Owyhee Subbasin Plan

Appendix 1 – General Supplemental Information

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Appendix 1.2 Fishing Research for the Shoshone-Paiute of the Duck Valley Indian Reservation Relating to Subbasin Planning (Source: Deward E. Walker, Jr., Ph.D., 2004)

As part of our ongoing research into Shoshone-Paiute reliance on fish and other riparian resources, we have been asked to provide information concerning the Shoshone-Paiute relating to subbasin planning. Since 1958 we have conducted comparative research among various tribes of the Columbia Plateau and Great Basin; this has necessitated specific research with most of the tribes in these regions (Table 1).

Table 1: Principal Tribes Involved in Comparative Research of the Columbia Plateau and Great Basin

Shoshone-Paiute of the Duck Valley Indian Reservation
Nez Perce
Confederated Tribes of the Umatilla Indian Reservation
Yakama Indian Nation
Palus
Confederated Tribes of the Colville Indian Reservation
Coeur d'Alene
Arapahoe
Bitterroot Salish (Flathead)
Kootenai
Ft. Hall Shoshone-Bannock
Lemhi Shoshone-Bannock
Warm Springs Confederated Tribes
Wind River Shoshone and Arapahoe
Ft. McDermitt Shoshone-Paiute
Burns Paiute
Klamath

Methods

Our research methods begin with reviewing relevant archaeological published research of historians, anthropologists, and fish biologists. Because of its importance to tribal leaders and others, we also review the legal foundation for the tribes' fishing rights both on and off-reservation. The most important addition we can make to the existing research is to communicate the detailed knowledge of fishing techniques, reliance, and cultural significance of fishing which the tribes hold. Ethnographic research that draws upon the memories and practices of tribal fishermen form the basis of much of the new information we have been gathering. Field travel to specific fishing sites is an essential part of our research with tribal fishermen and other cultural experts who possess information concerning both past and present aspects of fishing.

Some of our research has been published at various times (Walker 1967, 1992, 1993, 1995, 1999). Much of our data remain unpublished but are the foundation of ongoing research for the Shoshone-Paiute of the Duck Valley Indian Reservation. We have adopted an inclusive geographical setting for our research, spanning portions of Idaho, Oregon, and Nevada – areas known to have been occupied and used by Shoshone-Paiute fishermen. Principal riparian systems we are currently investigating for detailed evidence of traditional Shoshone-Paiute fishing are included in Table 2.

Table 2: Principal Rivers Under Investigation for Shoshone-Paiute Fishery Locations

Snake (Idaho and Oregon)
John Day
Deschutes
Owyhee
Powder
Burnt
Payette
Boise
Bruneau
Jarbridge
Weiser
Salmon

It should be noted that these rivers are not the only rivers on which Shoshone-Paiute fishing traditionally has taken place. We are documenting tribal fishing in a very large region which includes portions of both the Great Basin and the Columbia Plateau.

Because of our long-term research activity in the Columbia Plateau and Great Basin we are able to draw upon the knowledge of many different elders from various tribes. In this project these individuals include members of Shoshone-Paiute families who have traditionally used the fisheries not only in the Duck Valley area but at various locations throughout the Columbia Plateau and Great Basin. In our research we are guided by the customary ethnographic method of asking both detailed as well as open-ended questions of the most knowledgeable tribal members and by field trips and demonstrations of fishing practices. While sociological methods require elaborate preparation of questionnaires producing results that are quantitative in nature, ethnographic inquiry depends much more on the ethnographer's personal knowledge of and familiarity with the culture, language, and history of the carefully selected respondents known to possess expert knowledge of the topics under research. It is also occasionally necessary to conduct research interviews in either the Paiute/Bannock or Shoshone language in order to gain the in-depth understanding we are seeking. There are also various concepts and

topics that are best expressed in the native languages, and certain respondents are less comfortable answering questions in English. These questions focus on three types of inquiry:

1. The respondent's personal knowledge of past and present fishing practices;
2. The respondent's knowledge of past and present fishing practices by other tribal members;
3. The respondent's assessment of cultural and other impacts stemming from fishery losses and what coping strategies have been adopted to compensate for such losses.

Our research is particularly valuable for its documentation of the extensive geographic region within which fishing took place as well as the estimates we provide of the size of the annual catch and reliance of the Shoshone-Paiute and other tribes on this valuable resource. In gathering data from Tribal fishermen concerning the tribal catch and the tribes' reliance on aquatic resources, we have employed the following five methods:

1. Use of direct, recorded counts of fish catches.
2. Use of direct, recorded counts of the customary number of peak fishing days.
3. Use of direct, recorded counts of numbers of fishermen for the customary number of days and their productivity.
4. Use of direct, recorded counts of various types of fishing devices, with estimates of their efficiency.
5. Use of direct, recorded counts of the number of fishing locations customarily used, with estimates of their relative productivity.

Once such data have been obtained, we employ tribal fishermen to assist us in their interpretation and explanation considering the following five factors:

1. Nature and efficiency of traditional fishing gear.
2. Size and duration of the accessible fish run.
3. Extent and productivity of spawning habitats.
4. Cultural preferences for fish versus other foods, including the relative contribution of fish to the total tribal diet.
5. Uses of fish for other than dietary purposes (e.g., in trade or ceremonies).

Reliance and Technology

A significant contribution of our ethnographic assessment of Shoshone-Paiute fisheries to the existing body of published research is a description of tribal fishing technology. The fishing techniques employed by the traditional Shoshone-Paiute closely resemble those found among most tribes of the Columbia River and its tributaries. I have prepared a series of illustrations taken from archival photographs, direct observation in the field, ethnographic publications, archaeological publications, as well as information and

models provided by knowledgeable tribal fishermen. They are available upon request. They include the following:

- Various types of nets made of wild hemp, including dipnets and various seines.
- Detachable harpoons, leisters, and double-pronged spears in a style somewhat different from the Plateau styles seen among the Nez Perce, Umatilla, Yakama and others. They were made of bone, stone, and horn.
- The spearing or hooking blind in which a fisherman waited in a concealing structure to spear or hook the fish.
- Weirs (fence-like structures) like those first seen by Lewis and Clark on the Lemhi River that were employed on mid-sized streams.
- Traps such as the fall trap for taking fish descending the river.
- Basketry (tubular or conical) traps used independently or in conjunction with weirs.
- Dams built of piled stone so as to permit spearing or harpooning, usually in smaller streams.
- Gorges and hooks of bone and wood used to gaff as well as hook fish (with bait). They ranged in size from the large sturgeon hooks (with or without bait) to the small gorges used with bait. The large sturgeon hooks were used with long ropes that permitted butchering in the water, because the sturgeon were sometimes too large to land while still alive and intact.
- Fishwalls constructed of piled stones and extended out into the larger streams providing both a resting place for salmon moving upstream as well as a dipping and spearing platform for fishermen.
- Various types of stupefacients that temporarily immobilized fish so they could be speared, hand-fished, or dipnetted.

Cooperative fish drives were employed in placid pools in conjunction with spears, harpoons, nets, and fish clubs. Much larger congregations of tribal members, exceeding 1,000, would fish cooperatively using various techniques under the direction of a fishing specialist/leader (sometimes referred to as a fish or salmon chief) in such fisheries as the Hagerman-Shoshone Falls, Boise-Payette-Weiser Valley, and others throughout the Columbia, Snake, Salmon, and Owyhee drainages. Idaho Yesterdays (1974:14-23) presents a description of the Hagerman-Shoshone Falls fisheries. These large fisheries resemble Celilo and Kettle Falls in the Plateau on the mid-Columbia River.

Preservation of fish required little beyond sun drying, but smoke was also used for taste and to protect against insects. There was an extensive Shoshone-Paiute trade in dried fish. Dried fish were readily stored in basketry containers and in several types of underground caches for use during seasons of limited availability. Fish pemmican was prepared and traded as were sturgeon oil and other fish byproducts. Fish skin, bone, vertebrae, and sturgeon scales entered into the manufacture of various products for use and for trade.

Species taken include: Lamprey (Entosphenus tridentatus), sturgeon (Acipenser transmontanus), whitefish (Prosopium williamsoni), trout (Salmo sp.), chub (Gila sp.), Northern Pike minnow (Ptychocheilus oregonensis), suckers (Catostomus

platyrhynchus), crayfish (Astacus sp.), and mussels (Mytilidae sp.) were used as a supplement to the supplies of anadromous fish that included chinook (Oncorhynchus tsha-tscha), sockeye (Oncorhynchus nerka), chum (Oncorhynchus keta), coho (Oncorhynchus kisutch), and steelhead (Salmo gairdeneri).

We have discovered that Shoshone-Paiute fishing sites at which the various techniques have been traditionally employed are easily grouped into three broad types: 1) fishing sites at natural falls, cascades, or rapids; 2) sites with construction, such as weirs, traps (shades or blinds), and fish walls; and 3) the simple fishing site commonly utilized without such geographic or constructed distinguishing features. The first two types are by far the most productive sites and are capable of daily harvests in the hundreds and even thousands of fish during certain peak days of anadromous fish runs. The third type is not usually employed during peak days of the anadromous runs and is used in an opportunistic manner for both anadromous and especially resident species. Nets, spears, leisters, basketry traps, and other techniques were employed in various combinations at the first two types of sites to enhance their effectiveness. It is these types of fishing sites that produced the heavy catches described for the Hagerman-Shoshone Falls, Boise-Payette-Weiser Valley fisheries, and others throughout the Columbia, Snake, Salmon, and Owyhee drainages. Fishing at such sites typically required large numbers of Shoshone-Paiute working together to adequately exploit the passage of large runs of fish during the seasons and times of their availability. Fishing extended for as much as sixteen hours on certain days. These large congregations at major fisheries included most of the subgroups of the Shoshone-Paiute confederation (Walker 1993a), but also members of more distant tribes (see Table 1).

As evidence of the importance and significance of the annual fish catch we have reviewed direct historical observations of Shoshone-Paiute fishing in southern Idaho. For example, Robert Stuart, in 1812-1813, a member of the Astoria party, described the fishery on the Boise River system, as:

> . . . the most renowned Fishing place in this Country [southern and central Idaho] It is consequently the resort of the majority of Snakes [Shoshone-Paiute), where Immense numbers of Salmon are taken . . [Stuart 1813, 1935].
>
> . . . Mr. Miller says that he stopped here on his way down – it was in the afternoon, by far the best spearing time, when to his utter astonishment the Indians in a few hours killed some thousands of fish . . . [Stuart 1813, 1935].

Large fish catches in southern Idaho were also noted by Nathaniel J. Wyeth (Young 1899:168-169) as he led an exploring expedition along the Snake River in 1833. On September 9 he recorded the following:

> In [the] morning went to see the Indians catch salmon which is done by entangling them in their passage up the creek among dams [weirs] which they erect and spearing them they catch an immense quantity the operation commences in the morning at a signal given by their Chief. . . The main river here is full of salmon.

On September 12 Wyeth (Young 1899:169) recorded another observation of southern Idaho:

> The river is full of salmon and a plenty of them are to be had of the Indians which we meet every few miles fishing on the banks of the stream.

Craig and Hacker (1940:140) quote Washington Irving in describing Captain Bonneville as follows:

> The early traders report that Indians at Salmon Falls on the Snake River took several thousand salmon in one afternoon by means of spears [for additional details see Idaho Yesterdays (1974:14-23)].

In the October 12, 1871, issue of The Weekly Montanian, Granville Stuart (1871) wrote that the Shoshone were reliant on mountain sheep and salmon:

> . . . of which latter there is an abundance in [the] Salmon River . . .

Several valuable historical notes have also been presented in Madsen (1979). For example, he cites a report in the Commissioner of Indian Affairs Annual Report submitted on 25 September 1872 by J. C. Rainsford (1872:437) to J. A Viall, in which it is noted that a crisis was being created by dams and overfishing by non-Indians. He quotes:

> Sir: I have the honor to submit the following report of this agency:
>
> The salmon, though very abundant in the Columbia River during the past season, has been very scarce at the fishing places of these tribes. . . . This is, in my opinion, owing to the immense quantities caught, and the obstructions erected by the several fisheries on the Columbia River. The failure is of vast importance to these people [emphasis added] as they have been in the habit of curing and storing large quantities for winter use. The entire amount caught by [the tribe] this season does not exceed 10,000 pounds; while in past years the amount has been from 30,000 to 60,000 pounds. [Reference is to one band of Shoshone-Paiute at Lemhi.]

In addition to extensive recorded historical observations of the abundant fish catches customarily taken throughout the region we have employed tribal expertise to locate ten traditional weir sites in the Duck Valley region (Owyhee and Bruneau drainages) that have been blocked by downstream damming of the Owyhee and other Snake River tributaries. We have been able to use this information to estimate the average catch that could be expected in normal years before the blockading of fish passage for the various anadromous species available when the Duck Valley Indian reservation was established. We have determined that before the blockading of the fish passage on the Snake, Owyhee, and Bruneau rivers, the Shoshone-Paiute of the Duck Valley Indian Reservation enjoyed three annual salmon runs of about ten days each. We have determined from interviews of elders as well as recorded interviews of individuals born in the 19th century that there were three annual salmon runs that could be expected, in normal years, to last about ten days. In fact, we have evidence that suggests that the Duck Valley Indian

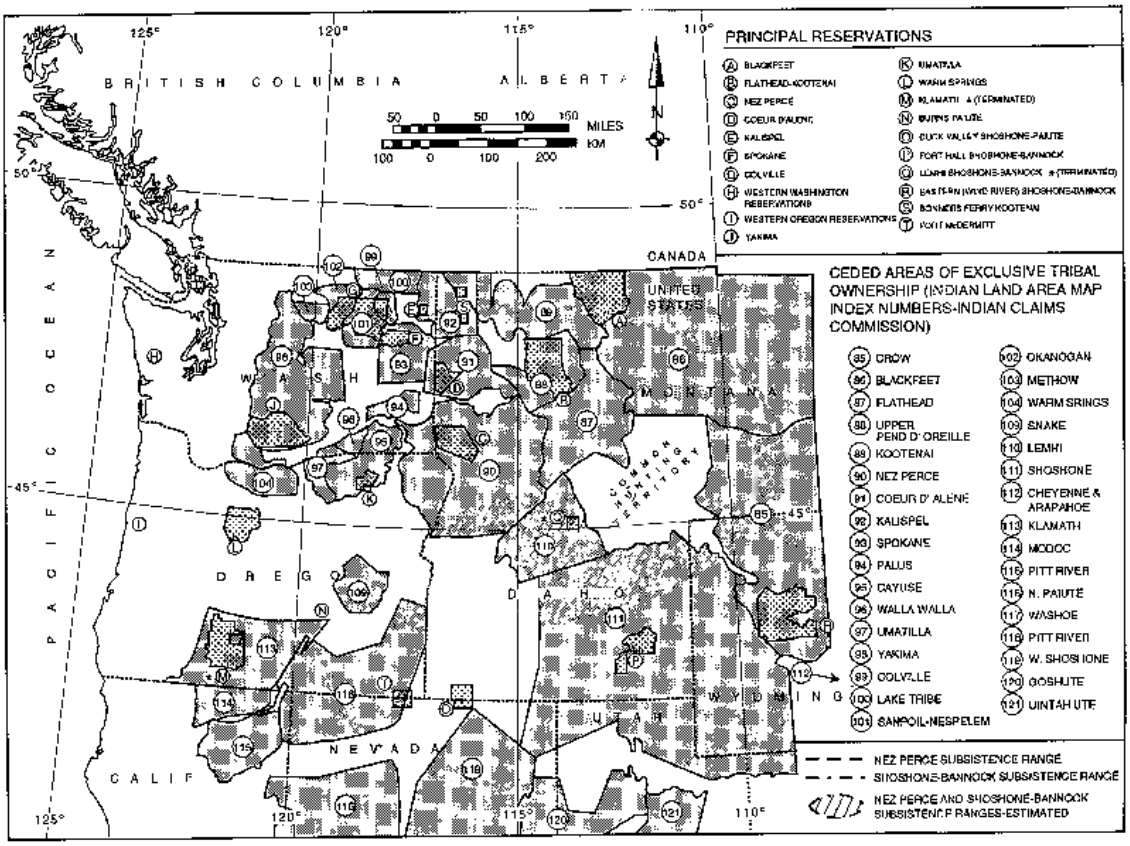
Reservation location was decided upon in part because of the abundant fisheries available in the region. For example, in an interview with Federal Agent Levi Gheen, the Territorial Enterprise (1-3-1878) quoted him to the effect that, "The country abounds in deer, grouse, prairie chickens and other wild game, while the creeks and river literally swarm with excellent fish. All in all Duck Valley is a veritable Indian paradise." Again, it was at this time that Captain Sam first mentioned Duck Valley to Gheen, a "place . . . about seventy or eighty miles northeast of [Elko] where [the Indians] say there is plenty of game and fish and a good farming country as near as they can judge with plenty of timber (in the mountains) water and grass" (Gheen 1875).

Using information gained from Shoshone-Paiute and other tribal fishermen as well as from comparative tribal catch records (Walker 1967, 1992, 1993b), we estimate their catch to have been about 200 fish per day, averaging 15 pounds each, for each weir, yielding a potential average annual catch of 90,000 pounds, or about 6,000 fish. As part of further comparative verification of these estimated catches, we have also derived estimates for two other important fisheries (the Boise-Payette-Weiser Valley and the Hagerman-Shoshone Falls sites) which the Shoshone-Paiute shared with occupants of the Upper Snake River and Boise Valley. We estimate that the Boise-Payette-Weiser Valley area contained at least 25 traditional weir sites and falls/cascades sites as did the Hagerman-Shoshone Falls area. It is our conclusion that each site could produce an average annual catch for about ten days, three times per year. We estimate this to have been 200 fish per day, per weir, averaging 15 pounds each per weir. Therefore, while the reported 19th century salmon catch estimates are large when compared to contemporary catches in the Columbia-Snake system, they appear to be very supportable by the evidence discovered in our research.

Reserved Fishing Rights

Anthropologists as well as the ICC (see Indian Claims Commission Act of 1946) (NARF 1973) have drawn heavy lines around "exclusively" occupied territorial areas for various tribal groups of the Great Basin and elsewhere (see Map 1). This practice completely ignores the overlapping, intertribal cross-utilization of various economic resources in the large areas lying between the nuclear areas of permanent habitation traditionally occupied by tribes of the Columbia Plateau, Great Basin, and elsewhere. It also ignores the very large subsistence ranges typical of such Tribes of the region. It should be noted that in its decisions, the ICC omitted large areas, to which tribal rights remain unextingquished, of southwest Idaho and adjacent areas that form much of the Shoshone-Paiute homeland. Such judicial territorial designations by the ICC must be regarded as misleading simplifications that ignore the joint, intertribal use of large, overlapping subsistence ranges in the Great Basin and Columbia Plateau. Anthropologists need not allow the administrative and legal needs of the Anglo-American system of law dictate how Shoshone-Paiute or other traditional tribal territorial limits are to be drawn. In fact, such lines may be quite different, depending on whether economic, political, or subsistence subsystems of tribal organization are being considered. In addition, the establishment of the reservation system and the drawing of territorial limitations/boundaries has tended to

encourage competition and opposition among reservations that did not previously exist among tribes. As with most other groups, the Shoshone-Paiute traditionally shared their territory with many others, despite frequently exaggerated and relatively rare examples of intertribal hostilities.



Historical evidence largely contradicts the popular picture of intertribal competition and occasional warfare among Columbia Plateau and Great Basin tribes. There is considerable evidence to the contrary that tribes throughout these two large regions traded, intermarried, and otherwise generally acted in a friendly manner toward one another. This foundation of friendship and cooperation has become even more important as the Shoshone-Paiute have attempted to compensate for the blockading of their reservation-based fisheries. With aid from friends and relatives on nearby reservations, public, or privately held lands, the Shoshone-Paiute continue to exercise their reserved rights in many off-reservation areas despite decisions made by the ICC and other federal agencies to deny those rights. These areas, around such rivers as the Snake, John Day, Deschutes, Owyhee, Powder, Burnt, Payette, Boise, Bruneau, Jarbridge, Weiser, and Salmon, contribute to offsetting the tribes' economic, cultural, ceremonial, and subsistence needs, but the loss of their local fisheries in the Duck Valley region has resulted in significant impoverishment, affecting especially the quality of their diet and health.

Establishment of the Duck Valley Indian Reservation began in 1877. A principal consideration in the decision to establish the reservation was its water and abundant fish resources. While the federal actions involved in establishing the Duck Valley Indian Reservation are complex, neither they nor the ICC's deliberations extinguished their customary off-reservation fishing or other rights. In effect, the fishing and hunting rights of the Shoshone-Paiute have continued uninterrupted into the present and have been collectively shared among the other tribal groups with whom they are related. In fact, since 1985 it has been the announced policy of the Bureau of Indian Affairs that tribal off-reservation treaty-reserved rights are potentially exercisable on all federal lands within a tribe's ceded area, as well as on federal lands in other areas traditionally used for those activities, unless applicable treaties/executive orders state otherwise. This policy is based on various legal interpretations by the courts of which I provide the following synopsis.

Some early court cases interpreting the right to fish at usual and accustomed stations indicated that a tribe's exercise of this right was limited to the lands ceded by the tribe to the United States. State v. Meninock, 115 Wash. 528, 529,197 P. 641, 642 (1941). However, it is the ruling of the U.S. Supreme Court that Indian treaties are to be interpreted according to the understanding of the Indians and the intent of the parties. Washington v. Washington State Commercial Passenger Fishing Vessel Association, 443 U.S. 658, 676 (1979). In 1919, the Supreme Court also determined that the Indians signing the Yakima Treaty would have understood their reserved fishing rights to extend to all of their traditional fishing areas, without regard to ceded land boundaries. Seufert Brothers v. United States, 249 U.S. 194, 198-99 (1919). Consequently, their fishing rights could be exercised both inside and outside their ceded lands. This holding has been followed ever since. United States v. Washington, 384 F. Supp. 312, 401-02 (W.D. Wash., 1974), aff'd, 520 F.2d 676, 9th Cir. 1975, cert. denied, 423 U.S. 1085 (1976).

