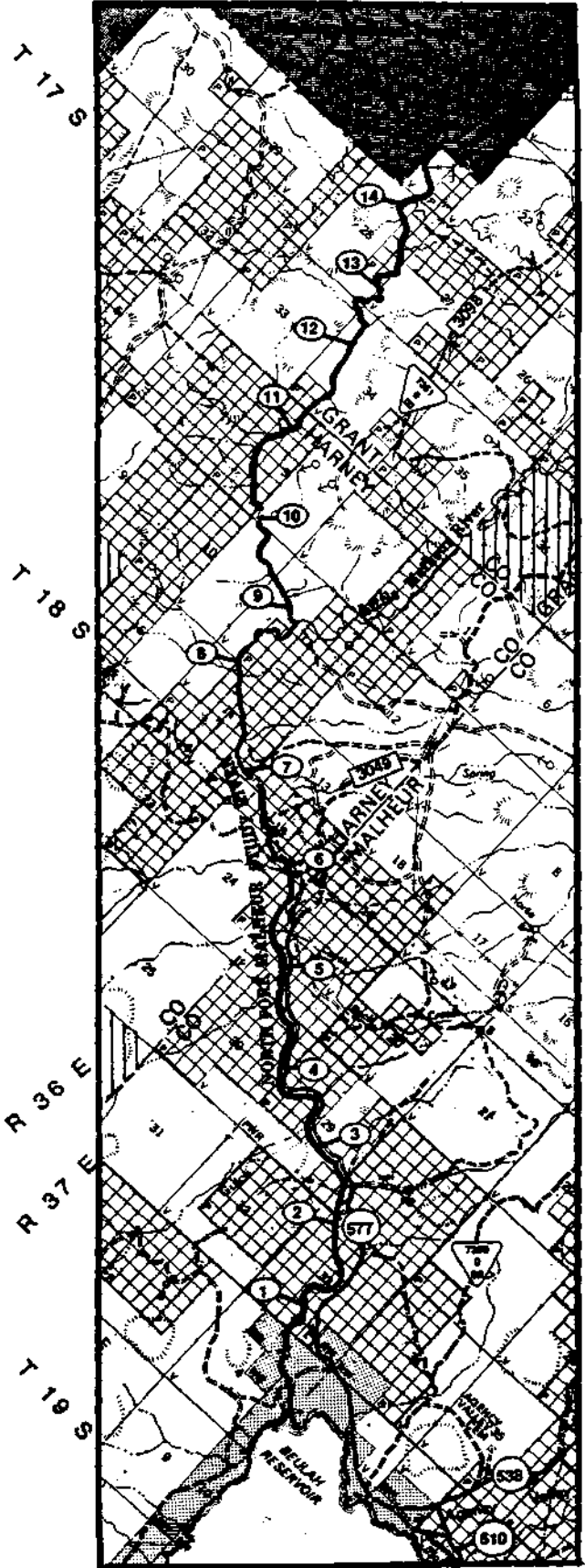
Map 1
Region of Comparison for North Fork Malheur Study River



LEGEND

- Region of Comparison Boundary **-----**
- Oregon SCORP Planning Regions **—————**
- County Lines **- - - - -**

U.S. Department of the Interior
 Bureau of Land Management
 Vale District, Oregon
 1993








Map 2 North Fork Malheur Study River

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Vale District, Oregon
1993







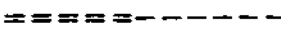
LEGEND

North Fork Malheur Study River..... 
River Miles..... 

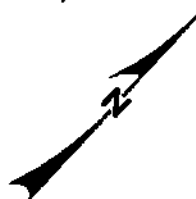
LAND STATUS:

Private..... 
BLM Administered Public Land..... 
BOR Administered Public Land..... 
Malheur National Forest..... 
State Land..... 

ROADS:

	BLM	COUNTY	PUBLIC ACCESS
Improved Public Use Roads			
Unimproved Public Use Road			
Other Roads			

Note: For access on National Forest land,
consult Malheur National Forest
Transportation Plan



Appendix A

Special Status Vertebrate Animal Species North Fork Malheur Study River

COMMON NAME	FEDERAL STATUS ¹	STATE STATUS ²
Northern Goshawk	C2	SC
Swainson's Hawk		SV
Western Sage Grouse	C2	SV
White-Headed Woodpecker		SC
Pileated Woodpecker		SC
Black-Backed Woodpecker		SC
Lewis' Woodpecker		SC
Williamson's Sapsucker		SU
Pygmy Nuthatch		S
Western Bluebird		SV
Pacific Western Big-Eared Bat	C2	SC
Redband Trout	C2	SV
Bull Trout	C2	SC

¹Federal Status Definitions

- C2 Candidate for listing under Endangered Species Act. More data is needed before a determination of threatened or endangered is warranted.
- 3C More common than previously thought as a result of data provided to the U.S. Fish and Wildlife Service. No need for listing.