Judicial holdings regarding other off-reservation reserved treaty rights have been less clear. Courts have held that the right to hunt on open and unclaimed lands is limited: 1) to the ceded lands, State v Arthur, 74 Idaho 251, 261, 261 P.2d 135, 141, cert. denied, 347 U.S. 937 (1953); 2) to aboriginal hunting territories, State v. Stasso, 172 Mont. 242, 246, 563 P.2d 562, 564 (1977); or 3) to unoccupied federal lands anywhere, State v. Tinno, 94 Idaho 759, 768, 497 P.2d 1386, 1395 (1972) (concurring opinion). Northwest Indian treaties give more specific direction to resolve these issues. For example, the Fort Bridger Treaty itself refers to "hunting districts," Treaty with the Eastern Band Shoshoni and Bannock, 1868, supra. art. 4, indicating that the signatories expected treaty hunting rights to be exercised within traditional hunting areas that were also unoccupied "public lands" of the United States, without regard to ceded lands. Treaty council minutes for several of the Stevens treaties reveal that the Indians understood that they were reserving their rights to hunt, gather, and pasture in areas traditionally used for those activities. No mention was made of restricting them to ceded lands.

It is the conclusion of the U.S. Supreme Court that Indian treaties are interpreted according to the understanding of the Indians, and in the absence of clear judicial direction, all reserved treaty rights should be exercisable both on ceded lands, where

tribal groups were presumed to have exclusive use and occupancy, and in other areas traditionally used (jointly) for those activities at the time of the treaty, unless the treaty clearly states otherwise. This also implies that investigation of tribal understanding of treaties is a part of an agency's official trust responsibilities in their determination and enforcement of tribal treaties and tribal off-reservation treaty-reserved rights.

Conclusions and Recommendations for Additional Research

Our research provides an important enrichment of the depiction of Shoshone-Paiute traditional and contemporary fishing. Based on numerous records the salmon played an important part in Shoshone-Paiute life and culture. We believe, however, that the information we have gathered is only a beginning and that much can be done to further clarify the nature of fishing and the impacts of various historical developments on this important aspect of tribal economy. Previous research is of limited value and must be strengthened by additional research because it has not adequately depicted the reliance, techniques, geographical range, legal foundation for off-reservation fishing, or the effects of fishery losses on the Shoshone-Paiute. A full and accurate picture requires the additional research that we are currently providing and hope to be able to complete in the near future.

Appendix 1.3 Abbreviations and Acronyms for the Owyhee Subbasin Plan

Appendix 1.3.1 Abbreviations and Acronyms from the Northwest Power Planning and Conservation Council's Directory of Organizations, Publication 2004-0x1

A

AFS	American Fisheries Society
AIC	Association of Idaho Cities
ANSI	American National Standards Institute
APAC	Association of Public Agency Customers
APPA	American Public Power Association
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
AWC	Association of Washington Cities

1 This document is a list of acronyms that may be found in Council-related materials. Please note that Council policy is to avoid the use of acronyms in written materials whenever possible. If an organization's name is long, a key word in that name should be used rather than an acronym. For example, instead of using COE or USACE for the Corps of Engineers, we use the word "Corps."

AWEA	American Wind Energy Association

B

BLM	Bureau of Land Management
BOG	Basin Oversight Group
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration

C

CABO	Council of American Building Officials
CAT Force	Conservation Acquisition Task Force
CBFWA	Columbia Basin Fish and Wildlife Authority
CEC	California Energy Commission
CIS	Coordinated Information System
COE	Corps of Engineers
CPUC	California Public Utilities Commission
CRITFC	Columbia River Inter-Tribal Fish Commission
CSPE	Columbia Storage Power Exchange
CTUIR	Confederated Tribes of the Umatilla Indian Reservation

D

DOE	U.S. Department of Energy
DREW	Drawdown Regional Economic Workgroup
DSIs	Direct service industries (or) Direct Service Industries, Inc.

E

EEI	Edison Electric Institute
EFAC	Economic Forecasting Advisory Committee
EFSC	Oregon Energy Facility Siting Council
EFSEC	Washington Energy Facility Site Evaluation Council
EIS	Environmental impact statement
EPRI	Electric Power Research Institute
EWEB	Eugene Water and Electric Board

F

FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
FOE	Friends of the Earth
FOEC	Fish Operations Executive Committee
FPC	Fish Passage Center
FPDEP	Fish Passage Development and Evaluation Program

G

GRC	Geothermal Resource Council
GRI	Gas Research Institute

H

HGP	Hanford Generating Project
HUD	U.S. Department of Housing and Urban Development

I

IAC	Idaho Association of Counties
ICBO	International Conference of Building Officials
ICNU	Industrial Customers of Northwest Utilities
ICP	Intercompany Pool
IDFG	Idaho Department of Fish and Game
IDWR	Idaho Department of Water Resources
IHOT	Integrated Hatchery Operations Team
IOU	Investor-owned utility
IndeGO	Independent Grid Operator
IPCo	Idaho Power Company
IPUC	Idaho Public Utilities Commission
ISAB	Independent Scientific Advisory Board
ISRP	Independent Scientific Review Panel

L

LADWP	Los Angeles Department of Water and Power
LOC	League of Oregon Cities

M

MACo	Montana Association of Counties
MAU	Montana Associated Utilities
MCS	Model conservation standards
MDFWP	Montana Department of Fish, Wildlife and Parks
MDNRC	Montana Department of Natural Resources and Conservation
MLGEO	Montana Local Government Energy Office
MPC	Montana Power Company
MPSC	Montana Public Service Commission
MTLCT	Montana League of Cities and Towns

N

NCAC Northwest Conservation Act Coalition
NEDC Northwest Environmental Defense Center
NELPA Northwest Electric Light and Power Association
NEPA National Environmental Protection Act
NERC National Electric Reliability Council
NIU Northwest Irrigation Utilities
NMFS National Marine Fisheries Service
NOAA National Oceanic and Atmospheric Administration
NWPCC Northwest Power Planning Council
NRC U.S. Nuclear Regulatory Commission
NRDC Natural Resources Defense Council
NRECA National Rural Electric Cooperative Association
NREL National Renewable Energy Laboratory (formerly Solar Energy Research Institute, SERI)
NRIC Northwest Resource Information Center
NWEC Northwest Energy Code
NWPP Northwest Power Pool
NWPPA Northwest Public Power Association
NWPPA Northwest Pulp and Paper Association
NWPCC Northwest Power and Conservation Council
NWPCC Northwest Power Planning Council

O

OAC Oregon Association of Counties
ODFW Oregon Department of Fish and Wildlife
OEC Oregon Environmental Council
OMB Office of Management and Budget
ONRC Oregon Natural Resources Council
OPUC Oregon Public Utility Commission
OPUDA Oregon People's Utility District Association
ORC Oregon Rivers Council
ORECA Oregon Rural Electric Cooperative Association
ONRC Oregon Natural Resources Council
OWRD Oregon Water Resources Department

P

PGE Portland General Electric
PG&E Pacific Gas and Electric (California)
PGP Public Generating Pool
PNCA Pacific Northwest Coordination Agreement
PNGC Pacific Northwest Generating Cooperative
PNL Pacific Northwest Laboratory
PNUCC Pacific Northwest Utilities Conference Committee
PPC Public Power Council

PP&L	Pacific Power and Light
PSPL	Puget Sound Power and Light
PUC	Public Utilities Commission or Public Utility Commission
PUD	Public Utility District or, in Oregon, People's Utility District
PURPA	Public Utility Regulatory Policies Act of 1978

R

REA	Rural Electrification Administration
RFF	Resources for the Future
RSDP	Residential Standards Demonstration Program
RTF	Regional Technical Forum

S

SAAC	State Agency Advisory Committee
SAM	System Analysis Model
SCE	Southern California Electric
SCL	Seattle City Light
SDGE	San Diego Gas and Electric
SEAof O	Solar Energy Association of Oregon

U

UCUT	Upper Columbia United Tribes
USBR	U.S. Bureau of Reclamation
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

W

WAC	Wildlife Advisory Committee
WAPA	Western Area Power Administration
WB	Water budget
WDF	Washington Department of Fisheries
WDOE	Washington Department of Ecology
WDW	Washington Department of Wildlife
WEC	Washington Environmental Council
WES	Western Electricity Study
WIEB	Western Interstate Energy Board
WMGT	Western Montana Electric Generating and Transmission Cooperative, Inc.
WNP	Washington Public Power Supply System Nuclear Project
WPPSS	Washington Public Power Supply System
WRDA	Water Resources Development Act of 1986
WREA	Washington Rural Electric Cooperative Association

WSAC	Washington State Association of Counties
WSCC	Western Systems Coordinating Council
WSEO	Washington State Energy Office
WUTC	Washington Utilities and Transportation Commission
WWO	Water Watch of Oregon

Y

YIN	Yakama Indian Nation

Appendix 1.3.2 Abbreviations and Acronyms from Columbia/Snake River Mainstem TMDL web site (USEPA 2004)

BPA	Bonneville Power Administration
CRITFC	Columbia River Inter-Tribal Fish Commission
CWA	Clean Water Act
DEQ	Department of Environmental Quality
DNMP	Dairy Nutrient Management Plan
DOE	Department of Ecology
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
LA	Load allocation (for non-point sources in TMDLs)
NPDES	National Pollutant Discharge Elimination System
NPS	Non-Point Source
NWIC	Northwest Indian College
OSS	On-site Septic System
PS	Point Source
PUD	Public Utility Districts
QA/QC	Quality Assurance/Quality Control
RBM 10	River Basin Model developed in EPA Region 10
RM #	River Mile Number
SIS	Summary Implementation Strategy
TDG	Total Dissolved Gas
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WQS	Water Quality Standards
WRIAS	Water Resource Inventory Areas

Appendix 1.3.3 Abbreviations and Acronyms from the Southeast Oregon Resource Management Plan (BLM 2003)

ACEC	area of critical environmental concern
ADC	animal damage control
AML	appropriate management level
AMP	allotment management plan
AMR	appropriate management response
APHIS	Agricultural Plant and Animal Health Inspection Service
ARA	Andrews Resource Area
ATV	all-terrain vehicle
AUM	animal unit month
BA	biological assessment
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
BO	biological opinion
BOM	Bureau of Mines
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
CERCLIS	comprehensive environmental response, Compensation and Liability Information System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLCAS	Canada Lynx Conservation Assessment and Strategy
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act
DLCD	Department of Land Conservation and Development
DOD	Department of Defense
DOE	Department of Energy
DOGAMI	Oregon Department of Geology and Mineral Industries
DOI	Department of the Interior
DPC	desired plant community
DRFC	desired range of future conditions
EA	environmental assessment
EIS	environmental impact statement
EPA	Environmental Protection Agency
ER	entrenchment ratio
ERMA	extensive recreation management area
ERU	ecological reporting unit
ESA	Endangered Species Act
ESI	ecological site inventory
E/EIS	Eastside Environmental Impact Statement
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
FMP	fire management plan
FWFMP	Federal Wildland Fire Management Policy
GIS	geographic information system

GMA	geographic management area
GTR	green tree replacement
HA	herd area
HMA	herd management area
HMP	habitat management plan
HUC	hydrologic unit code
ICBEMP	Interior Columbia Basin Ecosystem Management Plan
IMP	Interim Management Policy
IMPLWR	Interim Management Policy for Land under Wilderness Review
INFISH	Inland Native Fish Strategy
JRA	Jordan Resource Area
KGRA	known geothermic resource area
LCDC	Land Conservation and Development Commission
LGMP	Leslie Gulch ACEC Management Plan
MFP	management framework plan
MOU	memorandum of understanding
MRA	Malheur Resource Area
NCA	national conservation area
NEPA	National Environmental Policy Act
NHOT	National Historic Oregon Trail
NHPA	National Historic Preservation Act
NL	no leasing
NOAA	National Oceanographic and Atmospheric Administration
NPS	National Park Service
NPSP	nonpoint source pollution
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSO	no surface occupancy
NWSR	national wild and scenic river
NWSRA	National Wild and Scenic River Act
NWSRS	National Wild and Scenic River System
OAR	Oregon Administrative Rules
OBSMP	Oregon's Bighorn Sheep Management Plan
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ODPR	Oregon Department of Parks and Recreation
ODSL	Oregon Division of State Lands
OHV	off-highway vehicle
ONA	outstanding natural area
ONHP	Oregon Natural Heritage Program
ONHTMP	Vale District Oregon National Historic Trail Management Plan
ORS	Oregon Revised Statute
ORV	outstandingly remarkable value

OWFEIS	Oregon Wilderness Final Environmental Impact Statement
OWS	occupancy with stipulations
PFC	proper functioning condition
PILT	payments in lieu of taxes
PNC	potential natural community
PP&L	Pacific Power and Light
PSEORMP/FEIS	Proposed Southeastern Oregon Resource Management Plan Final Environmental Impact Statement
PRIA	Public Rangelands Improvement Act
PUC	Public Utilities Commission
RAIDS	riparian aquatic information date system
RAWS	remote automated weather station
RCA	riparian conservation area
RMO	riparian management objective
RMP	resource management plan
RNA	research natural area
ROD	record of decision
ROS	recreation opportunity spectrum
RPS	rangeland program summary
RS	Revised Statutes
R&PP	recreation and public purpose
SCORP	Oregon's Statewide Comprehensive Outdoor Recreation Plan
SEORAC	Southeastern Oregon Resource Advisory Council
SEORMP	Southeastern Oregon Resource Management Plan
SHPO	State Historic Preservation Office
SMA	special management area
SMCMPA	Steens Mountain Cooperative Management and Protective Area
SRMA	special recreation management area
SRP	special recreation permit
S&G's	Standards of Rangeland Health and Guidelines for Livestock Grazing Management
TGA	The Taylor Grazing Act
TMDL	total maximum daily load
TNC	The Nature Conservancy
TNR	temporary nonrenewable grazing
T&E	threatened and endangered
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	visual resource management
WAFWA	Western Association of Fish and Wildlife Agencies
WFSA	wildland fire situation analysis
WRCS	Western Regional Corridor Study
WSA	wilderness study area

WSRO	Wilderness Study Report Oregon
WQMP	Water Quality Management Plan
WQRP	water quality restoration plan

Appendix 1.4 Glossary of Technical Terms

1.4.1 Definition of Strategic Planning Terms

Action Plans: Detailed descriptions of how strategies will be implemented on an operational basis (*Manageware*, State of Louisiana 1996).

Biological Objectives (Science Review Team, SRT, August 16, 1996): Measurable objectives that are adopted by the Northwest Power Planning Council and incorporated into its Fish & Wildlife Program -- and thereby constitute legal standards.

Conceptual Foundation (Independent Scientific Group 1996):

> "A conceptual foundation is a set of scientific principles and assumptions that can give direction to management activities, including restoration programs, such as the FWP. A conceptual foundation determines how information is interpreted, determines what problems (e.g., limitations on fish production) are identified, and as a result, establishes the range of appropriate solutions (Lichatowich et al. 1996). Because it influences the interpretation of information, the conceptual foundation can be a powerful element of management and restoration plans and it can determine the success or failure of these plans. ... Unfortunately, salmon management and restoration plans rarely contain an explicitly described conceptual foundation. The Fish and Wildlife Program is no exception."

Ecological objectives[2] for the implementation work plans (Science Review Team, SRT, August 16, 1996):

> Ecological objectives define the type of biological and physical changes or conditions needed to achieve the management objective. Ecological objectives are based on a conceptual foundation that reflects current understanding of the ecology of the Columbia River Basin. The conceptual foundation is subject to modification as knowledge improves. This in turn can result in modification of objectives and actions. Again, this is a hierarchical system that defines ecological objectives at the Basin, subregional and subbasin level ... Ecological objectives should describe an ecosystem that is consistent with the management objectives. This could include habitat characteristics, correction of identified problems, and biological conditions such as survival changes, diversity and productivity. Ideally, ecological objectives should be quantitative indices relating to needed survival changes, return per spawner or other quantitative indices of ecological change. However, it is unlikely in the near term that such quantitative indices will be available. At this point, simply a qualitative assessment of ecological change or condition needed to meet

[2] The term "*Ecological Objective*" was suggested by the SRT rather than "*Biological Objective*" for two reasons. First, it avoids the legal problem of whether these are "Biological Objectives" in the sense of the Northwest Power Act. Second, it shifts the focus from simply getting a number of fish back through mechanistic solutions, to obtaining an ecological condition that is consistent with a certain condition characterized by a salmon, resident fish and wildlife condition defined by the management objective.

specific management objectives may be all that is possible in many cases. These would be sufficient to establish an overall framework with explicit links between objectives, needed change and actions.

Ecosystem: An ecological community, including all organisms and the abiotic environment, considered as a unit (Swartzman and Kaluzny 1987)[3].

Goals: The general end purposes toward which the effort is directed (*Manageware*, State of Louisiana 1996). Goals represent broad policy direction; e.g., improve migration conditions and survival conditions of listed fish (NMFS Draft Recovery Plan).

Management objectives (Science Review Team, SRT, August 16, 1996): "Management objectives should describe the direction and purpose of fish and wildlife recovery efforts. They should address the question of why recovery programs consist of a given set of strategies and actions. They describe the desired biological state for the watershed in regard to ecosystem characteristics, defining species and management actions. Watershed in this context refers to the Columbia River Basin (including the mainstem rivers as a system), subregions of the Basin (e.g. the Snake River Basin, mid-Columbia, lower Columbia) and individual subbasins. These are hierarchically nested such that there should be vertical consistency between individual subbasin objectives, subregional objectives and management objective for the entire Basin. Different management objectives and ecological relationships can be accommodated by simply moving up or down levels from the Basin to the subbasin levels. Development of management objectives will be an iterative process that cycles between what is desired for watersheds and what is possible given ecological, social and economic constraints."

Mission: A broad, comprehensive statement of the management entities' purpose (*Manageware*, State of Louisiana 1996).

Objectives: Specific and measurable targets for accomplishment (*Manageware*, State of Louisiana 1996). Objectives represent a more specific measurable target, and help define the purpose of setting the goal; e.g., achieve a 20% reduction in smolt mortality by year 2000 (NMFS Draft Recovery Plan).

Philosophies: The core values of the co-management entities, i.e., how we carry out the mission (*Manageware*, State of Louisiana 1996).

Strategies: The methods to accomplish goals and objectives (*Manageware*, State of Louisiana 1996). Strategies are ways to achieve goals and objectives, e.g., alter hydropower operations to mimic more natural river flows (NMFS Draft Recovery Plan).

Tasks (see Action Plans): The specific actions that must be done to achieve an objective using the chosen strategy.

Vision: A compelling conceptual image of the desired future (*Manageware*, State of Louisiana 1996). For example, NMFS' Vision for (Snake River salmon) Recovery[4]: "*We envision an ecosystem that functions to sustain naturally reproducing populations of native fish, and provides social, cultural, and economic benefits to the nation.*"

[3] *Ecological Simulation Primer* (p 335).
[4] The vision is not expected to be achievable within a short time period.

1.4.2 Geographic Information System and Hydrology (USGS, Ecotrust, and ESRI web access January 2003).

Information Sources for this Glossary:
USGS: http://water.usgs.gov/wsc/glossary ;
Ecotrust: http://www.inforain.org/about_gis.htm ;
ESRI: http://www.esri.com/library/glossary

Basic hydrologic data. Includes inventories of features of land and water that vary only from place to place (topographic and geologic maps are examples), and records of processes that vary with both place and time. (Records of precipitation, streamflow, ground-water, and quality-of-water analyses are examples.) Basic hydrologic information is a broader term that includes surveys of the water resources of particular areas and a study of their physical and related economic processes, interrelations and mechanisms. (USGS)

Biome: one of several terrestrial environments distinctly defined as a separate class of ecosystem (i.e. desert, tropical forest, temperate rain forest). (Ecotrust)

Bioregion: a territory defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations; a system of related, interconnected ecosystems. (Ecotrust)

Coverage:
1. A digital version of a map forming the basic unit of vector data storage in ArcInfo. A coverage stores geographic features as primary features (such as arcs, nodes, polygons, and label points) and secondary features (such as tics, map extent, links, and annotation). Associated feature attribute tables describe and store attributes of the geographic features.
2. A set of thematically associated data considered as a unit. A coverage usually represents a single theme such as soils, streams, roads, or land use. a digital map layer that stores vector information. (ESRI)

Database:
A logical collection of interrelated information, managed and stored as a unit, usually on some form of mass-storage system such as magnetic tape or disk. A GIS database includes data about the spatial location and shape of geographic features recorded as points, lines, areas, pixels, grid cells, or tins, as well as their attributes. (ESRI)

Fourth-field Watershed: a standardized hydrological unit – commonly used on Inforain and elsewhere – that splits large drainages into tributary watersheds and considers small, adjoining basins as part of a single unit. (Ecotrust)

GIS:

- Geographic information system. An organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information. (ESRI)
- A computer-based system whereby maps are dynamically tied to and updated through databases. GIS is used to display and analyze spatial data which are tied to a relational database. This connection is what gives GIS its power: maps can be drawn from the database and data can be referenced from the maps. GIS databases include a wide variety of information: geographic, social, political, environmental, and demographic. (Ecotrust)

HUC: (Hydrologic Unit Code) an eight digit code defined by the Bureau of Land Management that represents a specific drainage basin. (Ecotrust)

Hydrology. The science encompassing the behavior of water as it occurs in the atmosphere, on the surface of the ground, and underground. (USGS)

Metadata: documentation explaining the characteristics of a dataset. (Ecotrust)

Raster: A cellular data structure composed of rows and columns for storing images. Groups of cells with the same value represent features. See also grid. (ERSI)

Stream. A general term for a body of flowing water. In hydrology the term is generally applied to the water flowing in a natural *channel* as distinct from a canal. More generally as in the term *stream gaging*, it is applied to the water flowing in any channel, natural or artificial. (USGS)

Streamflow. The discharge that occurs in a natural channel. Although the term discharge can be applied to the flow of a canal, the word streamflow uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than runoff, as streamflow may be applied to discharge whether or not it is affected by diversion or regulation. (USGS)

Spatial Data: geo-referenced data, those which represent features on the ground. (Ecotrust)

Themes: GIS uses layers, called "themes," to overlay different types of information, much as some static maps use mylar overlays to add tiers of information to a geographic background. Each theme represents a category of information, such as roads or forest cover. (Ecotrust)

Watershed:

- An area drained by a single river or river-system, defined by a ridgeline. (Ecotrust)

- The divide separating one *drainage basin* from another and in the past has been generally used to convey this meaning. However, over the years, use of the term to signify drainage basin or catchment area has come to predominate, although drainage basin is preferred. *Drainage divide*, or just divide, is used to denote the boundary between one drainage area and another. Used alone, the term "watershed" is ambiguous and should not be used unless the intended meaning is made clear. (USGS)

1.4.3 EPA Region 7 Definitions from the TMDL Web Page (USEPA Region 7, January 2004).

The Act. The Clean Water Act, as amended, 33 U.S.C. 1251 et seq. The TMDL program deals with Subsection 303(d).

Allocation. A portion that has been designated for a specific purpose or to particular person or things.

Areawide agency. An agency designated under section 208 of the Act, which has responsibilities for water quality management (WQM) planning within a specified area of a State.

Best Management Practice (BMP). Methods, measures or practices selected by an agency to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

Designated management agency (DMA). An agency identified by a WQM plan and designated by the Governor to implement specific control recommendations.

Discharge of a pollutant. (A) Any addition of any pollutant to navigable waters from any point source. (B) Any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft. (FWPCS § 502)

Effluent limitation. Any restriction established by a state or the administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters of the contiguous zone or the ocean including schedules of compliance. (FWPCS § 502)

FWPCA. The legal acronym for the Federal Water Pollution Control Act originally enacted in 1948 and amended on October 18, 1972, becoming known as the Clean Water Act. (FWPCS § 502)

Impaired waterbody. Any waterbody of the United States that does not attain water quality standards (as defined in 40 CFR part 131) due to an individual pollutant, multiple pollutants, pollution, or an unknown cause of impairment. Where a waterbody receives a thermal discharge from one or more point sources, impaired means that the waterbody does not have or maintain a balanced indigenous population of shellfish, fish, and wildlife.

Indian Tribe. Any Indian Tribe, band, group, or community recognized by the Secretary of the Interior and exercising governmental authority over a Federal Indian reservation.

List of Impaired Waterbodies or ``List''. The list of impaired waterbodies that States, Territories and authorized Tribes are required to submit to EPA pursuant to section 303(d) of the CWA.

Load allocation (LA). The portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loads should be distinguished.

Loading capacity. The greatest amount of loading that a water can receive without violating water quality standards.

Load or loading. An amount of matter or thermal energy that is introduced into a receiving water; to introduce matter or thermal energy into a receiving water. Loading of pollutants may be either man-caused or natural (natural background loading).

Navigable waters. Waters of the United States, including territorial seas. (FWPCS § 502)

Non-point source. Any source from which pollution is discharged which is not identified as a point source, including, but not limited to urban, agricultural, or silvicultural runoff. Nonpoint source (NPS) pollution occurs when rainfall, snowmelt, or irrigation water runs over land, or through the ground, and picks up pollutants and deposits them into lakes, rivers and groundwater. Nonpoint pollutants and sources that threaten or impair designated uses in waterbodies include:

- Excess fertilizers (nutrients), herbicides, and insecticides from agricultural and residential and urban areas.
- Sediment (siltation, suspended solids), pesticides, pathogens (animal waste), from agricultural, and residential and urban areas.
- Oil, grease, and toxic chemicals from urban runoff and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks;

- Bacteria and nutrients from livestock operations, pet wastes, and faulty septic systems.
- Atmospheric deposition, hydromodification, and habitat alteration are also sources of NPS pollution.

Point source. Any discernible confined and discrete conveyance including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged, not including agricultural storm water discharges and return flows from irrigated agriculture. (FWPCS § 502)

Pollutant. Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, celler dirt and industrial, municipal, and agricultural waste discharged into water. (FWPCS § 502)

Pollution. The man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

Reasonable assurance. Reasonable assurance means that you demonstrate that each wasteload allocation and load allocation in a TMDL will be implemented. For point sources regulated under section 402 of the Clean Water Act you must demonstrate reasonable assurance by procedures that ensure that enforceable NPDES permits (including coverage to individual sources under a general NPDES permit) will be issued expeditiously to implement applicable wasteload allocations for point sources. For nonpoint sources you must demonstrate reasonable assurance by specific procedures and mechanisms that ensure load allocations for nonpoint sources will be implemented for that waterbody. Specific procedures and mechanisms for nonpoint sources must apply to the pollutant for which the TMDL is being established, must be implemented expeditiously and must be supported by adequate funding. Examples of specific procedures and mechanisms which may provide reasonable assurance for nonpoint sources include State, Territorial, and authorized Tribal regulations, local ordinances, performance bonds, contracts, cost-share agreements, memorandums of understanding, site-specific or watershed-specific voluntary actions, and compliance audits of best management practices.

Source. Any point of origin or beginning.

Thermal discharge. The discharge of the pollutant heat from a point source.

Threatened waterbody. Any waterbody of the United States that currently attains water quality standards, but for which existing and readily available data and information on adverse declining trends indicate that water quality standards will likely be exceeded by the time the next list of impaired or threatened waterbodies is required to be submitted to EPA. Where a waterbody is threatened by a thermal discharge, threatened means that the waterbody has a balanced indigenous population of shellfish, fish, and wildlife, but

adverse declining trends indicate that a balanced indigenous population of shellfish, fish, and wildlife will not be maintained by the time the next list of impaired or threatened waterbodies is required to be submitted to EPA.

Total maximum daily load (TMDL). The sum of the individual waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms or either mass per time, toxicity, or other appropriate measure. Best Management Practices or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations can be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs.

Wasteload allocation (WLA). The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.

Waterbody. A geographically defined portion of navigable waters, waters of the contiguous zone, and ocean waters under the jurisdiction of the United States, including segments of rivers, streams, lakes, wetlands, coastal waters and ocean waters.

Water quality limited segment (WQLS). Any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of the technology-based effluent limitations required by sections 301(b) and 306 of the Act.

Water quality management (WQM) plan. A State or areawide waste treatment management plan developed and updated in accordance with the provisions of sections 205(j), 208 and 303 of the Act and this regulation.

Water Quality Standards (WQS). Provisions of State or Federal law which consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the Act.

1.4.4 Idaho Department of Environmental Quality Glossary for the South Fork Owyhee TMDL (IDEQ 2003).

305(b)	Refers to section 305 subsection “b” of the Clean Water Act. 305(b) generally describes a report of each state’s water quality, and is the principle means by which the U.S. Environmental Protection Agency, congress, and the public

	evaluate whether U.S. waters meet water quality standards, the progress made in maintaining and restoring water quality, and the extent of the remaining problems.
303(d)	Refers to section 303 subsection "d" of the Clean Water Act. 303(d) requires states to develop a list of water bodies that do not meet water quality standards. This section also requires total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to U.S. Environmental Protection Agency approval.
Acre-Foot	A volume of water that would cover an acre to a depth of one foot. Often used to quantify reservoir storage and the annual discharge of large rivers.
Adsorption	The adhesion of one substance to the surface of another. Clays, for example, can adsorb phosphorus and organic molecules.
Aeration	A process by which water becomes charged with air directly from the atmosphere. Dissolved gases, such as oxygen, are then available for reactions in water.
Aerobic	Describes life, processes, or conditions that require the presence of oxygen.
Assessment Database	The ADB is a relational database application designed for the U.S. Environmental Protection Agency for tracking water quality assessment data, such as use attainment and causes and sources of impairment. States need to track this information and many other types of assessment data for thousands of water bodies, and integrate it into meaningful reports. The ADB is designed to make this process accurate, straightforward, and user-friendly for participating states, territories, tribes, and basin commissions.
Adfluvial	Describes fish whose life history involves seasonal migration from lakes to streams for spawning.
Adjunct	In the context of water quality, adjunct refers to areas directly adjacent to focal or refuge habitats that have been degraded by human or natural disturbances and do not presently support high diversity or abundance of native species.

Alevin	A newly hatched, incompletely developed fish (usually a salmonid) still in nest or inactive on the bottom of a water body, living off stored yolk.
Algae	Non-vascular (without water-conducting tissue) aquatic plants that occur as single cells, colonies, or filaments.
Alluvium	Unconsolidated recent stream deposition.
Ambient	General conditions in the environment. In the context of water quality, ambient waters are those representative of general conditions, not associated with episodic perturbations, or specific disturbances such as a wastewater outfall (Armantrout 1998, EPA 1996).
Anadromous	Fish, such as salmon and sea-run trout, that live part or the majority of their lives in the salt water but return to fresh water to spawn.
Anaerobic	Describes the processes that occur in the absence of molecular oxygen and describes the condition of water that is devoid of molecular oxygen.
Anoxia	The condition of oxygen absence or deficiency.
Anthropogenic	Relating to, or resulting from, the influence of human beings on nature.
Anti-Degradation	Refers to the U.S. Environmental Protection Agency's interpretation of the Clean Water Act goal that states and tribes maintain, as well as restore, water quality. This applies to waters that meet or are of higher water quality than required by state standards. State rules provide that the quality of those high quality waters may be lowered only to allow important social or economic development and only after adequate public participation (IDAPA 58.01.02.051). In all cases, the existing beneficial uses must be maintained. State rules further define lowered water quality to be 1) a measurable change, 2) a change adverse to a use, and 3) a change in a pollutant relevant to the water's uses (IDAPA 58.01.02.003.56).
Aquatic	Occurring, growing, or living in water.

Aquifer	An underground, water-bearing layer or stratum of permeable rock, sand, or gravel capable of yielding of water to wells or springs.
Assemblage (aquatic)	An association of interacting populations of organisms in a given water body; for example, a fish assemblage, or a benthic macroinvertebrate assemblage (also see Community) (EPA 1996).
Assimilative Capacity	The ability to process or dissipate pollutants without ill effect to beneficial uses.
Autotrophic	An organism is considered autotrophic if it uses carbon dioxide as its main source of carbon. This most commonly happens through photosynthesis.
Batholith	A large body of intrusive igneous rock that has more than 40 square miles of surface exposure and no known floor. A batholith usually consists of coarse-grained rocks such as granite.
Bedload	Material (generally sand-sized or larger sediment) that is carried along the streambed by rolling or bouncing.
Beneficial Use	Any of the various uses of water, including, but not limited to, aquatic biota, recreation, water supply, wildlife habitat, and aesthetics, which are recognized in water quality standards.
Beneficial Use Reconnaissance Program (BURP)	A program for conducting systematic biological and physical habitat surveys of water bodies in Idaho. BURP protocols address lakes, reservoirs, and wadeable streams and rivers.
Benthic	Pertaining to or living on or in the bottom sediment of a water body.
Benthic Organic Matter	The organic matter on the bottom of a water body.
Benthos	Organisms living in and on the bottom sediment of lakes and streams. Originally, the term meant the lake bottom, but it is now applied almost uniformly to the animals associated with the lake and stream bottoms.
Best Management	Structural, nonstructural, and managerial techniques that

Practices (BMPs)	are effective and practical means to control nonpoint source pollutants.
Best Professional Judgment	A conclusion and/or interpretation derived by a trained and/or technically competent individual by applying interpretation and synthesizing information.
Biochemical Oxygen Demand (BOD)	The amount of dissolved oxygen used by organisms during the decomposition (respiration) of organic matter, expressed as mass of oxygen per volume of water, over some specified period of time.
Biological Integrity	1) The condition of an aquatic community inhabiting unimpaired water bodies of a specified habitat as measured by an evaluation of multiple attributes of the aquatic biota (EPA 1996). 2) The ability of an aquatic ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to the natural habitats of a region (Karr 1991).
Biomass	The weight of biological matter. Standing crop is the amount of biomass (e.g., fish or algae) in a body of water at a given time. Often expressed as grams per square meter.
Biota	The animal and plant life of a given region.
Biotic	A term applied to the living components of an area.
Clean Water Act (CWA)	The Federal Water Pollution Control Act (PL 92-50), commonly known as the Clean Water Act, as last reauthorized by the Water Quality Act of 1987 (PL 100-4), establishes a process for states to use to develop information on, and control the quality of, the nation's water resources.
Coliform Bacteria	A group of bacteria predominantly inhabiting the intestines of humans and animals but also found in soil. Coliform bacteria are commonly used as indicators of the possible presence of pathogenic organisms (also see Fecal Coliform Bacteria).
Colluvium	Material transported to a site by gravity.
Community	A group of interacting organisms living together in a given place.

Conductivity	The ability of an aqueous solution to carry electric current, expressed in micro (μ) mhos/cm at 25 °C. Conductivity is affected by dissolved solids and is used as an indirect measure of total dissolved solids in a water sample.
Cretaceous	The final period of the Mesozoic era (after the Jurassic and before the Tertiary period of the Cenozoic era), thought to have covered the span of time between 135 and 65 million years ago.
Criteria	In the context of water quality, numeric or descriptive factors taken into account in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. EPA develops criteria guidance; states establish criteria.
Cubic Feet per Second	A unit of measure for the rate of flow or discharge of water. One cubic foot per second is the rate of flow of a stream with a cross-section of one square foot flowing at a mean velocity of one foot per second. At a steady rate, once cubic foot per second is equal to 448.8 gallons per minute and 10,984 acre-feet per day.
Cultural Eutrophication	The process of eutrophication that has been accelerated by human-caused influences. Usually seen as an increase in nutrient loading (also see Eutrophication).
Culturally Induced Erosion	Erosion caused by increased runoff or wind action due to the work of humans in deforestation, cultivation of the land, overgrazing, and disturbance of natural drainages; the excess of erosion over the normal for an area (also see Erosion).
Debris Torrent	The sudden down slope movement of soil, rock, and vegetation on steep slopes, often caused by saturation from heavy rains.
Decomposition	The breakdown of organic molecules (e.g., sugar) to inorganic molecules (e.g., carbon dioxide and water) through biological and nonbiological processes.
Depth Fines	Percent by weight of particles of small size within a vertical core of volume of a streambed or lake bottom sediment.

	The upper size threshold for fine sediment for fisheries purposes varies from 0.8 to 6.5 mm depending on the observer and methodology used. The depth sampled varies but is typically about one foot (30 cm).
Designated Uses	Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act.
Discharge	The amount of water flowing in the stream channel at the time of measurement. Usually expressed as cubic feet per second (cfs).
Dissolved Oxygen (DO)	The oxygen dissolved in water. Adequate DO is vital to fish and other aquatic life.
Disturbance	Any event or series of events that disrupts ecosystem, community, or population structure and alters the physical environment.
E. coli	Short for *Escherichia Coli*, *E. coli* are a group of bacteria that are a subspecies of coliform bacteria. Most *E. coli* are essential to the healthy life of all warm-blooded animals, including humans. Their presence is often indicative of fecal contamination.
Ecology	The scientific study of relationships between organisms and their environment; also defined as the study of the structure and function of nature.
Ecological Indicator	A characteristic of an ecosystem that is related to, or derived from, a measure of a biotic or abiotic variable that can provide quantitative information on ecological structure and function. An indicator can contribute to a measure of integrity and sustainability. Ecological indicators are often used within the multimetric index framework.
Ecological Integrity	The condition of an unimpaired ecosystem as measured by combined chemical, physical (including habitat), and biological attributes (EPA 1996).
Ecosystem	The interacting system of a biological community and its non-living (abiotic) environmental surroundings.
Effluent	A discharge of untreated, partially treated, or treated wastewater into a receiving water body.

Endangered Species	Animals, birds, fish, plants, or other living organisms threatened with imminent extinction. Requirements for declaring a species as endangered are contained in the Endangered Species Act.
Environment	The complete range of external conditions, physical and biological, that affect a particular organism or community.
Eocene	An epoch of the early Tertiary period, after the Paleocene and before the Oligocene.
Eolian	Windblown, referring to the process of erosion, transport, and deposition of material by the wind.
Ephemeral Stream	A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and no long continued supply from melting snow or other sources. Its channel is at all times above the water table. (American Geologic Institute 1962).
Erosion	The wearing away of areas of the earth's surface by water, wind, ice, and other forces.
Eutrophic	From Greek for "well nourished," this describes a highly productive body of water in which nutrients do not limit algal growth. It is typified by high algal densities and low clarity.
Eutrophication	1) Natural process of maturing (aging) in a body of water. 2) The natural and human-influenced process of enrichment with nutrients, especially nitrogen and phosphorus, leading to an increased production of organic matter.
Exceedence	A violation (according to DEQ policy) of the pollutant levels permitted by water quality criteria.
Existing Beneficial Use or Existing Use	A beneficial use actually attained in waters on or after November 28, 1975, whether or not the use is designated for the waters in Idaho's *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02).
Exotic Species	A species that is not native (indigenous) to a region.

Extrapolation	Estimation of unknown values by extending or projecting from known values.
Fauna	Animal life, especially the animals characteristic of a region, period, or special environment.
Fecal Coliform Bacteria	Bacteria found in the intestinal tracts of all warm-blooded animals or mammals. Their presence in water is an indicator of pollution and possible contamination by bacteria (also see Coliform Bacteria).
Fecal Streptococci	A species of spherical bacteria including pathogenic strains found in the intestines of warm-blooded animals.
Feedback Loop	In the context of watershed management planning, a feedback loop is a process that provides for tracking progress toward goals and revising actions according to that progress.
Fixed-Location Monitoring	Sampling or measuring environmental conditions continuously or repeatedly at the same location.
Flow	See Discharge.
Fluvial	In fisheries, this describes fish whose life history takes place entirely in streams but migrate to smaller streams for spawning.
Focal	Critical areas supporting a mosaic of high quality habitats that sustain a diverse or unusually productive complement of native species.
Fully Supporting	In compliance with water quality standards and within the range of biological reference conditions for all designated and exiting beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2000).
Fully Supporting Cold Water	Reliable data indicate functioning, sustainable cold water biological assemblages (e.g., fish, macroinvertebrates, or algae), none of which have been modified significantly beyond the natural range of reference conditions (EPA 1997).
Fully Supporting but	An intermediate assessment category describing water

Threatened	bodies that fully support beneficial uses, but have a declining trend in water quality conditions, which if not addressed, will lead to a "not fully supporting" status.
Geographical Information Systems (GIS)	A georeferenced database.
Geometric Mean	A back-transformed mean of the logarithmically transformed numbers often used to describe highly variable, right-skewed data (a few large values), such as bacterial data.
Grab Sample	A single sample collected at a particular time and place. It may represent the composition of the water in that water column.
Gradient	The slope of the land, water, or streambed surface.
Ground Water	Water found beneath the soil surface saturating the layer in which it is located. Most ground water originates as rainfall, is free to move under the influence of gravity, and usually emerges again as stream flow.
Growth Rate	A measure of how quickly something living will develop and grow, such as the amount of new plant or animal tissue produced per a given unit of time, or number of individuals added to a population.
Habitat	The living place of an organism or community.
Headwater	The origin or beginning of a stream.
Hydrologic Basin	The area of land drained by a river system, a reach of a river and its tributaries in that reach, a closed basin, or a group of streams forming a drainage area (also see Watershed).
Hydrologic Cycle	The cycling of water from the atmosphere to the earth (precipitation) and back to the atmosphere (evaporation and plant transpiration). Atmospheric moisture, clouds, rainfall, runoff, surface water, ground water, and water infiltrated in soils are all part of the hydrologic cycle.
Hydrologic Unit	One of a nested series of numbered and named watersheds arising from a national standardization of watershed delineation. The initial 1974 effort (USGS 1987) described

	four levels (region, subregion, accounting unit, cataloging unit) of watersheds throughout the United States. The fourth level is uniquely identified by an eight-digit code built of two-digit fields for each level in the classification. Originally termed a cataloging unit, fourth field hydrologic units have been more commonly called subbasins. Fifth and sixth field hydrologic units have since been delineated for much of the country and are known as watershed and subwatersheds, respectively.
Hydrologic Unit Code refer **(HUC)**	The number assigned to a hydrologic unit. Often used to to fourth field hydrologic units.
Hydrology	The science dealing with the properties, distribution, and circulation of water.
Impervious	Describes a surface, such as pavement, that water cannot penetrate.
Influent	A tributary stream.
Inorganic	Materials not derived from biological sources.
Instantaneous	A condition or measurement at a moment (instant) in time.
Intergravel Dissolved Oxygen	The concentration of dissolved oxygen within spawning gravel. Consideration for determining spawning gravel includes species, water depth, velocity, and substrate.
Intermittent Stream	1) A stream that flows only part of the year, such as when the ground water table is high or when the stream receives water from springs or from surface sources such as melting snow in mountainous areas. The stream ceases to flow above the streambed when losses from evaporation or seepage exceed the available stream flow. 2) A stream that has a period of zero flow for at least one week during most years.
Interstate Waters	Waters that flow across or form part of state or international boundaries, including boundaries with Indian nations.
Irrigation Return Flow	Surface (and subsurface) water that leaves a field following the application of irrigation water and eventually flows into streams.