²State of Oregon Endangered Species Definitions

- SC State Sensitive (Critical Category): Species for which listing as threatened or endangered is pending, or those for which threatened or endangered listing may be appropriate if immediate conservation actions are not taken.
- SV State Sensitive (Vulnerable Category): Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring.
- SU State Sensitive (Undetermined Category): Status unclear.
-

Appendix B

Vertebrate Animal Species List North Fork Malheur Study River

BIRDS

WATERFOWL

Green-winged teal
Cinnamon teal
Blue-winged teal
Mallard
Western Canada goose

Common merganser
Ruddy duck

SWIFTS/HUMMINGBIRDS

Vaux's swift
Black-chinned
hummingbird
Rufous hummingbird
Calliope hummingbird

GOATSUCKERS

Common nighthawk
Common poor-will

SHOREBIRDS/WADERS

Killdeer
Spotted sandpiper
Common snipe
Wilson's phalarope
Great blue heron

Great egret
Black-crowned night heron

PIGEONS/DOVES

Rock dove
Mourning dove

KINGFISHERS

Belted kingfisher

RAPTORS

Cooper's hawk
Northern goshawk
Sharp-shinned hawk
Golden eagle
Red-tailed hawk
Swainson's hawk

Northern harrier
Turkey vulture
Prairie falcon
American kestrel
Osprey

OWLS

Short-eared owl
Long-eared owl
Great horned owl
Western screech owl
Great gray owl

UPLAND GAME BIRDS

Chukar partridge
California quail
Ring-necked pheasant
Western sage grouse
Blue grouse

RAILS

American coot
Sora

PERCHING BIRDS/OTHER

Bushtit
Horned lark
Cedar waxwing
Brown creeper
American dipper

American crow
Common raven
Steller's jay
Clark's nutcracker
Gray jay

Black billed magpie
Red-winged blackbird
Lark sparrow
Yellow-rumped warbler
Yellow warbler

Townsend's warbler
Brewer's blackbird
Common yellowthroat
Yellow-breasted chat
Northern oriole

Dark-eyed junco
Lincoln's sparrow
Song sparrow
Brown-headed cowbird
Macgillivray's warbler

Savannah sparrow
Fox sparrow
Lazuli bunting
Black-headed grosbeak
Green-tailed towhee
Rufous-sided towhee
Western tanager
Vesper sparrow

Brewer's sparrow
Chipping sparrow

Western meadowlark
Orange-crowned warbler
Wilson's warbler

Yellow-headed blackbird
White-crowned sparrow

Pine siskin
American goldfinch
Cassin's finch
House finch
Purple finch

Evening grosbeak
Red crossbill
Cliff swallow
Barn swallow
N. Rough-winged swallow

Tree swallow
Violet-green swallow
Loggerhead shrike
Sage thrasher
Hermit thrush

Swainson's thrush
Townsend's solitaire
Ruby-crowned kinglet
Golden-crowned kinglet
Mountain bluebird

Western bluebird
American robin
Black-capped chickadee
Mountain chickadee
House sparrow

Red-breasted nuthatch
White-breasted nuthatch
Pygmy nuthatch
Starling
Canyon wren
Marsh wren

Rock wren
House wren
Winter wren
Olive sided flycatcher
Western wood-peewee
Western flycatcher
Hammond's flycatcher
Dusky flycatcher
Willow flycatcher

Gray flycatcher
Ash-throated flycatcher
Say's phoebe
Eastern kingbird
Western kingbird

Warbling vireo
Solitary vireo

WOODPECKERS

Northern flicker
White-headed woodpecker
Pileated woodpecker
Lewis' woodpecker
Downy woodpecker

Hairy woodpecker
Red-naped sapsucker
Williamson's sapsucker

FISH

Redband trout
Rainbow trout
Mountain whitefish
Bull trout
Bridgelip sucker
Largescale sucker

Mottled sculpin
Chiselmouth
Northern squawfish
Longnose dace
Speckled dace
Redside shiner

AMPHIBIANS

Pacific treefrog
Northern leopard frog
Spotted frog

N. long-toed salamander
Western toad
Great Basin spadefoot toad

REPTILES

Short horned lizard
N. sagebrush lizard
Basin fence lizard
Northern side-blotched lizard
Western skink

Rocky Mtn rubber boa
Western yellow-bellied racer
Great Basin gopher snake
Wandering garter snake
Common garter snake
Great Basin rattlesnake

MAMMALS

Wapiti
Mule deer
Coyote
Red fox
Cougar

Bobcat
River otter
Short-tailed weasel
Long-tailed weasel
Mink

Badger
Raccoon
Black bear
Big brown bat
Silver-haired bat

Hoary bat
California myotis
Long-eared myotis
Small-footed myotis
Little brown myotis