Key Watershed	A watershed that has been designated in Idaho Governor Batt's *State of Idaho Bull Trout Conservation Plan* (1996) as critical to the long-term persistence of regionally important trout populations.
Knickpoint	Any interruption or break of slope.
Land Application	A process or activity involving application of wastewater, surface water, or semi-liquid material to the land surface for the purpose of treatment, pollutant removal, or ground water recharge.
Limiting Factor	A chemical or physical condition that determines the growth potential of an organism. This can result in a complete inhibition of growth, but typically results in less than maximum growth rates.
Limnology	The scientific study of fresh water, especially the history, geology, biology, physics, and chemistry of lakes.
Load Allocation (LA)	A portion of a water body's load capacity for a given pollutant that is given to a particular nonpoint source (by class, type, or geographic area).
Load(ing)	The quantity of a substance entering a receiving stream, usually expressed in pounds or kilograms per day or tons per year. Loading is the product of flow (discharge) and concentration.
Loading Capacity (load capacity)	A determination of how much pollutant a water body can receive over a given period without causing violations of state water quality standards. Upon allocation to various sources, and a margin of safety, it becomes a total maximum daily load.
Loam	Refers to a soil with a texture resulting from a relative balance of sand, silt, and clay. This balance imparts many desirable characteristics for agricultural use.
Loess	A uniform wind-blown deposit of silty material. Silty soils are among the most highly erodable.
Lotic	An aquatic system with flowing water such as a brook, stream, or river where the net flow of water is from the headwaters to the mouth.

Luxury Consumption	A phenomenon in which sufficient nutrients are available in either the sediment or the water column of a water body, such that aquatic plants take up and store an abundance in excess of the plants' current needs.
Macroinvertebrate	An invertebrate animal (without a backbone) large enough to be seen without magnification and retained by a 500μm mesh (U.S. #30) screen.
Macrophytes	Rooted and floating vascular aquatic plants, commonly referred to as water weeds. These plants usually flower and bear seeds. Some forms, such as duckweed and coontail (*Ceratophyllum sp.*), are free-floating forms not rooted in sediment.
Margin of Safety (MOS)	An implicit or explicit portion of a water body's loading capacity set aside to allow the uncertainly about the relationship between the pollutant loads and the quality of the receiving water body. This is a required component of a total maximum daily load (TMDL) and is often incorporated into conservative assumptions used to develop the TMDL (generally within the calculations and/or models). The MOS is not allocated to any sources of pollution.
Mass Wasting	A general term for the down slope movement of soil and rock material under the direct influence of gravity.
Mean	Describes the central tendency of a set of numbers. The arithmetic mean (calculated by adding all items in a list, then dividing by the number of items) is the statistic most familiar to most people.
Median	The middle number in a sequence of numbers. If there are an even number of numbers, the median is the average of the two middle numbers. For example, 4 is the median of 1, 2, 4, 14, 16; and 6 is the median of 1, 2, 5, 7, 9, 11.
Metric	1) A discrete measure of something, such as an ecological indicator (e.g., number of distinct taxon). 2) The metric system of measurement.
Milligrams per Liter (mg/l)	A unit of measure for concentration in water, essentially equivalent to parts per million (ppm).
Million gallons per day	A unit of measure for the rate of discharge of water, often

(MGD)	used to measure flow at wastewater treatment plants. One MGD is equal to 1.547 cubic feet per second.
Miocene	Of, relating to, or being an epoch of, the Tertiary between the Pliocene and the Oligocene periods, or the corresponding system of rocks.
Monitoring	A periodic or continuous measurement of the properties or conditions of some medium of interest, such as monitoring a water body.
Mouth	The location where flowing water enters into a larger water body.
National Pollution Discharge Elimination System (NPDES)	A national program established by the Clean Water Act for permitting point sources of pollution. Discharge of pollution from point sources is not allowed without a permit.
Natural Condition	A condition indistinguishable from that without human-caused disruptions.
Nitrogen	An element essential to plant growth, and thus is considered a nutrient.
Nodal	Areas that are separated from focal and adjunct habitats, but serve critical life history functions for individual native fish.
Nonpoint Source	A dispersed source of pollutants, generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state. Nonpoint sources are without a discernable point or origin. They include, but are not limited to, irrigated and non-irrigated lands used for grazing, crop production, and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.
Not Assessed (NA)	A concept and an assessment category describing water bodies that have been studied, but are missing critical information needed to complete an assessment.
Not Attainable	A concept and an assessment category describing water bodies that demonstrate characteristics that make it unlikely that a beneficial use can be attained (e.g., a stream that is dry but designated for salmonid spawning).

Not Fully Supporting	Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (Grafe et al. 2000).
Not Fully Supporting Cold Water	At least one biological assemblage has been significantly modified beyond the natural range of its reference condition (EPA 1997).
Nuisance	Anything which is injurious to the public health or an obstruction to the free use, in the customary manner, of any waters of the state.
Nutrient	Any substance required by living things to grow. An element or its chemical forms essential to life, such as carbon, oxygen, nitrogen, and phosphorus. Commonly refers to those elements in short supply, such as nitrogen and phosphorus, which usually limit growth.
Nutrient Cycling	The flow of nutrients from one component of an ecosystem to another, as when macrophytes die and release nutrients that become available to algae (organic to inorganic phase and return).
Oligotrophic	The Greek term for "poorly nourished." This describes a body of water in which productivity is low and nutrients are limiting to algal growth, as typified by low algal density and high clarity.
Organic Matter	Compounds manufactured by plants and animals that contain principally carbon.
Orthophosphate	A form of soluble inorganic phosphorus most readily used for algal growth.
Oxygen-Demanding Materials	Those materials, mainly organic matter, in a water body which consume oxygen during decomposition.
Parameter	A variable, measurable property whose value is a determinant of the characteristics of a system; e.g., temperature, dissolved oxygen, and fish populations are parameters of a stream or lake.
Partitioning	The sharing of limited resources by different races or species; use of different parts of the habitat, or the same

	habitat at different times. Also the separation of a chemical into two or more phases, such as partitioning of phosphorus between the water column and sediment.
Bacteria	Disease-producing organisms (e.g., bacteria, viruses, parasites).
Perennial Stream	A stream that flows year-around in most years.
Periphyton	Attached microflora (algae and diatoms) growing on the bottom of a water body or on submerged substrates, including larger plants.
Pesticide	Substances or mixtures of substances intended for preventing, destroying, repelling, or mitigating any pest. Also, any substance or mixture intended for use as a plant regulator, defoliant, or desiccant.
pH	The negative $\log_{10}$ of the concentration of hydrogen ions, a measure which in water ranges from very acid (pH=1) to very alkaline (pH=14). A pH of 7 is neutral. Surface waters usually measure between pH 6 and 9.
Phased TMDL	A total maximum daily load (TMDL) that identifies interim load allocations and details further monitoring to gauge the success of management actions in achieving load reduction goals and the effect of actual load reductions on the water quality of a water body. Under a phased TMDL, a refinement of load allocations, wasteload allocations, and the margin of safety is planned at the outset.
Phosphorus	An element essential to plant growth, often in limited supply, and thus considered a nutrient.
Physiochemical	In the context of bioassessment, the term is commonly used to mean the physical and chemical factors of the water column that relate to aquatic biota. Examples in bioassessment usage include saturation of dissolved gases, temperature, pH, conductivity, dissolved or suspended solids, forms of nitrogen, and phosphorus. This term is used interchangeable with the terms “physical/chemical” and “physicochemical.”
Plankton	Microscopic algae (phytoplankton) and animals (zooplankton) that float freely in open water of lakes and oceans.

Point Source	A source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable "point" of discharge into a receiving water. Common point sources of pollution are industrial and municipal wastewater.
Pollutant	Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
Pollution	A very broad concept that encompasses human-caused changes in the environment which alter the functioning of natural processes and produce undesirable environmental and health effects. This includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.
Population	A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.
Pretreatment	The reduction in the amount of pollutants, elimination of certain pollutants, or alteration of the nature of pollutant properties in wastewater prior to, or in lieu of, discharging or otherwise introducing such wastewater into a publicly owned wastewater treatment plant.
Primary Productivity	The rate at which algae and macrophytes fix carbon dioxide using light energy. Commonly measured as milligrams of carbon per square meter per hour.
Protocol	A series of formal steps for conducting a test or survey.
Qualitative	Descriptive of kind, type, or direction.
Quality Assurance (QA)	A program organized and designed to provide accurate and precise results. Included are the selection of proper technical methods, tests, or laboratory procedures; sample collection and preservation; the selection of limits; data evaluation; quality control; and personnel qualifications and training. The goal of QA is to assure the data provided are of the quality needed and claimed (Rand 1995, EPA 1996).

Quality Control (QC)	Routine application of specific actions required to provide information for the quality assurance program. Included are standardization, calibration, and replicate samples. QC is implemented at the field or bench level (Rand 1995, EPA 1996).
Quantitative	Descriptive of size, magnitude, or degree.
Reach	A stream section with fairly homogenous physical characteristics.
Reconnaissance	An exploratory or preliminary survey of an area.
Reference	A physical or chemical quantity whose value is known, and thus is used to calibrate or standardize instruments.
Reference Condition	1) A condition that fully supports applicable beneficial uses with little affect from human activity and represents the highest level of support attainable. 2) A benchmark for populations of aquatic ecosystems used to describe desired conditions in a biological assessment and acceptable or unacceptable departures from them. The reference condition can be determined through examining regional reference sites, historical conditions, quantitative models, and expert judgment (Hughes 1995).
Reference Site	A specific locality on a water body that is minimally impaired and is representative of reference conditions for similar water bodies.
Representative Sample	A portion of material or water that is as similar in content and consistency as possible to that in the larger body of material or water being sampled.
Resident	A term that describes fish that do not migrate.
Respiration	A process by which organic matter is oxidized by organisms, including plants, animals, and bacteria. The process converts organic matter to energy, carbon dioxide, water, and lesser constituents.
Riffle	A relatively shallow, gravelly area of a streambed with a locally fast current, recognized by surface choppiness. Also an area of higher streambed gradient and roughness.

Riparian	Associated with aquatic (stream, river, lake) habitats. Living or located on the bank of a water body.
Riparian Habitat Conservation Area (RHCA)	A U.S. Forest Service description of land within the following number of feet up-slope of each of the banks of streams: - 300 feet from perennial fish-bearing streams - 150 feet from perennial non-fish-bearing streams - 100 feet from intermittent streams, wetlands, and ponds in priority watersheds.
River	A large, natural, or human-modified stream that flows in a defined course or channel, or a series of diverging and converging channels.
Runoff	The portion of rainfall, melted snow, or irrigation water that flows across the surface, through shallow underground zones (interflow), and through ground water to creates streams.
Sediment	Deposits of fragmented materials from weathered rocks and organic material that were suspended in, transported by, and eventually deposited by water or air.
Settleable Solids	The volume of material that settles out of one liter of water in one hour.
Species	1) A reproductively isolated aggregate of interbreeding organisms having common attributes and usually designated by a common name. 2) An organism belonging to such a category.
Spring	Ground water seeping out of the earth where the water table intersects the ground surface.
Stagnation	The absence of mixing in a water body.
Stenothermal	Unable to tolerate a wide temperature range.
Stratification	An Idaho Department of Environmental Quality classification method used to characterize comparable units (also called classes or strata).
Stream	A natural water course containing flowing water, at least part of the year. Together with dissolved and suspended materials, a stream normally supports communities of

	plants and animals within the channel and the riparian vegetation zone.
Stream Order	Hierarchical ordering of streams based on the degree of branching. A first-order stream is an unforked or unbranched stream. Under Strahler's (1957) system, higher order streams result from the joining of two streams of the same order.
Storm Water Runoff	Rainfall that quickly runs off the land after a storm. In developed watersheds the water flows off roofs and pavement into storm drains that may feed quickly and directly into the stream. The water often carries pollutants picked up from these surfaces.
Stressors	Physical, chemical, or biological entities that can induce adverse effects on ecosystems or human health.
Subbasin	A large watershed of several hundred thousand acres. This is the name commonly given to 4th field hydrologic units (also see Hydrologic Unit).
Subbasin Assessment (SBA)	A watershed-based problem assessment that is the first step in developing a total maximum daily load in Idaho.
Subwatershed	A smaller watershed area delineated within a larger watershed, often for purposes of describing and managing localized conditions. Also proposed for adoption as the formal name for 6th field hydrologic units.
Surface Fines	Sediment of small size deposited on the surface of a streambed or lake bottom. The upper size threshold for fine sediment for fisheries purposes varies from 0.8 to 605 mm depending on the observer and methodology used. Results are typically expressed as a percentage of observation points with fine sediment.
Surface Runoff	Precipitation, snow melt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions; a major transporter of nonpoint source pollutants in rivers, streams, and lakes. Surface runoff is also called overland flow.
Surface Water	All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, etc.)

	and all springs, wells, or other collectors that are directly influenced by surface water.
Suspended Sediment	Fine material (usually sand size or smaller) that remains suspended by turbulence in the water column until deposited in areas of weaker current. These sediment cause turbidity and, when deposited, reduce living space within streambed gravels and can cover fish eggs or alevins.
Taxon	Any formal taxonomic unit or category of organisms (e.g., species, genus, family, order). The plural of taxon is taxa (Armantrout 1998).
Tertiary	An interval of geologic time lasting from 66.4 to 1.6 million years ago. It constitutes the first of two periods of the Cenozoic Era, the second being the Quaternary. The Tertiary has five subdivisions, which from oldest to youngest are the Paleocene, Eocene, Oligocene, Miocene, and Pliocene epochs.
Thalweg	The center of a stream's current, where most of the water flows.
Threatened Species	Species, determined by the U.S. Fish and Wildlife Service, which are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.
Total Maximum Daily Load (TMDL)	A TMDL is a water body's loading capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual bases. TMDL = Loading Capacity = Load Allocation + Wasteload Allocation + Margin of Safety. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.
Total Dissolved Solids	Dry weight of all material in solution in a water sample as determined by evaporating and drying filtrate.
Total Suspended	The dry weight of material retained on a filter after filtration.

Solids (TSS)	Filter pore size and drying temperature can vary. American Public Health Association Standard Methods (Greenborg, Clescevi, and Eaton 1995) call for using a filter of 2.0 micron or smaller; a 0.45 micron filter is also often used. This method calls for drying at a temperature of 103-105 °C.
Toxic Pollutants	Materials that cause death, disease, or birth defects in organisms that ingest or absorb them. The quantities and exposures necessary to cause these effects can vary widely.
Tributary	A stream feeding into a larger stream or lake.
Trophic State	The level of growth or productivity of a lake as measured by phosphorus content, chlorophyll *a* concentrations, amount (biomass) of aquatic vegetation, algal abundance, and water clarity.
Turbidity	A measure of the extent to which light passing through water is scattered by fine suspended materials. The effect of turbidity depends on the size of the particles (the finer the particles, the greater the effect per unit weight) and the color of the particles.
Vadose Zone	The unsaturated region from the soil surface to the ground water table.
Wasteload Allocation (WLA)	The portion of receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. Wasteload allocations specify how much pollutant each point source may release to a water body.
Water Body	A stream, river, lake, estuary, coastline, or other water feature, or portion thereof.
Water Column	Water between the interface with the air at the surface and the interface with the sediment layer at the bottom. The idea derives from a vertical series of measurements (oxygen, temperature, phosphorus) used to characterize water.
Water Pollution	Any alteration of the physical, thermal, chemical, biological, or radioactive properties of any waters of the state, or the discharge of any pollutant into the waters of the state, which will or is likely to create a nuisance or to render such waters harmful, detrimental, or injurious to

	public health, safety, or welfare; to fish and wildlife; or to domestic, commercial, industrial, recreational, aesthetic, or other beneficial uses.
Water Quality	A term used to describe the biological, chemical, and physical characteristics of water with respect to its suitability for a beneficial use.
Water Quality Criteria	Levels of water quality expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, or industrial processes.
Water Quality Limited	A label that describes water bodies for which one or more water quality criterion is not met or beneficial uses are not fully supported. Water quality limited segments may or may not be on a 303(d) list.
Water Quality Limited Segment (WQLS)	Any segment placed on a state's 303(d) list for failure to meet applicable water quality standards, and/or is not expected to meet applicable water quality standards in the period prior to the next list. These segments are also referred to as "303(d) listed."
Water Quality Management Plan	A state or area-wide waste treatment management plan developed and updated in accordance with the provisions of the Clean Water Act.
Water Quality Modeling	The prediction of the response of some characteristics of lake or stream water based on mathematical relations of input variables such as climate, stream flow, and inflow water quality.
Water Quality Standards	State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.
Water Table	The upper surface of ground water; below this point, the soil is saturated with water.
Watershed	1) All the land which contributes runoff to a common point in a drainage network, or to a lake outlet. Watersheds are infinitely nested, and any large watershed is composed of smaller "subwatersheds." 2) The whole geographic region

	which contributes water to a point of interest in a water body.
Water Body Identification Number (WBID)	A number that uniquely identifies a water body in Idaho ties in to the Idaho Water Quality Standards and GIS information.
Wetland	An area that is at least some of the time saturated by surface or ground water so as to support with vegetation adapted to saturated soil conditions. Examples include swamps, bogs, fens, and marshes.
Young of the Year	Young fish born the year captured, evidence of spawning activity.

1.4.5 Definitions of Terms from the Southeastern Oregon Resource Management Plan (BLM 2003).

Acquired lands ~ Lands acquired for BLM administration in various ways, such as but not limited to: (1) any lands purchased by congressionally appropriated funds, (2) land donations, (3) land exchanges, (4) Land and Water Conservation Fund acquisitions, (5) land withdrawals returned to public land status through withdrawal revocations and/or relinquishments, etc., (6) split-estate acquisitions, (7) Federal agency jurisdictional transfers, (8) easement acquisitions, and/or (9) lands acquired by any other means.

Activity occasion ~ A standard unit of recreation use consisting of one individual participating in one recreation activity during any reasonable portion of any one day.

Actual use data ~ The number of livestock, kind or class of those livestock, and time period those livestock actually grazed a specific allotment or pasture.

Agate ~ A variety of chalcedony that exhibits several different color patterns (such as flat and/or concentric bands, swirls and loops) usually caused by mineral impurities. It is generally used as an ornamental or gem stone. Moss, lace, and plume agate are notable varieties.

Allotment management plan (AMP) ~ A plan for managing livestock grazing on specified public land.

Allowable sale quantity ~ The quantity of timber that may be sold from suitable land and that has been included in the yield projections for the timber period specified by the land use plan. Usually expressed on an annual basis as the average annual allowable sale quantity.

Alluvium ~ Material deposited on the land by water, such as sand, silt, or clay.

All-terrain vehicle (ATV) ~ Small, 3-wheel and 4-wheel recreational vehicles capable of operating in rugged terrain.

Andesite ~ A fine-grained igneous rock of intermediate composition composed of about equal amounts of iron and magnesium minerals and plagioclase feldspars.

Animal unit ~ One cow, one cow/calf pair, one horse, or five sheep.

Animal unit month (AUM) ~ The forage needed to support one cow, one cow/calf pair, one horse, or five sheep for one month. Approximately 800 pounds of forage.

Appropriate management level (AML) ~ The optimum number of wild horses that provides a thriving natural ecological balance on the public range.

Appropriate management response (AMR) ~ Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Area of critical environmental concern (ACEC) ~ Area where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect humans from natural hazards.

Argillite ~ A weakly metamorphosed clay-rich sedimentary rock.

Asbestos ~ A group of fibrous silicate minerals, generally used in the manufacture of heat and fire resistant materials (such as cloth, yarn, paint, paper, brake-linings, and tile).

Attribute ~ A discreet feature or characteristic of biotic or physical resources that can be measured (example: plant density, which is the number of individuals or stems per unit area).

Badlands ~ Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels, most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Band ~ A group of wild horses running together or a lone wild horse.

Basalt ~ A dark, heavy, fine-grained silica-poor igneous rock composed largely of iron and magnesium minerals and calcium-rich plagioclase feldspars.

Beneficial use ~ Any of various uses of water in an area. Water may be for agricultural, domestic, or industrial use, salmonid spawning, recreation, wildlife habitat, or other uses.

Bentonite ~ A soft, plastic, porous, light-colored rock composed essentially of clay of the smectite group, plus colloidal silica, and produced by the devitrification and

accompanying chemical alteration of rhyolitic tuffs or volcanic ash. It has the ability to absorb large quantities of water and expand several times its original volume. It is used as a sealant on dams and reservoirs, in drilling mud, and pet litter, and as a binder.

Best management practices (BMP's) ~ A set of practices which, when applied during implementation of management actions, ensures that negative impacts to natural resources are minimized. BMP's are applied based on site-specific evaluation and represent the most effective and practical means to achieve management goals for a given site.

Black acres ~ Actual burned area or actual acres treated for mechanical.

BLM assessment species ~ Plant and animal species on List 2 of the "Oregon Natural Heritage Data Base," or those species on the "Oregon List of Sensitive Wildlife Species"(OAR 635-100-040) that are identified in BLM Instruction Memo OR-91-57 and are not included as Federal candidate, State listed, or BLM sensitive species.

BLM sensitive species ~ Plant or animal species eligible for Federal listed, Federal candidate, State listed, or State candidate (plant) status, or on List 1 in the "Oregon Natural Heritage Data Base," or approved for this category by the BLM State Director.

BLM tracking species ~ Plant and animal species on List 3 and 4 of the "Oregon Natural Heritage Data Base," or those species on the "Oregon List of Sensitive Wildlife Species"(OAR 635-100-040) that are identified in BLM Instruction Memo OR-91-57 and are not included as Federal candidate, State listed, BLM sensitive, or BLM assessment species.

Board foot ~ A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1-foot wide, 1-foot long, and 1-inch thick before finishing.

Borax ~ An evaporite mineral ($Na_2B_4O_7 \cdot 10H_2O$). It is the major source of boron and is generally found in alkali lake deposits. It has a variety of uses (including glass and ceramics manufacturing, agricultural chemicals, chemical fluxes, fire retardant and preservative).

Brine ~ Subsurface water with a high concentration of dissolved salts, usually sodium, potassium and/or calcium, and lesser concentrations of other salts (such as boron).

Buffer strip ~ A protective area adjacent to an area of concern requiring special attention or protection. In contrast to riparian zones, which are ecological units, buffer strips can be designed to meet varying management concerns.

Burning period ~ That part of each 24-hour period when fires spread most rapidly, typically from 10 a.m. to sundown.

Calcareous soil ~ A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caldera ~ A volcanic depression much larger than the original crater and generally formed by the violent eruption of rhyolitic magma (examples: Crater Lake, and Mahogany Mountain Caldera).

Cave ~ See Chapter 2, Caves, for definition.

Chalcedony ~ A cryptocrystalline variety of quartz (SiO2) consisting of microscopic fibers**.** It exhibits a myriad of colors and patterns, and is used primarily as an ornamental or gemstone. Agate, jasper and thunder eggs are varieties.

Channeled ~ Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Chert ~ A hard, very dense, fine-grained sedimentary rock composed largely of microscopic quartz (SiO2) crystals; synonymous with *flint*.

Clastic ~ A rock composed of broken pieces of preexisting rock.

Clay ~ As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt. *Geology*: A rock or mineral fragment of any composition finer than 0.00016 inches in diameter. *Mineral:* A hydrous aluminum-silicate that occurs as microscopic plates, and commonly has the ability to absorb substantial quantities of water on the surface of the plates.

Clayey soil ~ Silty clay, sandy clay, or clay.

Climax vegetation ~ The stabilized plant community on a particular site. The plant cover reproduces itself and does not change as long as the environment remains the same.

Coarse textured soil ~ Sand or loamy sand.

Colluvium ~ Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forestland ~ Forestland that can produce 20 cubic feet of timber per acre per year and that is not withdrawn from timber production.

Commercial thinning ~ A cutting made in a forest stand to remove excess merchantable timber in order to accelerate growth or improve the health of the remaining trees.

Commodities ~ Goods and services produced by industries.

Complex, soil ~ A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Corrective maintenance ~ Maintenance performed on a nonroutine basis and considered to be a one-time only cost.

Craton ~ A portion of a continent that has been structurally stable for a prolonged period of time.

Crown ~ The upper part of a tree or shrub, including the living branches and their foliage.

Cryptogamic crust ~ See microbiotic crust.

Custodial management ~ Management of a group of similar allotments with minimal expenditure of appropriated funds to continue protecting existing resource values.

Deep soil ~ A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Diameter at breast height (DBH) ~ The diameter of a tree measured 4.5 feet above the ground.

Diatomite ~ A soft, crumbly, lightweight, highly porous sedimentary rock consisting mainly of microscopic siliceous skeletons of diatoms (single-celled aquatic plants related to algae). It is used for filter aids, paint filler, abrasives, anti-caking agents, insecticide carriers, and insulation.

Drainage, surface ~ Runoff, or surface flow of water, from an area.

Duff ~ A generally firm organic layer on the surface of mineral soils consisting of fallen, decaying plant material including everything from the litter on the surface to underlying pure humus.

Earnings ~ Wages and salaries, other labor income, and proprietor's income (including inventory valuation and capital consumption adjustments).

Ecological site condition ~ See ecological status.

Ecological site inventory (ESI) ~ The basic inventory of present and potential vegetation on BLM rangelands. Ecological sites are differentiated on the basis of the kind, proportion, or amount of plant species.

Ecological status ~ The present state of vegetation of a range site in relation to the potential natural community for that site. Four classes (see below) are used to express the degree to which the production or composition of the present plant community reflects that of the potential natural community (climax):

Ecological status (seral	Percent of community in climax

stage)	condition
Potential natural community	76–100
Late seral	51–75
Mid seral	26–50
Early seral	0–25

Ecosystem-based management ~ (1) management driven by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure, and function; (2) any land management system that seeks to protect viable populations of all native species, perpetuate natural-disturbance regimes on

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the regional scale, adopt a planning timeline of centuries, and allow human use at levels that do not result in long-term ecological degradation.

Employee compensation ~ Wages and salaries paid to employees by industries, plus the value of benefits and any contributions to Social Security and pension funds by the employee and employer.

Enhancement of habitat for special status animal and plant species ~ Taking deliberate, proactive measures that are expected to make habitat conditions more productive, diverse, or resilient to disturbances for the benefit of special status animal and plant species.

Enhancement of populations of special status animal and plant species ~ Taking deliberate, proactive measures in cooperation with the Oregon Department of Fish and Wildlife or

U.S. Fish and Wildlife Service to meet their respective species management goals. For animal species, enhancement means allowing supplemental releases of fish or wildlife into existing populations to increase overall numbers of animals or to improve their genetic health. For plants, enhancement means transplanting or seeding species to supplement existing populations.

Ephemeral stream ~ A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no continuous supply from melting snow or other source, and its channel is above the water table at all times.

Epithermal deposit ~ A type of hydrothermal deposit that occurs mainly as veins formed within 1,600 feet of the surface and with temperatures ranging from 122–392 F.

Erosion ~ The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated) ~ Erosion much more rapid than geologic erosion, occurring mainly as a result of human or animal activities or of a catastrophe in nature, such as with fire, that exposes the surface.

Erosion (geologic) ~ Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains; synonymous with *natural erosion*.

Escaped fire ~ A fire that has exceeded initial attack capabilities.

Evaporite mineral ~ A mineral precipitated as a result of evaporation (example: halite).

Extended attack situation ~ The situation when a fire cannot be suppressed with initial attack forces within a reasonable period of time. This type fire can usually be suppressed by additional forces from within the geographic area of the district and usually within 24 hours after suppression action has started.

Extensive recreation management area (ERMA) ~ Area where recreation management is less structured (than within an SRMA) and recreation use more dispersed with minimal regulatory constraints and where minimal recreation-related investments are required.

Feldspar ~ The most abundant minerals of the Earth's crust. The two groups are Alkali and Plagioclase.

Fertility, soil ~ The quality that enables a soil to provide plant nutrients in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fuel type ~ An identification association of fuel elements of distinctive species, form, size, arrangement or other characteristics that will cause a predictable rate of spread or resistance to control under specific weather conditions.

Fine textured soil ~ Sandy clay, silty clay, or clay.

Fire effects ~ The physical, biological, and ecological impact of fire on the environment.

Fire intensity ~ The product of the available heat of combustion per unit area of ground and the rate of spread of the fire.

Fire management area ~ One or more parcels of land having a common set of fire management objectives.

Fire regime ~ Periodicity and pattern of naturally occurring fire in a particular area or vegetative type, described in terms of frequency, biological severity, and area extent (Society of American Foresters, 1996).

Fire return interval ~ The number of years between two successive fires documented in a designated area (such as the interval between two successive fire occurrences).

Fire strategy ~ An overall plan of action for fighting a fire that gives regard to the most cost-efficient use of personnel and equipment in consideration of values threatened, fire behavior, legal constraints, and objectives established for resource management. Leaves decisions on the tactical use of personnel and equipment to line commanders in the suppression function.

Fire suppression ~ All the work activities connected with fire-extinguishing operations, beginning with the discovery and continuing until the fire is completely extinguished.

Flood plain ~ A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluorite ~ Fluorospar (CaF2). A halide mineral-related to table salt (Na2Cl), and the principal ore of fluorine gas**.** Fluorite is used as a flux in the manufacture of glass, in the manufacturing of hydrofluoric acid (HF), and as a source of carved ornamental stones.

Fluvial (Fluviatile) deposit ~ A sedimentary deposit laid down, transported by, or suspended in, a stream.

Forb ~ Any herbaceous plant not a grass or a grasslike species.

Forest health ~ The condition in which forest ecosystems sustain their complexity, diversity, resiliency and productivity while providing for human needs and values.

Forestland ~ Land that is now, or is capable of being, at least 10 percent stocked by forest tree species such as ponderosa pine, Douglas fir, western larch, white fir, or lodgepole pine.

Fuels ~ Includes living and dead plant materials that are capable of burning.

Fuel type ~ An identification association of fuel elements of distinctive species, form, size, arrangement or other characteristics that will cause a predictable rate of spread or resistance to control under specific weather conditions.

Graben ~ A fault-bounded down-dropped portion of the Earth's crust.

Gravel ~ Rounded or angular fragments of rock as much as 3 inches (2 millimeters–7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel ~ (Geology) Unconsolidated, rounded rock fragments greater than 0.08 inches in diameter. Sizes range from pebbles (.008–2.5 inches) to cobbles (2.5–10 inches) to boulders (greater than 10 inches).

Greenstripping ~ The practice of establishing or using patterns of fire-resilient vegetation and/or material to reduce wildfire occurrence and size. Examples are establishing fire-resilient vegetation adjacent to roads or railways, around or interspersed in valuable shrub stands, or within large blocks of flash fuels.

Ground water (geology) ~ Water filling all the unblocked pores of the material below the water table.

Ground yarding ~ Use of tracked or wheeled equipment to transport logs from where they are cut to a landing.

Gully ~ A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Harvest unit ~ An area from which trees are harvested. Harvest method can range from clearcutting to individual tree selection.

Herd ~ One or more wild horse bands using the same general area.

Herd Area (HA) ~ A geographic area identified as having provided habitat for a wild horse herd in 1971.

Herd management area (HMA) ~ A geographic area identified in a management framework plan or resource management plan for the long-term management of a wild horse herd.

Herd management area plan ~ A plan that prescribes measures for the protection, management, and control of wild horses and their habitat on one or more HMA's, in conformance with decisions made in approved management framework or resource management plans.

High resource values ~ Lands with high resource values are considered to be public lands that have the caliber of resources to qualify them for inclusion in SMA's such as ACEC's, NWSR's, WSA's, and high resource areas such as critical wildlife habitat areas, wild horse herd areas, critical fish habitat areas, cultural site areas, threatened and endangered species habitats, etc. Long-term retention of public lands in these SMA's is either required by law through congressional action or identified through the land use planning process.

Horizon, soil ~ A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes.

Horst ~ A fault-bounded uplifted portion of the Earth's crust.

Hot-springs deposit ~ A type of hydrothermal deposit formed in a hot-springs environment.

Hydrothermal deposit ~ A mineral deposit formed by hot, mineral-laden fluids.

Igneous rock ~ Rock that solidified from a molten or semimolten state. The major varieties include intrusive (solidified beneath the surface of the Earth) and volcanic (solidified on or very near the surface of the Earth).

Incident commander ~ Individual responsible for the management of all incident (fire) operations.

Initial attack ~ First action taken to suppress a fire, via ground and/or air. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Individual tree selection cutting ~ A cutting method in which selected trees are removed throughout a harvest unit to meet a specific goal. Goals can range from harvest of a specific volume to improving the health of the remaining trees.

Infiltration rate ~ The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Initial attack ~ First action taken to suppress a fire, via ground and/or air.

Interim management policy (IMP) ~ Policy for managing public lands under wilderness review. Section 603 (c) of FLPMA states: "During the period of review of such areas and until Congress has determined otherwise, the Secretary shall continue to manage such lands according to his authority under this Act and other applicable law in a manner so as not to impair the suitability of such areas for preservation as wilderness, subject, however, to the continuation of existing mining and grazing uses and mineral leasing in the manner and degree in which the same was being conducted on the date of approval of this Act: Provided, that, in managing the public lands the Secretary shall by regulation or otherwise take any action required to prevent unnecessary or undue degradation of the lands and their resources or to afford environmental protection."

Intermittent stream ~ A stream, or reach of a stream, that flows for prolonged periods only when it receives groundwater discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Interior drainage ~ Streams with no outlet to the sea.

Known geothermal resource area (KGRA) ~ "An area in which the geology, nearby discoveries, competitive interest, or other indicia would, in the opinion of the Secretary, engender the belief in men who are experienced in the subject matter that the prospect for extraction of geothermal stream or associated geothermal resources are good enough to warrant expenditures or money for that purpose" [43 CFR 3200.0-5(k)].

Lacustrine deposit (geology) ~ Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landing ~ A location where timber is gathered for further transport.

Limestone ~ A sedimentary rock consisting chiefly of calcium carbonate.

Limits of acceptable change ~ For recreation management, a nine-step process used to define the desired resource conditions for an area and to determine acceptable levels of resource change due to recreation use. The process helps to develop management actions to avoid exceeding standards.

Loam ~ Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Magma ~ Molten rock from within the Earth capable of flowing like liquid.

Maintenance of habitat for special status animal and plant species ~ Avoidance or mitigation of projects and land uses so that they cause no new significant adverse impacts on habitats of special status animal and plant species. The quality of the habitat to be maintained is probably variable and may range from poor to excellent. The amount of habitat may be below its potential. Under maintenance management options, especially where habitat quality is low, there is some risk that species may eventually need to be listed under the authority of the ESA.

Maintenance of populations of special status animal and plant species ~ Avoidance or mitigation of projects and land uses so that they have no new significant adverse impacts on populations of special status animal and plant species. Populations to be maintained may range from low to high over time and may be below their potential level. Under maintenance management options, especially where populations are small, there is some risk that species may eventually need to be listed under the authority of the ESA.

Management framework plan (MFP) ~ BLM land use plan, predecessor to the RMP.

Map unit ~ The basic system of description in a soil survey and delineation on a soil map. Can vary in level of detail.

Mature timber ~ Trees that have passed their maximum rate of growth in terms of physiological processes, height, diameter or volume.

MBF ~ Thousand board feet.

Mechanical treatment ~ Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil ~ Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees ~ Trees that are of sufficient size to be economically processed into wood products.

Metamorphosed ~ Rock that has been altered in composition, texture or structure by heat and/or pressure.

Microbiotic crust ~ Lichens, mosses, green algae, fungi, cyanobacteria, and bacteria growing on or just below the surface of soils.

MMBF ~ Million board feet.

Monitoring ~ The periodic and systematic collection of resource data to measure progress toward achieving objectives.

Multiple use management ~ Management of public land and resource values to best meet various present and future needs of the American people. This means coordinated management of resources and uses to assure the long-term health of the ecosystem.

Multiplier ~ A change in an economic measure resulting from a specified change in some other economic measure.

Naturalness (a primary wilderness value) ~ An area that generally appears to have been affected primarily by the forces of nature with the imprint of people's work substantially unnoticeable.

Near natural rate of recovery ~ Synonymous with the PACFISH requirement not to "retard" or "measurably slow" recovery of degraded riparian features. Further defined in these recommendations within the context of effects that "carry over to the next year." Any effect that carries over to the next year is likely to result in cumulative negative effects and measurably slow recovery of degraded riparian features.

Net value change ~ The sum of the changes resulting from increases (benefits) and decreases (damages) in the value of outputs from the land area affected as the consequences of fire. An average dollar value per acre is assigned based on the change to all resources including range, watershed, wildlife, soils, and recreation.

Nutrient, plant ~ Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil, and carbon, hydrogen, and oxygen obtained from the air and water.

Off-highway vehicle (OHV) ~ A vehicle that can be operated off of improved and regularly maintained roads with hardened or gravel surfaces.

Old growth forest ~ Dry site pine stands meeting the following criteria: At least 10 trees/ acre that are at least 150 years of age and/or 21 inches dbh, and have a basal area of 24 square foot/acre at least 10 acres in size; or, in very late-seral stands, at least 2 trees/acre that are at least 200 years of age and/or 31 inches dbh, and have a basal area of 11 square foot/ acre.

Organic matter~ Plant and animal residue in the soil in various stages of decomposition.

Overstory ~ The trees in a forest that form the upper crown cover.

Percolation ~ The downward movement of water through the soil.

Perennial stream ~ A stream in which water is present during all seasons of the year.

Perlite ~ A rhyolite volcanic glass that contains more water than ordinary obsidian. It commonly contains a cracked texture caused by contraction during cooling. The material is used primarily as lightweight aggregate and as an insulator.

Permeability ~ The quality of the soil that enables water to move downward through the profile, measured as the number of inches per hour that water moves downward through the saturated soil.

Personal income ~ Employee compensation plus property income.

Phase 1 fire planning ~ The first phase of a two-stage fire management planning process that identifies desired resource conditions and fire management direction, including fire management strategies, which will promote achievement of resource objectives

pH value ~ A numerical designation of acidity and alkalinity in soil (see "reaction, soil").

Physiographic province ~ A geographic region with similar climatic, land form, and geologic features, and which is significantly different from adjacent regions.

Picture rock ~ (Also known as picture jasper, scenic jasper.) A variety of chalcedony with fanciful patterns that often resemble scenery. Varieties are found in southeastern Oregon (examples: Owyhee jasper and McDermitt jasper).

Pluton ~ An igneous rock that crystallized deep underground.

Pluvial ~ Referring to a period of greater rainfall.

Pluvial Lake ~ A lake formed during a period of exceptionally high rainfall (such as during a time of glacial advance during the Pleistocene epoch) and now either extinct or existing as a remnant, such as Lake Bonneville.

Porphyry deposit ~ A large, low-grade metallic mineral deposit containing disseminated sulfide minerals (examples: copper, gold, molybdenum, or tin).

Prescribed burning ~ Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions that allow the fire to be confined to a predetermined area and at the same time to produce the fire line intensity and rate of spread required to attain planned resource management objectives.

Prescribed fire ~ Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescription ~ Written statement defining objectives to be attained, as well as measurable criteria, which guide the selection of appropriate management actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, and legal considerations under which the fire will be allowed to burn.

Preventative maintenance ~ Scheduled servicing, repairs, inspections, adjustments, and replacement of parts that result in fewer breakdowns and fewer premature replacements, and achieve the expected life of facilities and equipment.

Primary wilderness values ~ The primary or key wilderness values described in the "Wilderness Act" by which WSA's and designated wilderness are managed to protect and enhance the wilderness resource. Values include roadlessness, naturalness, solitude, primitive and unconfined recreation, and size.

Primitive and unconfined recreation (a primary wilderness value) ~Nnonmotorized and undeveloped types of outdoor recreation activities. Refers to wilderness recreation opportunities, such as nature study, hiking, photography, backpacking, fishing, hunting, and other related activities. Does not include the use of motorized vehicles, bicycles, or other mechanized means of travel.

Productivity ~ (1) *Soil productivity*: the capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties (such as depth, temperature, water-holding capacity, and mineral, nutrient, and organic matter content). (2) *Vegetative productivity*: the rate of production of vegetation within a given period. (3) *General*: the innate capacity of an environment to support plant and animal life over time.

Project acres ~ (fire) Total project size.

Public land ~ Any land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM.

Public resource values ~ Lands with public resource values are considered to be any public lands located outside SMA's, and high resource areas that do not have the caliber of resources to qualify them for inclusion in SMA's and high resource areas. For these types of lands BLM would maintain its land tenure adjustments options within Zone 1, 2, and 3 areas. Any land tenure adjustments involving public lands having "public resource values" must be determined to be in the public interest and must meet the requirements of NEPA and the General Management Criteria of Appendix L.

Pumice ~ A glassy, rhyolitic rock exhibiting a vesicular, or frothy texture. It is generally used as a light weight aggregate and an abrasive.

Pyroclastic debris ~ Rock fragments produced by a volcanic explosion.

Range site ~ An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Rangeland ~ Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Rangeland health ~ The degree to which the integrity of the soil and the ecological processes of rangeland ecosystems are sustained.

Reaction, soil ~ A measure of acidity or alkalinity of a soil, expressed in pH values. Soils with pH values less than 7 are acidic and those with pH greater than 7 are alkaline.

Recreation opportunity spectrum (ROS) ~ A means of characterizing recreation opportunities in terms of setting, activity, and experience opportunities.

Recreation site ~ An area where management actions are required to provide a specific recreation setting and activity opportunities, to protect resource values, provide public visitor safety and health, and/or to meet public recreational use demands and recreation partnership commitments. A site may or may not have permanent facilities.

Recreational river ~ A river or section of a river that is readily accessible by road or railroad; it may have had some development along the shorelines and may have undergone some impoundments or diversions in the past.

Regeneration ~ The new growth of a natural plant community that develops from seed.

Rehabilitation ~ The activities necessary to repair damage or disturbance caused by wildfire or the fire suppression activity.

Research natural area (RNA) ~ An area where natural processes predominate and which is preserved for research and education. Under current BLM policy, these areas must meet the relevance and importance criteria of ACEC's and are designated as ACEC's.

Resource advisor ~ Resource specialist responsible to the incident commander for gathering and analyzing information concerning values-at-risk that may be impacted by the fire or fire suppression activities.

Resource management plan (RMP) ~ A land use plan as described by the FLPMA.

Restoration ~ Holistic actions taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes.

Restoration of habitat for special status animal and plant species ~ Taking deliberate, proactive measures to reestablish habitat suitable for supporting special status animal and plant species.

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Restoration of populations of special status animal and plant species ~ Taking deliberate, proactive measures in cooperation with the ODFW or USFWS to meet their respective species management goals. Restoration means reestablishing a species into a currently unoccupied suitable area.

Rhyolite ~ A fine-grained light-colored silica-rich igneous rock composed largely of potash feldspars and quartz.

Rift ~ A graben of regional extent; it marks a zone where the entire crust is ruptured under tension.