Fringed myotis
Long legged myotis
Western pipistrelle
Pacific western big-eared bat
Merriam shrew

Black-tailed jackrabbit
White-tailed jackrabbit
Mountain cottontail
Beaver
Sagebrush vole

Long-tailed vole
Montane vole
Desert woodrat
Deer mouse
Porcupine

Northern pocket gopher
Great Basin pocket mouse
Yellow pine chipmunk
Least chipmunk
Yellow bellied marmot
Belding ground squirrel
Golden manted ground squirrel
Red squirrel
Western jumping mouse

APPENDIX C

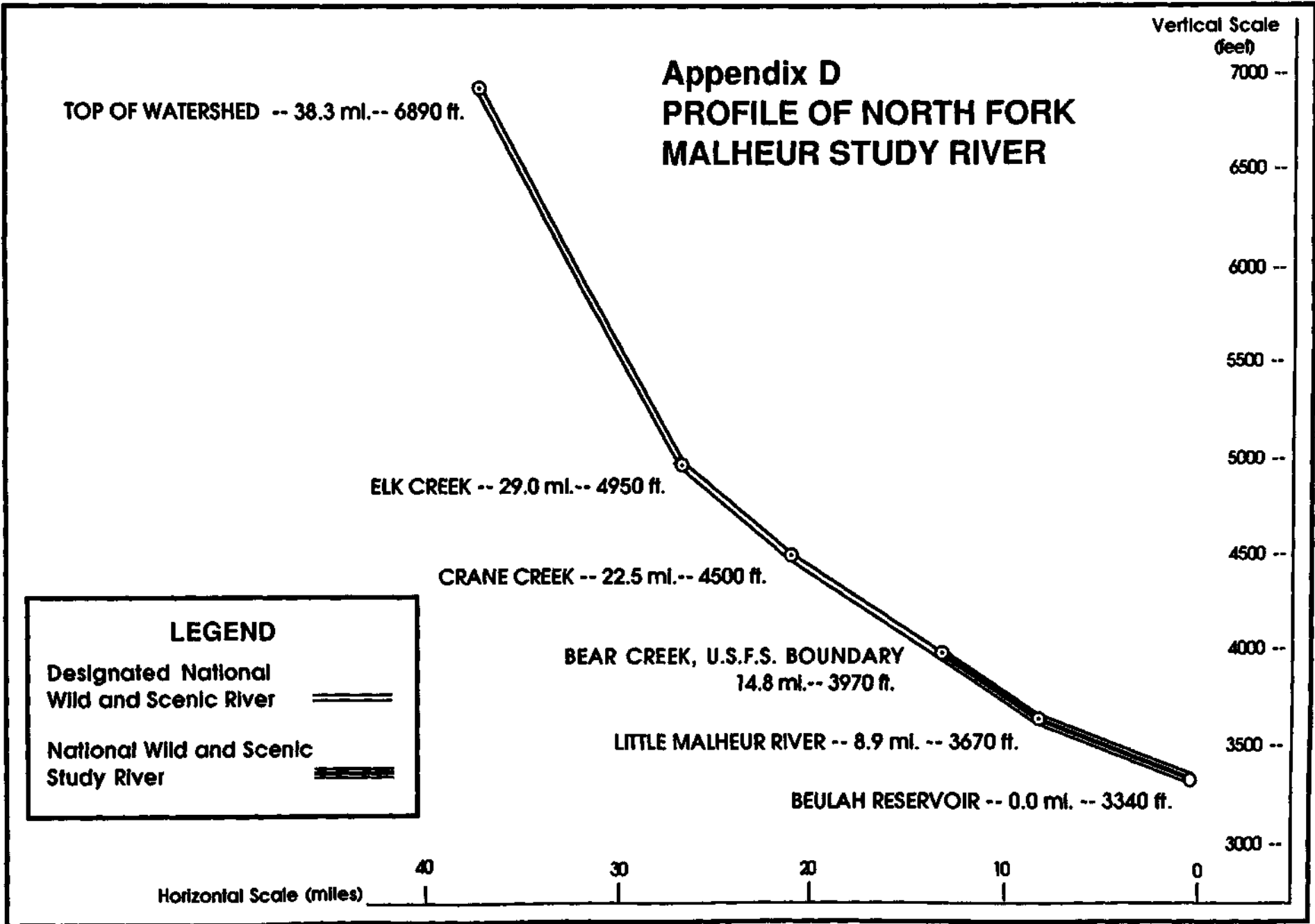
PLANT SPECIES LIST North Fork Malheur Study River