Right-of-way ~ A permit or an easement authorizing the use of public land for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, reservoirs, etc. Also, the reference to the land covered by such an easement or permit.

Right-of-way corridor ~ A parcel of land identified by law, Secretarial order, through a land use plan or by other management decision as being the preferred location for existing and future right-of-way grants and suitable to accommodate one type of right-of-way or one or more rights-of-way that are similar, identical or compatible.

Rill ~ A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Riparian/wetland areas ~ See Chapter 2, Water Resources and Riparian/Wetland Areas section, Riparian and Wetland Definitions, Processes, Functions, and Patterns.

Risk assessment ~ Assessing the chance of fire starting, natural or human-caused, and its potential risk to life, resources and property.

Rock fragments ~ Rock or mineral fragments having a diameter of 2 millimeters or more (examples: pebbles, cobbles, stones, and boulders).

Runoff ~ The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground water runoff or seepage flow from ground water.

Saline soil ~ A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salvage cutting ~ Removal of trees that are dead or in imminent danger of being killed by injurious agents.

Sand ~ (geology) A rock fragment or detrital particle between 0.0025 and 0.08 inches in diameter.

Scenic river ~ A river or section of a river that is free of impoundments and whose shorelines are largely undeveloped but accessible in places by roads.

Schist ~ A metamorphic rock characterized by coarse-grained minerals oriented approximately parallel.

Section 202 lands ~ Lands being considered for wilderness designation under section 202 of FLPMA.

Sediment ~ Soil, rock particles and organic or other debris carried from one place to another by wind, water or gravity.

Selection cutting ~ Removal of individual or small groups of trees to meet predetermined goals for the remaining stand.

Seral stage ~ See ecological status.

Series, soil ~ A nationally-defined soil type set apart on distinct soil properties that affect use and management. In a soil survey, this includes a group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shallow soil ~ A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion ~ The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Silica ~ Silicon dioxide (SiO2), occurring in both crystalline (such as quartz, cristobalite, and chalcedony) and amorphous (such as opal) form, as well as impure (such as diatomite, and chert) forms, and combined as silicates for numerous significant minerals (such as feldspars or amphiboles).

Silt ~ *Geology*: A rock fragment or detrital particle smaller than very fine sand and larger then coarse clay, ranging from 0.0024 to 0.00016 inches in diameter and commonly having a high content of clay minerals. *As a soil separate:* Individual mineral particles

ranging in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand

(0.05 millimeter). *As a soil textural class:* Soil that is 80 percent or more silt and less than 12 percent clay.

Simple approach smoke estimation model ~ A straight-line Gaussian plume dispersion model designed as a screening tool to predict maximum particulate concentrations and visual impacts from prescribed fire. The model simulates emissions, transport, dispersion, and optical effects of any inert pollutant over flat terrain.

Skid trails ~ Pathways along which logs are dragged to a landing for further transportation.

Skidding ~ A commonly used term for the yarding of logs to a landing.

Slash ~ The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slate ~ A compact, fine-grained, platy metamorphic rock formed from shale or claystone.

Slope ~ The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. For example, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Smectite ~ A group of clay minerals, characterized by a three-layer crystal lattice, that is capable of absorbing water molecules between the layers of the crystal lattice allowing it to expand several times its original volume. Montmorillonite and Hectorite smectites are the major constituents of the bentonites found the planning area.

Sodic (alkali) soil ~ A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Soil ~ A natural, three-dimensional body at the Earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil association ~ A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single soil map unit.

Soil classification ~ The systematic arrangement of soils into groups or categories on the basis of their characteristics.

Soil compaction ~ An increase in soil bulk density of 15 percent or more from the undisturbed level.

Soil complex ~ A map unit of two or more kinds of soils in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping.

Soil productivity ~ The capacity of a soil for producing a specified plant or sequence of plants under specific management.

Soil profile ~ A vertical section of the soil extending through all its horizons and into the parent material.

Soil survey ~ A field investigation resulting in a soil map showing the geographic distribution of various kinds of soil and an accompanying report that describes the soil types and interprets the findings.

Soil texture ~ The relative proportions of sand, silt, and clay particles in a mass of soil.

Solitude (a primary wilderness value) ~ The state of being alone or remote from habitations; a lonely, unfrequented, or secluded place. The intent is to evaluate the opportunity for solitude in comparison to habitations of people.

Special recreation management area (SRMA) ~ An area where recreation is one of the principal management objectives, where intensive recreation management is needed, and where more than minimal recreation-related investments are required.

Special status species ~ Plant or animal species known or suspected to be limited in distribution, rare or uncommon within a specific area, and/or vulnerable to activities that may affect their survival. Lists of special status species are prepared by knowledgeable specialists throughout the State of Oregon; BLM prepares a list of State sensitive species predominantly based on the lists prepared biennially by ONHP.

Special stipulation ~ A specific operating condition or limitation added to a mineral lease to protect sensitive resources. It modifies the original terms and conditions of that lease.

Stand ~ A community of trees occupying a specific area and sufficiently uniform in species, age, spacial arrangement and condition as to be distinguishable from trees on surrounding lands.

Stream channel ~ The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Structure, soil ~ The arrangement of primary soil particles into compound particles or aggregates.

Sunstone ~ A calcium-rich variety of plagioclase feldspar that exhibits a pink to red metallic shimmer when viewed perpendicular to the surface. The shimmer is caused by

light reflecting off the surface of minute parallel platelets of native copper suspended in the stone.

Supplemental wilderness values ~ Includes ecological (such as vegetation, wildlife, and overall biological/botanical processes and values associated with the natural environment), geological, scientific, educational, scenic, and historic values. When present they can enhance primary wilderness values, but are not mandated by Congress.

Sustained yield ~ Maintenance of an annual or regular periodic output of a renewable resource from public land consistent with the principles of multiple use.

Talc ~ A very soft, light green mineral (Mg3Si4O10 (OH2)), found in basic igneous rocks and metamorphosed dolomites (CaMg (CO3)2). It is used in a wide variety of applications (such as filler, cosmetics, lubricants and as a source of ornamental stone).

Talus ~ Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Terrace (geologic) ~ An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Terrane ~ A suite of similar rocks transported by crustal movements into a position where they are separated from dissimilar rocks by faults.

Thinning ~ A cutting made in a forest stand to remove or kill excess timber in order to accelerate growth or improve the health of the trees that remain.

Thriving natural ecological balance ~ The condition of the public range when resource objectives related to wild horses in approved land use and/or activity plans have been achieved.

Thunderegg ~ An agate, opal, or chalcedony-filled nodule deposit formed in rhyolitic lavas or tuffs.

Trend ~ The direction of change in ecological status observed over time. Trend is described as toward or away from the potential natural community, or as not apparent.

Tuff ~ Volcanic ash or rock composed of compacted ash.

Upland (geology) ~ Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Utilization ~ The proportion or degree of the current year's forage production that is consumed or destroyed by animals (including insects); may refer either to a single plant species, a group of species, or to the vegetation as a whole; synonymous with *use.*

Values-at-risk ~ Any or all natural resources, improvements or other values that may be jeopardized if a fire occurs (value-at-risk, risk of resource values).

Vegetation manipulation ~ Alteration of present vegetation by using fire, plowing, or other means to manipulate natural succession trends.

Visit –A unit of measure for evaluating the amount of recreational activity on public land; equivalent to one person spending any part of a day recreating on public land.

Visual resource classes ~ Refer to Chapter 2.

Volcanic arc ~ A curved, linear belt of volcanoes.

Volcaniclastic ~ A sedimentary rock consisting largely of lava fragments, volcanic glass, and crystals.

Wild horses ~ Unbranded and unclaimed horses that use public land as all or part of their habitat, or that have been removed from such land by an authorized officer but have not lost their status under section 3 of the "Wild Free-Roaming Horse and Burro Act."

Wild river ~ A river or section of a river that is free of impoundments and generally inaccessible except by trail, with watersheds and shorelines essentially primitive and waters unpolluted.

Wilderness inventory ~ A written description of resource information and data, and a map of those public lands that meet the wilderness criteria as established under Section 603 (a) of FLPMA and Section 2 (c) of "The Wilderness Act."

Wilderness study area (WSA) ~ A roadless area or island that has been inventoried and found to have wilderness characteristics as described in section 603 of FLPMA and section 2 (c) of "The Wilderness Act." WSA's were administratively designated by BLM following evaluation of wilderness inventories.

Wildfire ~ Any fire occurring on wildland that is not meeting management objectives and thus requires a suppression response. An unwanted wildland fire.

Wildland fire ~ Any nonstructure fire, other than prescribed fire, that occurs in the wildland.

Wildland fire situation analysis (WFSA) ~ A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

Woodland ~ A forest community occupied primarily by noncommercial species such as juniper, mountain mahogany or aspen.

Xenolith ~ A fragment of rock distinctly different from the igneous rock in which it is enclosed; a foreign intrusion into rock.

Yarding ~ The moving of logs from the stump to a landing for further transportation.

Zeolite ~ A group of hydrated silicates of aluminum with alkali metals. They contain a porous molecular structure that allows them to selectively trap individual molecules within that structure. Zeolites are used in water purification and decontamination systems, animal feed supplements, drying agents, and for soil improvement.

1.4.6 Cultural Anthropology-related terms (Source UCSB Anthropology Web Site, http://www.anth.ucsb.edu/netinfo.html), unless otherwise noted.

acculturation: cultural change that occurs in response to extended firsthand contacts between two or more previously autonomous groups.

achieved status: social standing and prestige reflecting the ability of an individual to acquire an established position in society as a result of individual accomplishments (cf. ascribed status).

adaptation: changes in gene frequencies resulting from selective pressures being placed upon a population by environmental factors; results in a greater fitness of the population to its ecological niche.

administrative system: a twentieth-century system of ownership in which land is owned and managed by the state; found in China, the Soviet Union, and some parts of Africa and Latin America.

affinal kin: persons related by marriage.

alienation: the fragmentation of individuals' relations to their work, the things they produce, and the resources with which they produce them.

altruistic act: a behavior characterized by self-sacrifice that benefits others.

ambilocality: residence of a married couple with or near the kin of either husband or wife, as they choose.

animatism: belief in an impersonal supernatural force.

animism: belief in a soul, a spiritual essence that differs from the tangible, physical body.

anthropological linguistics: the scientific study of human communication within its sociocultural context and the origin and evolution of language.

anthropology: the study of humanity - our physical characteristics as animals, and our unique non-biological characteristics we call culture. The subject is generally broken down into three subdisciplines**:** biological (physical) anthropology, cultural (social) anthropology, and archaeology.

applied anthropology: the activity of professional anthropologists in programs that have as primary goals changes in human behavior believed to ameliorate contemporary social, economic, and technological problems.

archaeology: a subdiscipline of anthropology involving the study of the human past through its material remains.

arranged marriage: any marriage in which the selection of a spouse is outside the control of the bride and groom. art the process and products of applying skills to any activity that transforms matter, sound, or motion into forms considered aesthetically pleasing to people in a society.

ascribed status: social standing or prestige which is the result of inheritance or hereditary factors (cf. achieved status).

authority: the ability to exert influence because of one's personal prestige or the status of one's office.

autonomy: taking commands from only one authoritative source, oneself, and rejecting all attempts to override one's autonomy. Moral autonomy entails making the final decisions about what one should do. Political autonomy entails having the liberty to act upon the decision one has made.

band: a small territorially-based social group consisting of 2 or more nuclear families. A loosely integrated population sharing a sense of common identity but few specialized institutions.

Bands: A small units within the tribe are termed **"bands"** because of their political autonomy, small population, and simple, informal social organization. (Stewart 1939).

bifurcation: a basis of kin classification that distinguishes the mother's side of the family from the father's side.

bilateral descent: a descent ideology in which individuals define themselves as being at the center of a group of kin composed more or less equally of kin from both paternal and maternal lines.

bilocal residence: regular alternation of a married couple's residence between the household or vicinity of the wife's kin and of the husband's kin.

biological imperatives: the basic human drives for food, rest, sexual satisfaction, and social contact.

biological species: a group of interbreeding populations that is reproductively isolated from other such groups.

bride price: payment made by a man to the family from whom he takes a daughter in marriage.

bride service: service rendered by a man as payment to a family from whom he takes a daughter in marriage.

bride wealth: property given by the family of the groom to the family of the bride to compensate them for the loss of their daughter's services.

call system: a repertoire of sounds, each of which is produced in response to a particular situation.

carrying capacity: the point at or below which a population tends to stabilize.

caste: a social category in which membership is fixed at birth and usually unchangeable.

cattle complex: an East African socioeconomic system in which cattle represent social status as well as wealth.

census: a comprehensive survey of a population designed to reveal its basic demographic characteristics.

centralization: concentration of political and economic decisions in the hands of a few individuals or institutions.

ceremonial fund: the portion of the peasant budget allocated to religious and social activities.

chiefdom: a term used to describe a society that operates on the principle of ranking, i.e. differential social status. Different lineages are graded on a scale of prestige, calculated by how closely related one is to the chief. The chiefdom generally has a permanent ritual and ceremonial center, as well as being characterized by local specialization in crafts.

civilization: a term used by anthropologists to describe any society that has cities.

clan: a unilineal descent group usually comprising more than ten generations consisting of members who claim a common ancestry even though they cannot trace step-by-step their exact connection to a common ancestor.

class: a ranked group within a stratified society characterized by achieved status and considerable social mobility.

cognates: words so similar from one language to the next as to suggest that both are variants of a single ancestral prototype.

cognitive anthropology: the study of how peoples of different cultures acquire information about the world (cultural transmission), how they process that information and reach decisions, and how they act on that information in ways that other members of their cultures consider appropriate.

cognitive processes: ways of perceiving and ordering the world.

collateral relatives: people to whom one is related through a connecting person.

communal cult: a society with groups of ordinary people who conduct religious ceremonies for the well-being of the total community.

community identity: an effort by speakers to identify themselves with a specific locality and to distinguish themselves from outsiders.

conflict: in its political manifestation, conflict exacts an ever-increasing toll in human lives and misery.

conjugal relationship: the relationship between spouses.

consanguineal kin: persons related by birth.

conversion: the use of a sphere of exchange for a transaction with which it is not generally associated.

corporate ownership control: of land and other productive resources by a group rather than by individuals.

creation-science: the idea that scientific evidence can be and has been gathered for creation as depicted in the Bible. Mainstream scientists and the Supreme Court discount any scientific value of creation-science statements.

cross-cultural research: (holocultural research) a method that uses a global sample of societies in order to test hypotheses.

cultural anthropology: a subdiscipline of anthropology concerned with the non-biological, behavioral aspects of society; i.e. the social, linguistic, and technological components underlying human behavior. Two important branches of cultural anthropology are ethnography (the study of living cultures) and ethnology (which attempts to compare cultures using ethnographic evidence). In Europe, it is referred to as social anthropology.

cultural determinism: the idea that except for reflexes all behavior is the result of learning.

cultural diffusion: the spreading of a cultural trait (e.g., material object, idea, or behavior pattern) from one society to another.

cultural ecology: a term devised by Julian Steward to account for the dynamic relationship between human society and its environment, in which culture is viewed as the primary adaptive mechanism.

cultural environment: the complex of products of human endeavor, including technology and social institutions.

cultural evolution: the theory that societal change can be understood by analogy with the processes underlying the biological evolution of species.

cultural materialism: the theory, espoused by Marvin Harris, that ideas, values, and religious beliefs are the means or products of adaptation to environmental conditions ("material constraints").

cultural relativism: the ability to view the beliefs and customs of other peoples within the context of their culture rather than one's own.

cultural universal: those general cultural traits found in all societies of the world. culture shock a psychological disorientation experienced when attempting to operate in a radically different cultural environment.

culture area: a region in which several groups have similar culture complexes.

culture of poverty: a self-perpetuating complex of escapism, impulse gratification, despair, and resignation; an adaptation and reaction of the poor to the marginal position in a class-stratified, highly individuated, capitalistic society.

culture: learned, nonrandom, systematic behavior and knowledge that can be transmitted from generation to generation.

demographic transition: a rapid increase in a society's population with the onset of industrialization, followed by a leveling off of the growth rate due to reduced fertility.

demography: the study of the processes which contribute to population structure and their temporal and spatial dynamics..

dependent variable: a variable that is affected by the independent variable.

descent group: a group of consanguineal kin united by presumed lineal descent from a common ancestor.

descent relationship: the ties between mother and child and between father and child.

descent tracing: one's kinship connections back through a number of generations.

descriptive linguistics: that branch of anthropological linguistics that studies how languages are structured.

differentiation: organization in separate units for various activities and purposes.

diffusion: when elements of one culture spread to another without wholesale dislocation or migration.

divination: a practice in which an element of nature acts as a sign to provide supernatural information to the diviner.

division of labor: the set of rules found in all societies dictating how the day to day tasks are assigned to the various members of a society.

domestic cycle: the changes in household organization that result from a series of demographic events.

domestication: the process by which people try to control the reproductive rates of animals and plants by ordering the environment in such a way as to favor certain species.

double descent: a system of descent in which individuals receive some rights and obligations from the father's side of the family and others from the mother's side.

dowry: payment made by the bride's family to the groom or to the groom's family.

dysfunction: the notion that some cultural traits can cause stress or imbalance within a cultural system.

ecological determinism: a form of explanation in which it is implicit that changes in the environment determine changes in human society.

ecology: the study of the dynamic relationships of organisms to each other and the total environment.

economic class: a group that is defined by the economic position of its members in relation to the means of production in the society--the wealth and relative eocnomic control they may command.

economic system: the ideas and institutions that people draw upon and the behaviors in which they engage in order to secure resources to satisfy their needs and desires.

ecosystem: a group of organisms with specific relationships between themselves and a particular environment.

egalitarian society: a society that recognizes few differences in wealth, power, prestige, or status.

emic: a perspective in ethnography that uses the concepts and categories that are relevant and meaningful to the culture under analysis.

empirical: received through the senses (sight, touch, smell, hearing, taste), either directly or through extensions.

empiricism: reliance on observable and quantifiable data.

environment: everything external to the organism.

equilibrium: a balance among the components of an ecosystem.

ethnicity: a basis for social categories that are rooted in socially perceived differences in national origin, language, and/or religion.

ethnobotany: a subdiscipline of anthropology that explores how societies perceive and categorize plants in their environment and how they use these plants for food, medicine, ritual, etc.

ethnocentrism: the tendency to judge the customs of other societies by the standards of one's own ethnographic present: describes the point in time at which a society or culture is frozen when ethnographic data collected in the field are published in a report.

ethnography: that aspect of cultural anthropology concerned with the descriptive documentation of living cultures.

ethnohistory: the study of ethnographic cultures through historical records.

ethnology: a subset of cultural anthropology concerned with the comparative study of contemporary cultures, with a view to deriving general principles about human society.

evolution: the process by which small but cumulative changes in a species can, over time, lead to its transformation; may be divided into two categories: physical evolution (adaptive changes in biological makeup) and cultural evolution (adaptive changes in thought and behavior).

evolutionary ecology: the study of living organisms within the context of their total environment, with the aim of discovering how they have adapted.

exchange: the distribution of goods and services among members of a society.

exogamy: marriage outside a particular group with which one is identified.

extended family household: a multiple-family unit incorporating adults of two or more generations.

family household: a household formed on the basis of kinship and marriage.

folktales: traditional stories found in a culture (generally transmitted orally) that may or may not be based on fact.

foraging: collecting wild plants and hunting wild animals for subsistence.

formal interview: an interview that consists of questions designed to elicit specific facts, attitudes, and opinions.

formal organization: a group that restricts membership and makes use of officially designated positions and roles, formal rules and regulations, and a bureaucratic structure.

fossil: the remains or traces of any ancient organism.

fraternal polyandry: marriage of one woman with a set of brothers.

freehold: private ownership of property.

function: the contribution that a particular cultural trait makes to the longevity of the total culture.

gender: a cultural construct consisting of the set of distinguishable characteristics associated with each sex.

genetic determinism: the idea that all behavior, including very specific behavior, is biologically based, in contrast to cultural determinism.

genetics: the study of the mechanisms of heredity and biological variation.

grammar: the formal structure of a language, comprising phonology, morphology, and syntax.

grammatical structure: the rules for organizing elements of a language into meaningful utterances.

graphic arts: those forms of art such as painting and drawing.

group: a number of individuals who interact on a regular basis and have a sense of collective identity.

habitat: the specific area where a species lives.

historical linguistics: the study of how languages change over time.

holism: the philosophical view that no complex entity can be considered to be only the sum of its parts; as a principle of anthropology, the assumption that any given aspect of human life is to be studied with an eye to its relation to other aspects of human life.

Homo sapiens: the human species.

horizontal migration: a nomadic pattern characterized by regular movement over a large area in search of grass; also called plains migration.

horticulture: a simple form of agriculture based on the working of small plots of land without draft animals, plows, or irrigation; also called extensive agriculture.

household: a domestic residential group whose members live together in intimate contact, rear children, share the proceeds of labor and other resources held in common, and in general cooperate on a day-to-day basis.

hunter-gatherers: a collective term for the members of small-scale mobile or semi-sedentary societies, whose subsistence is mainly focused on hunting game and gathering wild plants and fruits; organizational structure is based on bands with strong kinship ties.

hunting and gathering: involves the systematic collection of vegetable foods, hunting of game, and fishing.

hypothesis: a statement that stipulates a relationship between a phenomenon for which the researcher seeks to account and one or more other phenomena.

hypothetico-deductive explanation: a form of explanation based on the formulation of hypotheses and the establishment from them by deduction of consequences which can then be tested against the archaeological data.

incest taboo: the prohibition of sexual intimacy between people defined as close relatives.

incest: sexual intercourse between closely related persons.

inclusive fitness: an individual's own fitness plus his or her effect on the fitness of any relative.

independent family household: a single-family unit that resides by itself, apart from relatives or adults of other generations.

independent variable: the variable that can cause change in other variables.

induction: a method of reasoning in which one proceeds by generalization from a series of specific observations so as to derive general conclusions (cf. deduction).

Industrial Age: a cultural stage characterized by the first use of complex machinery, factories, urbanization, and other economic and general social changes from strictly agricultural societies.

industrial society: a society consisting of largely urban populations that engage in manufacturing, commerce, and services.

industrialism: a form of social organization in which the population's needs for food, manufactured products, transportation, and many services are met through the use of machines powered largely by fossil fuel.

informant: a person who provides information about his or her culture to the ethnographic fieldworker.

innovation: the process of adopting a new thing, idea, or behavior pattern into a culture.

instinct: a genetically-determined pattern of behavior that is characteristic of a species and is often a response to specific internal or environmental stimuli.

institutions: a society's recurrent patterns of activity, such as religion, art, a kinship system, law, and family life.

intensive agriculture: a form of agriculture that involves the use of draft animals or tractors, plows, and often some form of irrigation.

invention: any new thing, idea, or way of behaving that emerges from within a society.

inventory of resources: a catalogue of the kinds of materials the people under investigation take from their environment in order to clothe, house, and feed themselves; the amount of time they spend procuring these materials; the quantity of food they collect or produce; and the distribution of the research population per unit of land.

in selection: the process whereby an individual's genes are selected by virtue of that individual's increasing the chances that his or her kin's genes will be propagated into the next generation.

kindred: a collection of bilateral kin.

language: a highly flexible and complex system of communication that allows for the exchange of detailed information about both interior and exterior conditions. As a creative and open system, new signals may be added and new ideas transmitted.

law: a rule of social conduct enforced by sanctions administered by a particular source of legitimate power.

legitimacy: the right to rule on the basis of recognized principles.

lexicon: in linguistics, the total number of meaningful units {such as words and affixes) of a language.

lexigram: a symbol that represents a word.

life expectancy: the length of time that a person can, on the average, expect to live.

lineage: a unilineal descent group composed of people who trace their genealogies through specified links to a common ancestor.

lineal relatives: direct ascendants and descendants.

linguistic anthropology: a subdivision of anthropology that is concerned primarily with unwritten languages (both prehistoric and modern), with variation within languages, and with the social uses of language; traditionally divided into three branches: descriptive linguistics, the systematic study of the way language is constructed and used; historical linguistics, the study of the origin of language in general and of the evolution of the languages people speak today; and sociolinguistics, the study of the relationship between language and social relations.

linguistics: the scientific study of language.

linked changes: those changes brought about in a culture when other (interconnected) parts of that same culture undergo change.

local races: subdivisions of geographical races. One type consists of partially isolated groups, usually remnants of once larger units. The second type includes fairly large subdivisions that contain a degree of variation within them.

low energy budget: an adaptive strategy by which a minimum of energy is used to extract sufficient resources from the environment for survival.

marginal people: those individuals who are not in the mainstream of their society.

market exchange: a mode of exchange which implies both a specific location for transactions and the sort of social relations where bargaining can occur. It usually involves a system of price-making through negotiation.

material culture: the buildings, tools, and other artifacts that includes any material item that has had cultural meaning ascribed to it, past and present.

matriarchy: a society ruled by females.

matrifocal: centered on the mother; said of a family situation common to the urban poor worldwide in which the woman and her relationships with her children and her female kin form the core of family life.

matrilineage: a lineage whose members trace their genealogies through specified female links to a common female ancestor.

matrilineal descent: descent traced through the female line.

matrilocal residence: residence of a married couple with or near the wife's kin.

mechanization: the replacement of human and animal labor by mechanical devices.

mercantile system: a system of ownership common in Europe and elsewhere after the eighteenth century in which land became the private property of individual owners.

model: a system of hypothetical principles that represents the characters of a phenomenon and from which predictions can be made.

monogamy: an exclusive union of one man and one woman.

monotheism: belief in one god.

morphemes: the smallest units of speech that convey meaning.

morphology: the study of structure, including the system by which speech units are combined to form meaningful words.

natural selection: the process whereby members of a species who have more surviving offspring than others pass their traits on to the next generation, whereas the less favored do not do so to the same degree.

Neolithic: an Old World chronological period characterized by the development of agriculture and, hence, an increasing emphasis on sedentism.

neolocal residence: residence of a married couple in a new household established apart from both the husband's and the wife's kin.

network: a web of social ties of various kinds.

niche: the environmental requirements and tolerances of a species; sometimes seen as a species' "profession" or what it does to survive.

nomadic pastoralism: the strategy of moving the herds that are one's livelihood from pasture to pasture as the seasons and circumstances require.

nonunilineal descent group: a kin group in which descent may be traced through either parent or through both.

nonverbal communication: the various means by which humans send and receive messages without using words (e.g., gestures, facial expressions, touching).

norm: the most frequent behavior that the members of a group will show in a specific situation.

Northern Paiute Groups – Bands versus Tribes versus Nations: Since no political authority bound the whole group together, it might have been equally correct to have called the inclusive unit a "**nation**" and each of the smaller units "**tribes**". However, since Powell, Kroeber, Steward, and others have already referred to the subdivisions of the Northern Paiute as **bands**, it seemed preferable to retain that designation (Stewart 1939).

nuclear family household: an independent family unit formed by a monogamous union.

nucleation: the tendency of populations to cluster in settlements of increasing size and density.

Paiute: The history of the name Paiute (Pah Ute, Piute) for the Indians of west central Nevada has been explained as a combination of the Paiute words pa ("water") and ute ("direction"). The Indians spoke themselves as nömönömönömö (people), but probably

travelers who had had previous experience with the Ute used **ute** to form the last part of the named for this new Shoshonean group, but added **pa** to indicate observable differences between the two groups. Certain it is that the same Indians are known as Snake by some writers and Paiute by others. Fremont, for example, made no distinction between the Indians he met in southern Oregon and those near Pyramid Lake (Stewart 1939).

paleontologists: experts on animal life of the distant past.

paleontology: that specialized branch of physical anthropology that analyzes the emergence and subsequent evolution of human physiology.

pastoralism: a form of social organization based on herding.

patrilineage: a lineage whose members brace their genealogies through specified male links to a common male ancestor.

patrilineal descent group: a unilineal descent group in which membership is inherited through the paternal line.

patrilineal descent: descent traced through the male line.

patrilocal postmarital residence: a custom where by a married couple resides in the household or vicinity of the husband's parents.

patrilocal residence: residence of a married couple with or near the husband's kin.

patrimonial system: a system of ownership, followed in northern and central Europe during the Middle Ages, in which land was controlled by feudal lords who held their domains by hereditary right.

peasants: farmers who lack control over the means of their production--the land, the other resources, and the capital they need to grow their crops, and the labor they contribute to the process.

phoneme: a class of sounds that differ slightly from one another but that may be substituted for one another without any change of meaning.

phonology: the sound system of a language.

physical anthropology: the scientific study of the physical characteristics, variability, and evolution of the human organism.

physical environment: the complex of inanimate elements that surround an organism.

politics: the process by which a community's decisions are made, rules for group behavior are established, competition for positions of leadership is regulated, and the disruptive effects of disputes are minimized.

polyandry: marriage between one woman and two or more men simultaneously.

polygamy: plural marriage.

polygyny: marriage between one man and two or more women simultaneously.

polytheism: belief in many gods.

positive eugenics: a method of increasing the frequency of desirable traits by encouraging reproduction by individuals with these traits.

potlatch: a form of competitive giveaway found among the Northwest Coast American Indians that serves as a mechanism for both achieving social status and distributing goods.

power: the ability to exert influence because one's directives are backed by negative sanctions of some sort.

prehistoric: the period prior to written records for any given area. In North America synonymous with

prehistory: the period of human history before the advent of writing.

primitive: a derogatory term used to describe small-scale, preliterate, and technologically simple societies.

processors: hunter-gatherers who occupy one permanent settlement, from which they move to temporary camps to exploit seasonally available resources (a foraging pattern).

production: the conversion of natural resources to usable forms.

productive life span: the period bounded by the culturally established ages at which a person ideally enters and retires from the work force.

productivity: the amount of work a person accomplishes in a given period of time.

profane: the sphere of the ordinary and routine; the everyday, natural world.

psychological anthropology: the study of the relationship between culture and individual personality.

race: a subgroup of human population that shares a greater number of physical traits with one another than they do with those of other subgroups.

regulation of access to resources: control over the use of land, water, and raw materials.

religion: a framework of beliefs relating to supernatural or superhuman beings or forces that transcend the everyday material world.

research design: systematic planning of research, usually including (1) the formulation of a strategy to resolve a particular question; (2) the collection and recording of the evidence; (3) the processing and analysis of these data and their interpretation; and (4) the publication of results.

resilience: the ability of an ecosystem to undergo change while still maintaining its basic elements or relationships.

revolution: an attempt to overthrow the existing form of political organization, the principles of economic production and distribution, and the allocation of social status.

rites of passage: rituals that mark a person's transition from one set of socially identified circumstances to another.

ritual: behavior that has become highly formalized and stereotyped.

role: a set of behavioral expectations appropriate to an individual's social position.

sacred: the sphere of extraordinary phenomena associated with awesome supernatural forces.

sampling: the probabilistic, systematic, or judgmental selection of a sub-element from a larger population, with the aim of approximating a representative picture of the whole.

sanction: any means used to enforce compliance with the rules and norms of a society.

scarce resources: a central concept of Western economics which assumes that people have more wants than they have resources to satisfy them.

science: a method of reaming about the world by applying the principles of the scientific method, which includes making empirical observations, proposing hypotheses to explain those observations, and testing those hypotheses in valid and reliable ways; also refers to the organized body of knowledge that results from scientific study.

scientific theory: a statement that postulates ordered relationships among natural phenomena.

sedentism: the practice of establishing a permanent, year-round settlement.

semantic domains: groups of related categories of meaning in a language.

semantics: the study of the larger system of meaning created by words.

senescence: old age.

serial monogamy: an exclusive union followed by divorce and remarriage, perhaps many times.

settlement pattern: the spatial distribution of cultural activities across a landscape at a given moment in time.

sexual division of labor: the situation in which males and females in a society perform different tasks. In hunting-gathering societies males usually hunt while females usually gather wild vegetable food.

sexual stratification: the ranking of people in a society according to sex.

shaman: a medium of the supernatural who acts as a person in possession of unique curing, divining, or witchcraft capabilities.

shamanistic cult: that form of religion in which part-time religious specialists called shamans intervene with the deities on behalf of their clients.

slavery: a practice that permits some people within a society to own other persons and to claim the right to their labor.

social anthropology: see cultural anthropology.<> **social category:** a category composed of all people who share certain culturally identified characteristics.

social class: a category of people who have generally similar educational histories, job opportunities, and social standing and who are conscious of their membership in a social group that is ranked in relation to others and is replicated over generations.

social division of labor: the process by which a society is formed by the integration of its smaller groups or subsets.

social norm: an expected form of behavior.

social pressure: a means of social control in which people who venture over the boundaries of society's rules are brought back into line.

social stratification: the ranking of subgroups in a society according to wealth, power, and prestige..

socialization: the process by which a person acquires the technical skills of his or her society, the knowledge of the kinds of behavior that are understood and acceptable in that society, and the attitudes and values that make conformity with social rules personally meaningful, even gratifying; also termed enculturation.

society: a group of interacting people who share a geographical region, a sense of common identity, and a common culture.

sociobiology: the study of the biological control of social behavior.

sociocultural anthropology: a branch of anthropology that deals with variations in patterns of social interaction and differences in cultural behavior.

sociolinguistics: a branch of anthropological linguistics that studies how language and culture are related and how language is used in different social contexts.

sorcery: the performance of certain magical rites for the purpose of harming other people.

specialization: the limited range of activities in which a single individual is likely to be engaged.

specialized pastoralism: the adaptive strategy of exclusive reliance on animal husbandry.

speech community: a socially distinct group that develops a dialect; a variety of language that diverges from the national language in vocabulary, pronunciation, and grammar.

spheres of exchange: the modes of exchange-- reciprocity, redistribution, and market exchange-- that apply to particular goods or in particular situations.

spirit possession: the supposed control of a person's behavior by a supernatural spirit that has entered the body.

stability: the ability of an ecosystem to return to equilibrium after disturbances.

state: a term used to describe a social formation defined by distinct territorial boundedness, and characterized by strong central government in which the operation of political power is sanctioned by legitimate force. In cultural evolutionist models, it ranks second only to the empire as the most complex societal development stage.

statistical analysis: the application of probability theory to quantified descriptive data.

status: a position in a pattern of reciprocal behavior.

stratification: the division of a society into groups that have varying degrees of access to resources and power.

supernatural beliefs: a set of beliefs found in all societies that transcend the natural, observable world.

symbol: something that can represent something distant from it in time and space.

syntax: the arrangement of words into meaningful utterances.

system: a series of interrelated parts wherein a change in one part brings about changes in all parts.

terms of reference: the terms by which people refer to their kin when they speak about them in the third person.

territory: an area that a group defends against other members of its own species.

theism: belief in one or more gods of extrahuman origin.

theory: a step in the scientific method in which a statement is generated on the basis of highly confirmed hypotheses and is used to generalize about conditions not yet tested.

totem: a plant or animal whose name is adopted by a clan and that holds a special significance for its members, usually related to their mythical ancestry.

transhumance: seasonal movement of livestock between upland and lowland pastures.

travelers: hunter-gatherers who follow a regular yearly round, occupying a series of campsites for brief periods when a valued resource is available in the vicinity of each site (a logistical pattern).

tribe: a descent and kinship-based group in which subgroups are clearly linked to one another, with the potential of uniting a large number of local groups for common defense or warfare. Unlike bands, tribes are usually settled farmers, though they also include nomadic pastoral groups whose economy is based on exploitation of livestock. Individual communities tend to be integrated into the larger society through kinship ties.

Tribes: Certainly, if we have units to set apart, the basis for the formation of those units must be clearly defined. The larger unit I have called **"tribe"** because it is a group of Indians linguistically, culturally, and territorially united. (Stewart 1939).

unilineal descent group: a kin group in which membership is inherited only through either the paternal or the maternal line, as the society dictates.

unilineal evolution: a pattern of cultural progress through a sequence of evolutionary stages; the basic premise of the early cultural evolutionists.

unstructured interview: an ethnographic data-gathering technique usually used in the early stages of one's fieldwork in which interviewees are asked to respond to broad, open-ended questions.

urbanization: the proportionate rise in the number of people living in cities in comparison to the number living in rural areas.

urbanized society: a society in which a majority of people live in cities.

variable: any property that may be displayed in different forms.

wealth: the accumulation of material objects that have value within a society.

Appendix 1.5.

Appendix 1.5 Specific stakeholder comments at the Owyhee Subbasin Public Outreach meetings and response letters written by Steven C. Vigg and reviewed by the Owyhee Technical/Planning team.

Appendix 1.5.1 Comments at the Owyhee, Nevada Meeting on April 1, 2004 – listed by stakeholder.

Herman Atkinis' Comments

Comment #1: There are three parts to the assessment, where are you at with those three steps?

Comment #2: Sounds like changes to the final plan could be made by people outside of the subbasin. Who will have the last say? In effect, local people have comment, but the NWPCC will ultimately have the last say.

Guy Dodson's Comments

Comment #1:
Guy Dodson noted that there was an incorrect entry on Indian Creek as there are no pollutant sources within this area.

John Jackson's Comments

Comment #1:
John Jackson commented that on the QHA spreadsheet, Indian Creek on p.6 says that the limiting factor is obstruction and on the limiting factors page it says that the limiting factor for this reach is pollutants. John Jackson noted that a black and white copy of a color-coded spreadsheet made things a little bit difficult to review.

Comment #2:
John also questioned the entry on Sheep Creek – S.F. Owyhee to Sheep Cr. Reservoir stating that this reach is listed as a 1.0, but below the reservoir there are no pollutants identified and they are listed as a 4.0.

Comment #3:
John Jackson asked whether or not the website had a PowerPoint showing where the different reaches are since several of the creeks had different names. John Jackson asked

Guy Dodson, which Juniper Creek was referred to on the spreadsheet. John Jackson questioned whether or not livestock grazing can be listed as a pollutant.

John Sellman's Comments

Comment #1:
He asked how information has been collected from year to year for these different reaches. Tim Dykstra explained that on the Nevada side they met with BLM Fisheries Biologist, Pat Coffman and NDOW, Gary Johnson. Jake Sellman asked if they were going to update this spreadsheet once a year. The NWPCC requires a 5-year review of each subbasin plan, but a more frequent review may be conducted locally.

Appendix 1.5.2 Letters responding to the comments at the Owyhee, Nevada Meeting on April 1, 2004 – listed by stakeholder.

Response to Herman Atkinis' Comments
May 17, 2004

Herman Atkinis, Administration
Shoshone Paiute Tribes of the Duck Valley Indian Reservation
Highway 51 Stateline
P.O. Box 219
Owyhee, Nevada 89832

Dear Herman Atkinis:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: There are three parts to the assessment, where are you at with those three steps?
- Comment #2: Sounds like changes to the final plan could be made by people outside of the subbasin. Who will have the last say? In effect, local people have comment, but the NWPCC will ultimately have the last say.

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following responses:

- Response to comment #1

During the public meeting, I explained that all three parts of the Owyhee Subbasin Plan were in progress – the first draft of the technical assessment, first draft of inventory of restoration activities were available, and the management plan was in development and first draft would be available by the middle of April. At this time (May 17th) we have completed several revisions on each of the Owyhee Subbasin Plan Chapters and Appendices. The latest versions of all Owyhee Subbasin Plan documents are available for review at any time on www.Owyhee.US – just click the "Deliverables" navigation button on the front page. All contract deliverables will be due COB May 28, 2004 to the Northwest Power and Conservation Council (NWPCC), Portland, Oregon.

- Response to comment #2

During the public meeting, Tom Dayley gave an in-depth description of the subbasin plan review process. The NWPCC expects to have a final document for amendment into the Program by January 2005. Tom Dayley affirmed that changes to the plan could be made by people outside of this Subbasin via the official F&W Program amendment public comment process, but that the NWPCC would not give equal weight to all of the comments received – with more weight given to comments from local stakeholders. Steve explained that the local support for the plan is extremely important to the entire process. Tom Dayley confirmed that it is the responsibility of the NWPCC to make the final determinations on the subbasin plan revision and Fish & Wildlife Program Amendment process.

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Response to Guy Dodson's Comments

May 17, 2004
Guy Dodson Sr., Director
Habitat, Fish, Wildlife & Parks Department
Shoshone Paiute Tribes of the Duck Valley Indian Reservation
Highway 51 Stateline
P.O. Box 219
Owyhee, Nevada 89832

Dear Guy Dodson:

We thank you for attending the Owyhee Subbasin public outreach meeting. Your comment has been posted on the www.Owyhee.us web site:

- Comment #1: Guy Dodson noted that there was an incorrect entry on Indian Creek as there are no pollutant sources within this area.

Your comment has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

During the meeting John Jackson, from Petan Ranch, also stated that this rating was apparently a mistake since there is no mining, milling, housing, development, or other sources of pollution on Indian Creek. I checked with Gary Johnson, Nevada Department of Wildlife, and he agreed that the rating of 1.0 for "pollutants" was in error. We discussed the ratings for the tributaries flowing into Indian Creek (Winters, Mitchell and Wall) that all had been rated 4.0 for "pollutants". Based on Mr. Johnson's personal observations and the ratings of the tributaries, we decided that Indian Creek should be rated 4.0 for the "pollutants" attribute. We will correct this datum in the QHA data files. To further clarify the matter, Gary Johnson also informed me that there are two "Indian Creeks" in the Nevada portion of the Owyhee. The one under discussion provides habitat for redband trout; it is near the south end of the Duck Valley Indian Reservation – emanating from the Bull Run Mountains and flowing into the S. Fork of the Owyhee River. Prior to entering the Owyhee, some of the water is diverted into Dry Creek Reservoir on the Petan Ranch. The other "Indian Creek" is in Independence Valley and is a tributary to the headwaters of the S.F. Owyhee River; it does not contain redband trout or any other salmonid species.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

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Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Response to John Jackson's Comments:
May 16, 2004

John Jackson
Owyhee, NV 89832

Dear John Jackson:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: John Jackson commented that on the QHA spreadsheet, Indian Creek on p.6 says that the limiting factor is obstruction and on the limiting factors page it says that the limiting factor for this reach is pollutants. John Jackson noted that a black and white copy of a color-coded spreadsheet made things a little bit difficult to review.
- Comment #2: John also questioned the entry on Sheep Creek – S.F. Owyhee to Sheep Cr. Reservoir stating that this reach is listed as a 1.0, but below the reservoir there are no pollutants identified and they are listed as a 4.0.
- Comment #3: John Jackson asked whether or not the website had a PowerPoint showing where the different reaches are since several of the creeks had different names. John Jackson asked Guy Dodson, which Juniper Creek was referred to on the spreadsheet. John Jackson questioned whether or not livestock grazing can be listed as a pollutant.

Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

You are right, the photocopy of a color-coded spreadsheet made it difficult to read some numbers. For HUC 17050105, Indian Creek on p.6 of the Limiting Factors Handout #3b actually lists pollutants as the limiting factor. This is consistent with the minimum score of 1.0 for Pollutants (Attribute #10) on Handout 3a QHA Ratings – for the Indian Creek reach.