SCIENTIFIC NAME	COMMON NAME	LIFE FORM*
<i>Acer negundo</i>	Box-elder	T
<i>Ainus</i> sp.	Alder	T
<i>Betula occidentalis</i>	Water birch	T
<i>Juniperus occidentalis</i>	Western juniper	T
<i>Pinus ponderosa</i>	Ponderosa pine	T
<i>Populus tremuloides</i>	Quaking aspen	T
<i>Populus trichocarpa</i>	Black cottonwood	T
<i>Prunus virginiana</i>	Common choke-cherry	T
<i>Pseudotsuga menziesii</i>	Douglas fir	T
<i>Sambucus cerulea</i>	Blue elderberry	T
<i>Amelanchier alnifolia</i>	Western serviceberry	S
<i>Arabis</i> sp.	Rockcress	S
<i>Artemisia ludoviciana</i>	Western mugwort	S
<i>Artemisia tridentata tridentata</i>	Basin big sagebrush	S
<i>Artemisia tridentata vaseyana</i>	Mountain big sagebrush	S
<i>Artemisia rigida</i>	Stiff sagebrush	S
<i>Cercocarpus ledifolius ledifolius</i>	Curleaf mountain-mahogany	S
<i>Chrysothamnus nauseosus</i>	Gray rabbitbrush	S
<i>Chrysothamnus viscidiflorus</i>	Green rabbitbrush	S
<i>Cornus stolonifera</i>	Red-osier dogwood	S
<i>Grayia spinosa</i>	Spiny hopsage	S
<i>Peraphyllum ramosissimum</i>	Squaw apple	S
<i>Philadelphus lewisii</i>	Mock orange	S
<i>Rhus radicans</i>	Poison oak; Poison ivy	S
<i>Ribes aureum</i>	Golden currant	S
<i>Ribes cereum</i>	Squaw currant; Wax currant	S
<i>Rosa woodsii</i>	Wood's rose	S
<i>Salix</i> sp.	Willow	S
<i>Salix exigua</i>	Willow	S
<i>Carex</i> sp.	Sedge	G-L
<i>Carex douglasii</i>	Douglas' sedge	G-L
<i>Juncus</i> sp.	Rush	G-L
<i>Juncus balticus</i>	Baltic rush	G-L
<i>Scirpus</i> sp.	Bulrush	G-L
<i>Agropyron spicatum</i>	Bluebunch wheatgrass	G
<i>Bromus commutatus</i>	Hairy cheatgrass	G
<i>Bromus tectorum</i>	Cheatgrass	G
<i>Dactylis glomerata</i>	Orchard-grass	G
<i>Elymus cinereus</i>	Giant wildrye	G
<i>Festuca idahoensis</i>	Idaho fescue	G
<i>Phleum pratensis</i>	Common timothy	G
<i>Poa bulbosa</i>	Bulbous bluegrass	G
<i>Poa pratensis</i>	Kentucky bluegrass	G
<i>Poa sandbergii</i>	Sandberg's bluegrass	G

SCIENTIFIC NAME	COMMON NAME	LIFE FORM*
<i>Sitanion hystrix</i>	Bottlebrush squirreltail	G
<i>Achillea millefolium</i>	Common yarrow	F
<i>Agastache uticifolia</i>	Nettle-leaf horse-mint	F
<i>Allium acuminatum</i>	Tapertip wild onion	F
<i>Amsinkia</i> sp.	Fiddleneck	F
<i>Amsinkia tessellata</i>	Tesselate fiddleneck	F
<i>Antennaria dimorpha</i>	Low pussy-toes	F
<i>Apocynum cannabinum</i>	Common dogbane	F
<i>Arabis</i> sp.	Rockcress	F
<i>Aster</i> sp.	Aster	F
<i>Balsamorhiza hookeri</i>	Hooker's balsamroot	F
<i>Balsamorhiza sagittata</i>	Arrowleaf balsamroot	F
<i>Blepharipappus scaber</i>	Blepharipappus	F
<i>Castilleja</i> sp.	Indian paintbrush	F
<i>Castillaja applegatei pinetorum</i>	Applegate's paintbrush	F
<i>Chaenactis douglasii</i>	Douglas chaenactis	F
<i>Chorispora tenella</i>	Blue mustard	F
<i>Cirsium</i> sp.	Thistle	F
<i>Clematis ligusticifolia</i>	White virgin's heart	F
<i>Collomia linearis</i>	Narrow-leaf collomia	F
<i>Crepis</i> sp.	Hawksbeard	F
<i>Cryptantha</i> sp.	White forget-me-not	F
<i>Delphinium</i> sp.	Larkspur	F
<i>Equisetum arvense</i>	Horsetail; Scouring-rush	F
<i>Erigeron bloomeri</i>	Scabland fleabane	F
<i>Erigeron philadelphicus</i>	Philadelphia daisy; Fleabane	F
<i>Eriogonum compositum</i>	Northern buckwheat	F
<i>Eriogonum heracleoides</i>	Wyeth buckwheat	F
<i>Eriogonum sphaerocephalum</i>	Rock buckwheat	F
<i>Eriogonum strictum</i>	Strict buckwheat	F
<i>Erodium cicutarium</i>	Alfilaria; Stork's-bill	F
<i>Galium</i> sp.	Bedstraw; Cleavers	F
<i>Geranium carolinum</i>	Carolina geranium	F
<i>Haplopappus stenophyllus</i>	Narrow-leaved goldenweed	F
<i>Heuchera</i> sp.	Alumroot	F
<i>Iris missouriensis</i>	Iris	F
<i>Lepidium montanum</i>	Peppergrass; Pepperweed	F
<i>Lewisia rediviva</i>	Bitterroot	F
<i>Lomatium dissectum</i>	Fern-leaved lomatium	F
<i>Lupinus laxiflorus</i>	Spurred lupine	F
<i>Medicago</i> sp.	Alfalfa	F
<i>Melilotus officinalis</i>	Yellow sweet clover	F
<i>Mentzelia albicaulis</i>	White-stemmed mentzelia	F
<i>Mimulus guttatus</i>	Yellow monkey-flower	F
<i>Mimulus nanus</i>	Dwarf purple monkey-flower	F
<i>Montia perfoliata</i>	Miner's lettuce	F
<i>Onopordum acanthium</i>	Scotch thistle	F
<i>Oenothera andina</i>	Obscure evening-primrose	F
<i>Penstemon deustus</i>	Hot rock penstemon	F
<i>Penstemon speciosus</i>	Showy penstemon	F
<i>Phacelia heterophylla</i>	Varileaf phacelia	F
<i>Phacelia linearis</i>	Threadleaf phacelia	F
<i>Phacelia ramosissima</i>	Branched phacelia	F

SCIENTIFIC NAME	COMMON NAME	LIFE FORM*
<i>Phoenicaulis cheiranthoides</i>	Daggerpod	F
<i>Potentilla gracilis</i>	Cinquefoil	F
<i>Purshia tridentata</i>	Bitterbrush	F
<i>Ranunculus repens</i>	Creeping buttercup	F
<i>Rorippa nasturtium-aquaticum</i>	Water-cress	F
<i>Rumex crispus</i>	Curly dock; Sour dock	F
<i>Scutellaria antirrhinoides</i>	Sanpdragon; Skullcap	F
<i>Senecio</i> sp.	Groundsel	F
<i>Sidalcea oregana</i>	Oregon checker-mallow	F
<i>Sisymbrium altissimum</i>	Jim Hill mustard	F
<i>Solidago</i> sp.	Goldenrod	F
<i>Taraxacum</i> sp.	Dandelion	F
<i>Tragopogon dubius</i>	Yellow salsify	F
<i>Trifolium</i> sp.	Clover	F
<i>Triteleia hyacinthina</i>	Hyacinth brodiaea	F
<i>Urtica dioica</i>	Stinging nettle	F
<i>Veratrum californicum</i>	False hellebore	F
<i>Verbascum thapsis</i>	Common mullein	F
<i>Veronica americana</i>	American speedwell	F
<i>Veronica peregrina</i>	Speedwell; Purslane	F
<i>Vicia americana</i>	American vetch	F
<i>Zygadenus paniculatus</i>	Death camas	F

*Life Form: T=tree, S=shrub, G-L=grasslike, G=grass, F=forb



Appendix E

Businesses, Organizations, Agencies and Individuals to Whom Copies of the Eligibility Study Report for the North Fork Malheur Study River Were Sent

Businesses

Atlas Mining Corporation
Castle Rock Ranch
Cramer & Mallon
Denver Meat Company
Foster Brothers
Main Street Family Physicians
Mariposa Images
United Farms Co, Inc
V Dash Cattle Co.
Water For Life
Yturri, Rose, Burnham, Bentz & Helfrich

Organizations

American Fisheries Society
Blue Mountain Group, Sierra Club
Committee for Idaho High Desert
Concerned Citizens for Responsible Mining
Desert Trail Association
Eastern Oregon Mining Association
Grant County Conservationists
National Organization for River Sports
National Wildlife Federation
Nature Conservancy
NW Forestry Association
Oregon Cattlemen's Association
Oregon Natural Desert Ass'n.
The Oregon Rivers Council
Treasure Valley Community College
WaterWatch of Oregon
Wilderness Society

Government

Bureau of Indian Affairs
Bureau of Indian Affairs,
Confederated Tribes of Umatilla
Indian Reservation
Bureau of Mines
Burns Paiute Tribe

Bureau of Reclamation
Confederated Tribes of Warm Springs Reservation of
Oregon
Department of Natural Resources,
Division of State Lands
Grant County Courthouse, Judge
Harney County Courthouse, Judge
John Day Basin Council
Malheur County Courthouse, Judge
Malheur National Forest
Oregon Department of Agriculture
Oregon Department of Fish and Wildlife
Oregon Department of Geology
Oregon Dept of State Parks and Recreation
Oregon Farm Bureau Federation
Oregon Water Resources Department
National Park Service
Soil Conservation Service
U.S. Department of Fish and Wildlife
U.S. House of Representatives, Robert F. Smith
U.S. Senate, Mark O. Hatfield
U.S. Senate, Robert W. Packwood

Individuals

Dr. Roger W. Allen
Tom Ballantyne
Don Bartlett
Ella Baucum
Dean Bertalotto
Dan H. Bishop
Wayne J. Blaylock
Jim Boeder
William J. Butler II
S. E. Comfort
Kelly Edwards
Dr. Ned A. Enyeart
Kenneth L. Evans
Bill Gibbs
Steve Gurnsey
Robert L. Harrod
Roy Hurst
Anthony Joyce
Dan Joyce
Geraldine Joyce

Mark Joyce
Timothy Joyce
V. W. Kaczynski PhD
Glenn Kaufman
Gary Kish
Edward Klimko
D. R. Knoll
William H. Lawrence
R. M. Lesley
Duncan S. Mackenzie
Bill and Velda Mims
Catherine Morrow
Robert E. Moses
Jim and Lisa Nutt

George and Rhonda Ostertag
William J. Pendola, Jr.
Ron J. Rathbone
Pete Rawlins
Leonard E. Rider
Jeffrey Ritter
Phyllis Ross
Charles Rouse
Kirk Schroeder
Dan Sherman
Eric Stone
Jim Tamarelli
Arleta Turner
Mike Weaver
D. H. Wessels, MD

Appendix F

Response to Written Comments

Following are BLM responses to public comments received on the Draft North Fork Malheur Study River Eligibility Study Report.

1. **Comment:** Custom and culture and economic loss, as they relate to cattle operations on the North Fork Malheur River, and private property access for road construction needs to be addressed.

Response: The river evaluation process provides for addressing such subjects under the suitability phase of evaluating rivers for possible inclusion in the National Wild and Scenic Rivers System. Suitability evaluation is a component of BLM's resource management plan (RMP) development process. The Malheur/Jordan RMP is scheduled to begin in 1995, with a completion date of about two years later. These subjects are beyond the scope and purpose of the eligibility study phase of the river evaluation process.

2. **Comment:** Livestock grazing uses, river bank instability and destruction of native plants in the Castle Rock Allotment should be addressed in the next phase of the river study process.

Response: A Castle Rock Allotment Management Plan (AMP) is presently being developed. The plan will address livestock use in relationship to resource issues and will provide for the management of and any needed mitigation associated with livestock use. The AMP will prescribe a grazing system designed to meet the resource management objectives identified in the Rangeland Program Summary of the Ironside Environmental Impact Area.

3. **Comment:** Potential improvement of water quality should be a consideration in evaluating water quality.

Response: While there are opportunities for BLM to take actions for enhancing the water quality of the study river, any actions taken would not improve water quality sufficiently to have it qualify as an outstandingly remarkable value. The upstream water sources for the study river is largely from within the national forest and large blocks of private land where BLM has no jurisdiction. The Malheur National Forest determined that the water quality is not an outstandingly remarkable value. Opportunities to improve water quality will be addressed in allotment management plans and any other specific resource activity management plans affecting public lands of the study river area.

4. **Comment:** Do the existing water diversion structures have the necessary water rights permits and fish screening devices required by Oregon State law?

Response: It is the responsibility of the water user to work with the State of Oregon to meet any state requirements. These requirements are not within BLM's jurisdiction and are beyond the scope and purpose of this study report.

5. **Comment:** If the river is designated by Congress as a component of the National Wild and Scenic Rivers System (NWSRS), significant increases of visitor use will destroy the natural nature of the river and use of private land for private purpose will be restricted.

Response: These concerns are beyond the scope and purpose of the eligibility study report. The suitability phase of the river evaluation process addresses these types of concern. Also see response to comment number 1, above. Should any of the river become a component of the NWSRS, a river management plan for the designated river would also address these types of concern.

6. **Comment:** For further management purposes, would it be beneficial to have the boundary located on a ridge top?

Response: Boundary setting for management of the river is part of the classification phase of the river evaluation process. Such boundary setting would occur with development of the Malheur/Jordan Resource Management Plan (RMP). In the interim, the National Wild and Scenic Rivers Act prescribes a quarter mile either side of the study river (640 acres per river mile) for the length of the study river.

7. Comment: A Hydrologist is not listed as one of the preparers, so how can this resource be technically written about?

Response: A Hydrologist was a member of the interdisciplinary team and was inadvertently excluded from the List of Preparers in the draft report. This final report has the Hydrologist listed.

8. Comment: The only outstandingly remarkable value is livestock grazing.

Response: Livestock practices are not evaluated. Livestock grazing along rivers occurs commonly throughout the region of comparison.

9. Comment: Private landowner plans to harvest timber within the study area.

Response: Recognized in this final report.

10. Comment: Hiking is an outstandingly remarkable value in this ecosystem. A developed trail would be fabulous.

Response: Hiking opportunities are more readily available in similar river corridors within the region of comparison. The high degree of unaltered landscape of the upper study area is a contributing factor to the outstandingly remarkable scenic value of the area.

11. Comment: Documentation indicates that livestock grazing occurred within the study river area at least since 1874.

Response: Recognized in this final report.

12. Comment: Livestock grazing within the study river area has occurred at least since 1918, when my Great Uncle Mike Joyce homesteaded on the river.

Response: Provided for in this final report.

13. Comment: Logging of our timber stands is feasible by helicopter or cable logging.

Response: The position that logging is considered feasible on some private land is included in this final study report. The North Malheur Management Framework Plan excludes timber harvest on public land within the study area.

14. Comment: The redband trout was exterminated when the river was historically poisoned.

Response: The draft Malheur River Basin Fish Management Plan (May 1990, Oregon Department of Fish and Wildlife) states that the redband trout species is present in the study river area. This was confirmed with the agency in November, 1992.

15. Comment: The Whitley Canyon Allotment has a portion of the study river area in it.

Response: This final report includes information about the Whitley Canyon Allotment.

16. Comment: This study must include an evaluation of economic impact on water right holders downstream from Beulah Reservoir to farms west and north of Ontario, Oregon.

Response: Such an evaluation is outside the scope and purpose of this document. Impacts of possible designation will be addressed in the Jordan/Malheur Resource Management Plan.

17. Comment: All of the endangered species of fish have had to be re-introduced into the Malheur River.

Response: As indigenous fish species of the study river and as candidate species for listing under the federal Endangered Species Act, the bull trout and redband trout meet the criteria to evaluate for an outstandingly remarkable value determination.

18. Comment: No official notice of the study was given to the County Seat newspaper, to private landowners along the study river, to downstream owners of water rights, or of a 30-day comment period.

Response: Notice to a newspaper or to all persons with water rights is not a requirement for the study. Landowners along the study river were invited to attend a meeting held with them or their designated representatives prior to the study being commenced. Notice of a 30-day public comment period was provided with mailing of the draft document. Responses from an original mass mailing effort asking for interest in the study was used to aid development of the draft document mailing list.

19. Comment: This study was a trespass, information involving private property was stolen from landowners, and given to the federal government.

Response: Information was gathered for this study report from public domain documents, internal records, information provided by private landowners, access granted by landowners, aerial reconnaissance surveys, and observations made from public lands.

20. Comment: This study violated the National Environmental Policy Act (NEPA) which states no federal agency or its agents shall violate Custom, Culture, Heritage, or Community stability.

Response: NEPA has no direct reference to custom, culture, heritage or community stability. As stated in the act's purpose, it provides a national policy which will encourage productive and enjoyable harmony between man and his environment. NEPA requires that agencies shall, to the fullest extent possible, utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decisionmaking which may have an impact on man's environment. This document makes no decisions on land use. However, the study will be used as a data source for NEPA compliance during development of the Malheur/Jordan Resource Management Plan.

21. Comment: The study destroys land monetary value directly.

Response: Determining land monetary values is not a component of the river study process.

22. Comment: A survey must be done by the federal government to determine exact property lines.

Response: Conducting cadastral land surveys are beyond the scope of the eligibility study. If any river segment is congressionally designated a component of the NWSRS and site specific concerns require it, then a site survey may be needed. Who conducts a survey is dependent upon the nature of specific concerns.

23. Comment: Grazing and its effects are mentioned throughout this document. In some of the examples the negative effects of grazing are hidden in the words, but are still there. If grazing is this big of a problem you should use plain english and say it.

Response: Upon review of the draft study, we consider the information an accurate depiction about livestock uses within the study river area.

24. Comment: The draft report failed to point out critical Constitutional questions such as a Fifth Amendment clause "No person shall be deprived of life, liberty or property without due process of law; nor shall private property be taken for a public purpose without the payment of just compensation." This study is a direct taking of property.

Response: This report is a compilation of data regarding resource values of the study river area, and an evaluation of those resource values to determine their significance. The study does not represent a taking of property.

25. Comment: The Wild and Scenic Rivers Act is an attempt to gain control over water by the federal government.

Response: Discussion of water rights is beyond the purpose of this document. Designation as a component of the NWSRS does not affect prior existing water rights.

Appendix G

List of Preparers

STUDY TEAM MEMBERS

Name	Title	Responsibilities
Garwood Allen	Vale District Geologist	Geology
Robert Alward	Outdoor Recreation Planner	Team Leader, Document Preparation, Technical Coordinator, Visual Input
Rich Conrad	Vale District Outdoor Recreation Planner	Visual and Recreational Resources
Angel Dawson	Archaeologist	Cultural Resources
Jean Findley	Vale District Botanist	Botany/Ecology
Clifford Harvey	Recreation Technician	Research Assistance, Visual Input
Ralph Heft	Malheur Resource Area Manager	Management Oversight
Ron Rembowski	Range Conservationist	Range Resources
Jon Sadowski	Vale District Wildlife Biologist	Fish and Wildlife Resources
Jack Wenderoth	Vale District Hydrologist	Hydrology/Water Quality

SUPPORT SERVICES

Mark Hamel	Typesetting	Visual Information Specialist, Oregon State Office
Cliff McClelland	Printing	Printing Specialist, Oregon State Office
Lynne Silva	Resource Assistant	Final Document Preparation

Appendix H

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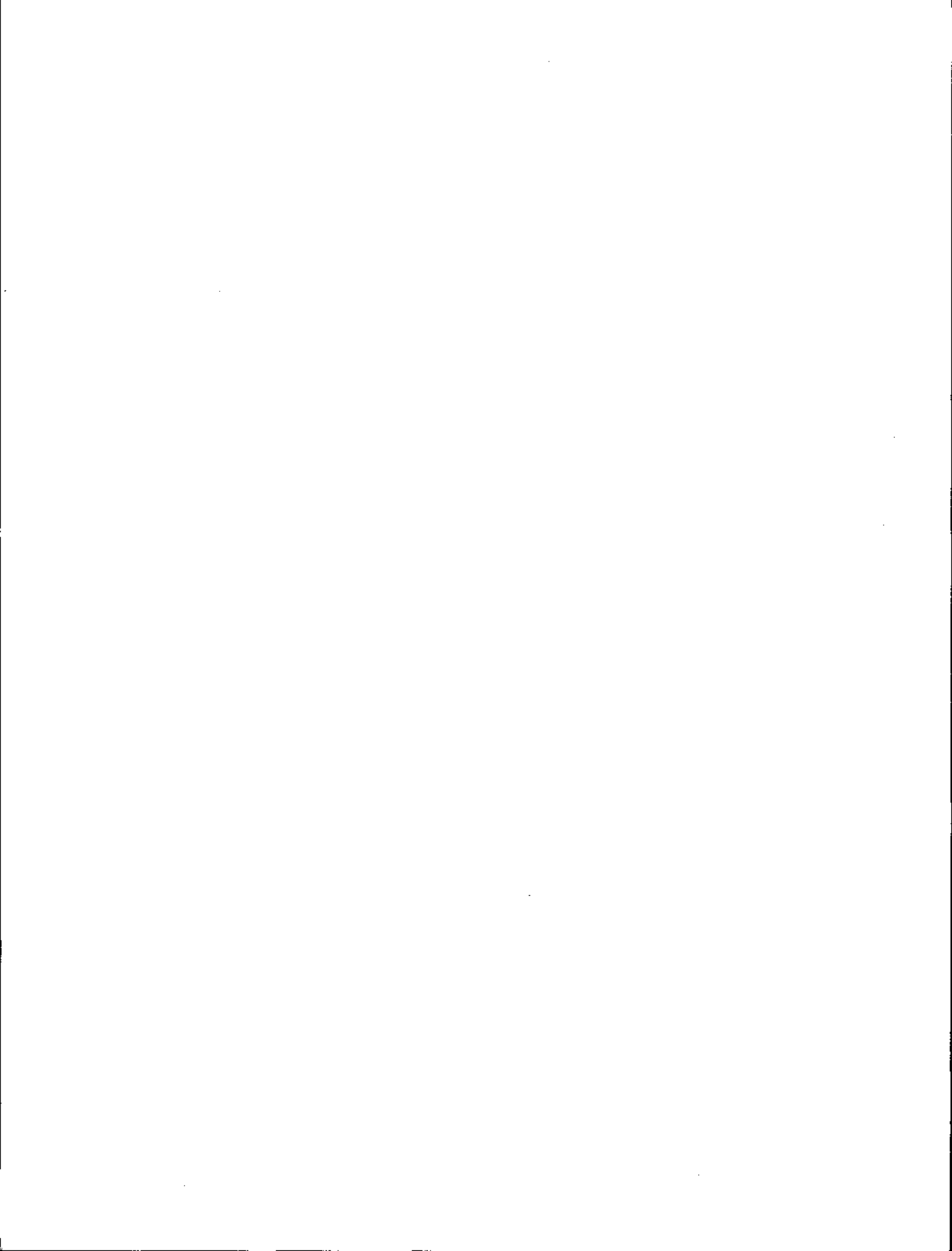
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