- Response to comment #2:
- For HUC 17050105, the Sheep Creek reach – S.F. Owyhee to Sheep Cr. Reservoir -- is rated as a 1.0 for Pollutants and 0.5 for Obstructions. The reach below the reservoir is intermittent/dry and therefore contains no redband trout – so the dam (#11 Obstruction) is the limiting factor with a score of 0.5 because it eliminates the flow below the reservoir. Thus intermittent flow/dessication is the overwhelming problem below the dam and the "pollutants" attribute is rated at a 4.0 because it is not a factor when the stream is dry.

- Response to comment #3:

We used the BLM GIS data bases as the definitive tool to locate specific reaches and identify streams by name. Livestock grazing is not listed as a pollutant; however, livestock feces on the stream banks may result in high coliform bacteria (*E. coli*) counts or other factors such as increased sedimentation in the stream.

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Thank you,

Steven C. Vigg

Principal
Steven Vigg & Company

SCV

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Response to John Sellman's Comments
May 17, 2004

John Sellman, Biologist
Habitat, Fish, Wildlife & Parks Department
Shoshone-Paiute Tribes of the Duck Valley Indian Reservation
Highway 51 Stateline
P.O. Box 219
Owyhee, Nevada 89832

Dear John Sellman:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: He asked how information has been collected from year to year for these different reaches. Jake Sellman also asked if they were going to update this spreadsheet once a year.

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

During the public meeting, Tim Dykstra explained that on the Nevada portion of the Owyhee, we met with BLM Fisheries Biologist, Pat Coffin and NDOW Fisheries biologist, Gary Johnson to review information collected by their agencies over the past two decades and to get their expert judgments on the QHA evaluation. The Northwest Power and Conservation Council requires a 5-year review of each of the 62 subbasin plans as part of the Council's Fish & Wildlife Program Amendment process. However, a more frequent review will be conducted as part of the Provincial Review (every three years) as part of the BPA funding process for Fish & Wildlife enhancement projects. Furthermore, the Tribes' Habitat, Fish, Wildlife and Parks Department will be updating relevant information annually as part of the Monitoring & Evaluation (M&E) Plan that is being initiated this year (spring of 2004).

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

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Thank you,

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Appendix 1.5.3 Comments at the Grand View, Idaho Meeting on April 2, 2004 – listed by stakeholder.

Craig Baker's Comments

Comment #1:
Craig Baker of the Sierra Del Rio Ranch noted that Pole Creek and Deep Creek reaches listed within the Idaho QHA spreadsheet pool only where they flow through in the spring. The predominant fish in these creeks are bass, not redband trout.

Comment #2:
Craig Baker stated that if you killed 1 juniper tree per year for every cow out on the range (which would be the slow approach), the trees would eventually be gone and the water would be ten-fold.

Donna Bennett's Comments

Comment #1:
Donna Bennett explained that the studies that this assessment is based upon were primarily done in the 1980s. She explained that the area has been in a drought since the 1970s, but none of the studies take this fact into account.

Comment #2:
Donna Bennett commented that juniper burning needs to be a part of the land management in the subbasin. She explained that on her place in the fall, the Indians used to come: the men would hunt and the women gathered camas roots. When they moved out they would burn the entire area. She explained that one 50 year old juniper tree will transpire 80 gallons of water per day. She noted that they have started burning on their place and they are starting to get springs coming back, even on dry years.

George Bennett's Comments

Comment #1:
George Bennett stated that the water in some locations is coming out of the ground a good 2 degrees higher than the current temperature standard.

Brian Collett's Comments

Comment #1:
Brian Collett stated that the reach labeled Rock Creek-6 is entirely on private ground. He questioned when a study on this reach was done and by whom, stating that there are trespass issues associated with this sort of thing. The confidence rating for this reach is a

0.5, and should be a zero. He requested that this reach be eliminated from the assessment as his family is the only people with knowledge of this reach and they do not want this section ranked.

Comment #2:
Brian Collett stated that in order to have better water quality in this area we will have to address the juniper invasion problem.

Comment #3:
Brian Collett stated that the use of agenda-driven science in these assessments is not acceptable.

Chris Collett's Comments

Comment #1:
Chris Collett noted that Bruce Zoellick, the leading scientist in the QHA assessment for the Idaho stream reaches, has a personal agenda for this area and his data is biased.

Comment #2:
Chris Collett stated that the terms "restoration and protection" are worrisome to her – protection from what? She commented that money used should focus on restoration not protection. She stated her concern that fences will be built where they are not needed, and ranchers that are doing a good job currently will be punished for their caretaking of the land.

Comment #3:
Chris Collett stated that the use of agenda-driven science in these assessments is not acceptable.

Gene Davis' Comments

Comment #1:
Gene Davis noted that the reach entitled 'Battle Creek #2' should not be rated at all because of the zero confidence. He questioned why 'Shoofly Creek' was ranked with zero confidence as well. He also noted that 'Dry Creek #1 and #2' are reaches that are dry seven out of ten years, with no water running in them at all. He explained that there is some riparian vegetation, but the reaches shouldn't be considered for red band trout habitat due to the lack of water.

Derron Fredrick's Comments

Comment #1:

Derron Frederick noted that Bruce Zoellick, the leading scientist in the QHA assessment for the Idaho stream reaches, has a personal agenda for this area and his data is biased.

Comment #2:
Derron Frederick commented that Rock Creek only has water in the spring and there are no fish within this stream.

Comment #3:
Derron Frederick stated that Dry Creek (reach 1 and 2 on page 9 of the handout) are always dry. He stated that the lack of existing water is such that they have to have a pipeline to water cattle in that area. He also noted that Shoofly Creek #3 is on private land and the only time there is water there is when there is flood water. He explained that the water down below in this reach is only wastewater from the canal. In fact, he stated that several people farm through what they are calling a creek.

Comment #4:
Derron Frederick stated that in the Owyhee River Basin, most of the Red Band Trout exist on private ground or in areas that are only accessed through private ground. He stated that if the process continues to proceed with unfair assessments that use agenda-based science that the local landowners will lock up there lands and will no longer provide access through their lands to these areas.

Jeanette Hemenway's Comments

Comment #1:
Jeanette Hemenway commented that she had come to the meeting because she had seen a program on television where the Indians claimed to have owned the Snake River. She said she was 86 years old, had lived here all her life, and has had established water rights. She explained that she has always respected the Indians, but can't understand why fish are more important than her and her descendants. Steve Vigg commented that he was not aware of this television program. Guy Dodson noted that she was most likely referring to a program that ran on Idaho Public Television (Channel 4).

Comment #2:
Jeanette Hemenway noted that her grandparents were here in 1904, and that there was not the amount of salmon present in the Snake River that people were claiming.

Dana Rutan's Comments

Comment #1:
Dana Rutan expressed his concerns about the redband trout habitat designation in many of the stream reaches as they are not naturally cool enough to sustain redband trout populations. He further explained his concern that such an inaccurate designation will be used to justify the removal of cattle from these areas in the future, as this will be seen by land managers as the only solution.

Comment #2:
Dana Rutan stated that the bottom line solution will be to kick cattle off of the range. He questioned why we should get money to protect fish that have obviously adapted to existing habitat conditions.

Comment #3:
Dana Rutan stated that while the Owyhee Dam may have blocked some fish migration, it multiplied the amount of food produced within the area by more than fifty times.

Comment #4:
Dana Rutan commented that it is not right to rank streams with a zero confidence rating. Giving an area a low score without any data is not fair.

Comment # 5:
Dana Rutan noted that Combination Creek dries up. He also explained that Boulder Creek has lots of willows and is in very good riparian condition.

John Urquidi's Comments

Comment #1:
John Urquidi asked if there were two Shoofly Creeks because he was only familiar with the Shoofly Creek that was located in the Bruneau drainage. Pam Smolczynski noted later that there is a Shoofly Creek in the Owyhee Subbasin. It is possible that the agency personnel and local landowners use different names for this stream reach.

Comment #2:
John Urquidi asked how Steve Vigg had documented that pre-1933 salmon runs existed in the Owyhee River Basin. He wondered where he had documented that these supposed salmon runs were eliminated by the construction of the Owyhee Dam.

Comment #3:
John Urquidi commented regarding the attribute rating and definition of normative used in the QHA models. He stated that normal conditions in the Owyhee drainage have unique variances from other areas. For example, spring temperatures are hotter in the Owyhees than in other areas, and juniper invasions cause dewatering of the drainages. These are just two of the many variances occurring within the Owyhee Subbasin. He stated his opinions that more work needs to be done to establish baseline data and the definition of normal.

Comment #4:
John Urquidi noted that a confidence rating of 0 is confusing. He stated that it should not have been ranked in all columns as 0 indicated no factual knowledge. He suggested that areas with 0 confidences should state not/rated in the notes of the model and only includes numbers to meet the computer models requirements.

Appendix 1.5.4 Letters responding to the comments at the Grand View, Idaho Meeting on April 2, 2004 – listed by stakeholder.

Response to Craig Baker's Comments
May 16, 2004

Craig Baker
17351 Murphy Flat Rd.
Murphy, ID 83650

Dear Craig Baker:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Craig Baker of the Sierra Del Rio Ranch noted that Pole Creek and Deep Creek reaches listed within the Idaho QHA spreadsheet pool only where they flow through in the spring. The predominant fish in these creeks are bass, not redband trout.
- Comment #2: Craig Baker stated that if you killed 1 juniper tree per year for every cow out on the range (which would be the slow approach), the trees would eventually be gone and the water would be ten-fold.

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following responses:

- Response to comment #1

Your specific information regarding the Pole Creek and Deep Creek reaches is noted. Members of the technical team have observed good populations of redband trout in the upper reaches of Deep Creek that have spring-fed perennial flow. Apparently, the flow in Pole Creek and the lower reaches of Deep Creek may be intermittent or interrupted – dependant upon terrain – and may have more of the warm water species such as smallmouth bass.

- Response to comment #2

The issue of increased water consumption (evapotranspiration) by increased Juniper encroachment has been noted. By inspection of the current versus historic maps of the distribution of old growth western Juniper and Mountain Mahogany Woodlands habitat (Source: www.nwhi.org/ibis) – it is apparent that this habitat type has increased in the Owyhee Subbasin. This habitat is dominated by fire-sensitive species, and therefore, the range of western juniper and mountain mahogany has expanded because of federal fire suppression policies (Crawford and Kagan 2004; Wayne Burkhart cited by Jerry Hoagland, Personal Correspondence, April 2004). Quigley and Arbelbide concluded that in the Inland Pacific Northwest, Juniper/Sagebrush, Juniper Woodlands, and Mountain Mahogany cover types now are significantly greater in extent than before 1900; however, this habitat is generally in degraded condition because of increased exotic plants and decreased native bunchgrasses. As far as I am aware, no scientific studies have been conducted to estimate temporal changes in water loss by Junipers in the Owyhee Subbasin (mid-1800's to present). However, I understand that cooperative research has been initiated by USDA, University of Idaho, Oregon State University, and

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BLM – to study the effects of Juniper woodlands on stream flow in the Owyhee Subbasin and the Burns, Oregon area.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

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Principal
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Response to Donna Bennett's Comments
May 16, 2004

Donna Bennett
Grand View, ID 83624

Dear Donna Bennett:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Donna Bennett explained that the studies that this assessment is based upon were primarily done in the 1980s. She explained that the area has been in a drought since the 1970s, but none of the studies take this fact into account.
- Comment #2: Donna Bennett commented that juniper burning needs to be a part of the land management in the subbasin. She explained that on her place in the fall, the Indians used to come: the men would hunt and the women gathered camas roots. When they moved out they would burn the entire area. She explained that one 50 year old juniper tree will transpire 80 gallons of water per day. She noted that they have started burning on their place and they are starting to get springs coming back, even on dry years.

Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

A substantial amount of habitat and water quality monitoring and fish population surveys have been conducted during the past 3-5 years – during drought conditions. We agree that it is important to take climatic conditions into account, including recent drought conditions.

- Response to comment #2:

The need to manage Juniper encroachment has been noted by many landowners providing comments. However, old growth Juniper would not be categorized as recent encroachment. As far as I am aware, no scientific studies have been conducted to estimate temporal changes in water loss by Junipers (recent versus old growth) in the Owyhee Subbasin. However, I understand that cooperative research has recently been initiated by USDA, University of Idaho, Oregon State University, and BLM – to study the effects of Juniper woodlands on stream flow in the Owyhee Subbasin and the Burns, Oregon area. Perhaps additional studies are needed to estimate the magnitude of water loss due to increased biomass of Juniper trees in the Owyhee over time.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the

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Response to George Bennett's Comments
May 16, 2004

George Bennett
Grand View, ID 83624

Dear George Bennett:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: George Bennett stated that the water in some locations is coming out of the ground a good 2 degrees higher than the current temperature standard.

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

We understand that warm springs occur throughout the Owyhee Subbasin – and some springs have water temperatures at the source that are above the DEQ standards for cool water fisheries and/or the thermal tolerance of redband trout. We have noted your comment, we are interested in specific temperature data in specific stream reaches, if you have that available, please sent it to us.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

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Response to Brian Collett's Comments

May 16, 2004

Brian Collett
Oreana, ID 83650

Dear Brian Collett:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Brian Collett stated that the reach labeled Rock Creek-6 is entirely on private ground. He questioned when a study on this reach was done and by whom, stating that there are trespass issues associated with this sort of thing. The confidence rating for this reach is a 0.5, and should be a zero. He requested that this reach be eliminated from the assessment as his family is the only people with knowledge of this reach and they do not want this section ranked.
- Comment #2: Brian Collett stated that in order to have better water quality in this area we will have to address the juniper invasion problem.
- Comment #3: Brian Collett stated that the use of agenda-driven science in these assessments is not acceptable.

Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

Our Technical team members checked the reach labeled "Rock Creek-6" and found it included a small overlap of federal land and that the headwaters area included about 110 acres of state ground that has developed springs and has been leased out to private landowners in the past. For clarification, we could change the description on our tables to incorporate the phrase "excluding private ground and including state and federal lands". The Qualitative Habitat Assessment tool was designed to incorporate various levels of information – "hard" (quantitative) scientific data, expert opinion of professionals, and inferences based on best available information and reasonable hypotheses. In cases where a quantitative assessment of habitat condition and/or redband trout population sampling had not been conducted on a specific reach – it is reasonable for fishery and habitat experts to make inferences from adjacent or nearby reaches that have similar characteristics. On a scale of 0 to 2, a confidence rating of 0.5 was generally assigned to reaches without site-specific quantitative data, that could be qualitatively assessed via expert opinion and inferences based the condition of upstream or downstream reaches in the same proximity.

Even if the stream reaches had a confidence ratings of "0" (zero) it should not be eliminated from the QHA analysis and results according to Jeff Fryer (Oregon Technical Team). Dr. Fryer stated: "Biologists doing the rating who know the area can do a good job of inferring from other data how a reach should rate. If the biologist knows the land

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use, has data from upstream and/or downstream of the reach in question, or has knowledge of other similar reaches in the area, the rating given has a good chance of being accurate. Low confidence should be taken into account when looking at the results and coming up with a subbasin plan. For example, if a reach has high current or restoration value, but low confidence, filling in this data gap could well be one of the priorities of the subbasin plan."

- Response to comment #2

The issue of increased water consumption (evapotranspiration) by increased Juniper encroachment has been noted. By inspection of the current versus historic maps of the distribution of old growth western Juniper and Mountain Mahogany Woodlands habitat (Source: www.nwhi.org/ibis) – it is apparent that this habitat type has increased in the Owyhee Subbasin. This habitat is dominated by fire-sensitive species, and therefore, the range of western juniper and mountain mahogany has expanded because of federal fire suppression policies (Crawford and Kagan 2004; Wayne Burkhart cited by Jerry Hoagland, Personal Correspondence, April 2004). Quigley and Arbelbide concluded that in the Inland Pacific Northwest, Juniper/Sagebrush, Juniper Woodlands, and Mountain Mahogany cover types now are significantly greater in extent than before 1900; however, this habitat is generally in degraded condition because of increased exotic plants and decreased native bunchgrasses. As far as I am aware, no scientific studies have been conducted to estimate temporal changes in water loss by Junipers in the Owyhee Subbasin (mid-1800's to present). However, I understand that cooperative research has been initiated by USDA, University of Idaho, Oregon State University, and BLM – to study the effects of Juniper woodlands on stream flow in the Owyhee Subbasin and the Burns, Oregon area.

- Response to comment #3

"Science" is the result of valid application of the scientific method which includes hypothesis testing, data collection according to standard protocols, data analysis according to standard methods, and interpretation according to sound logic. Natural Resources biologists and managers utilize data derived from research based on the scientific method – to compile a valid knowledge base. The Owyhee Subbasin Plan relies on data bases developed by resource management entities, best available information derived from relevant scientific studies and publications, and direct observation from professionals and other reliable sources that can be documented.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

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Thank you,

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Response to Chris Collett's Comments

May 16, 2004

Chris Collett
Oreana, ID 83650

Dear Chris Collett:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Chris Collett noted that Bruce Zoellick, the leading scientist in the QHA assessment for the Idaho stream reaches, has a personal agenda for this area and his data is biased.
- Comment #2: Chris Collett stated that the terms "restoration and protection" are worrisome to her – protection from what? She commented that money used should focus on restoration not protection. She stated her concern that fences will be built where they are not needed, and ranchers that are doing a good job currently will be punished for their caretaking of the land.
- Comment #3: Chris Collett stated that the use of agenda-driven science in these assessments is not acceptable.

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following responses:

- Response to comment #1

The Owyhee Technical Team includes Bruce Zoellick as a representative of the Bureau of Land Management, Bruneau Resource Area. I consider Bruce Zoellick to be to be a qualified and knowledgeable biologist with significant experience in field research related to Owyhee River habitats and fish ecology. Several other professional biologists provided input to the Idaho QHA workshops, including Pam Druliner, Bonnie Hunt, Eric Lietzinger, Keith Meyer, Tim Dykstra, and myself – none of these biologists have indicated that Bruce Zoellick presented biased data in the QHA process.

- Response to comment #2

Restoration and protection are common terms in Fish & Wildlife Management. Protection simply means taking management actions to prevent properly functioning habitat from being degraded; and "restoration" means conducting actions that bring degraded habitat back to a properly functioning state.

- Response to comment #3

"Science" is the result of valid application of the scientific method which includes hypothesis testing, data collection according to standard protocols, data analysis according to standard methods, and interpretation according to sound logic. In the

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Owyhee Subbasin Plan, we make every attempt to incorporate best available information based on scientific research.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

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Response to Gene Davis' Comments
May 16, 2004

Gene Davis
790 E. 11 North
Mountain Home, ID 83647

Dear Gene Davis:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: Gene Davis noted that the reach entitled 'Battle Creek #2' should not be rated at all because of the zero confidence. He questioned why 'Shoofly Creek' was ranked with zero confidence as well. He also noted that 'Dry Creek #1 and #2' are reaches that are dry seven out of ten years, with no water running in them at all. He explained that there is some riparian vegetation, but the reaches shouldn't be considered for red band trout habitat due to the lack of water.

Your comment has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

The Qualitative Habitat Assessment tool was designed to incorporate various levels of information – "hard" (quantitative) scientific data, expert opinion of professionals, and inferences based on best available information and reasonable hypotheses. In cases where a quantitative assessment of habitat condition and/or redband trout population sampling had not been conducted on a specific reach – it is reasonable for fishery and habitat experts to make inferences from adjacent or nearby reaches that have similar characteristics. Even if the stream reaches had a confidence ratings of "0" (zero) it should not be eliminated from the QHA analysis and results according to Jeff Fryer (Oregon Technical Team). Dr. Fryer stated: "Biologists doing the rating who know the area can do a good job of inferring from other data how a reach should rate. If the biologist knows the land use, has data from upstream and/or downstream of the reach in question, or has knowledge of other similar reaches in the area, the rating given has a good chance of being accurate. Low confidence should be taken into account when looking at the results and coming up with a subbasin plan. For example, if a reach has high current or restoration value, but low confidence, filling in this data gap could well be one of the priorities of the subbasin plan." We will utilize the low confidence ratings (<1.0) to point out areas where additional research is needed.

We noted your information about 'Dry Creek #1 and #2 relative to water flow and redband riparian conditions and habitat. Derron Frederick also commented that these stream segments are usually dry. We will consult with the biologists who rated those reaches

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regarding specific scores and flow regimes; if we find any conflicting information we will contact you to help resolve the issues.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

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Response to Derron Fredrick's Comments

May 16, 2004

Derron Frederick
Grand View, ID 83624

Dear Derron Frederick:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Derron Frederick noted that Bruce Zoellick, the leading scientist in the QHA assessment for the Idaho stream reaches, has a personal agenda for this area and his data is biased.
- Comment #2: Derron Frederick commented that Rock Creek only has water in the spring and there are no fish within this stream.
- Comment #3: Derron Frederick stated that Dry Creek (reach 1 and 2 on page 9 of the handout) are always dry. He stated that the lack of existing water is such that they have to have a pipeline to water cattle in that area. He also noted that Shoofly Creek #3 is on private land and the only time there is water there is when there is flood water. He explained that the water down below in this reach is only wastewater from the canal. In fact, he stated that several people farm through what they are calling a creek.
- Comment #4: Derron Frederick stated that in the Owyhee River Basin, most of the Red Band Trout exist on private ground or in areas that are only accessed through private ground. He stated that if the process continues to proceed with unfair assessments that use agenda-based science that the local landowners will lock up there lands and will no longer provide access through their lands to these areas.

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following responses:

- Response to comment #1

The Owyhee Technical Team includes Bruce Zoellick as a representative of the Bureau of Land Management, Bruneau Resource Area. I consider Bruce Zoellick to be to be a qualified and knowledgeable biologist with significant experience in field research related to Owyhee River habitats and fish ecology. Several other professional biologists provided input to the Idaho QHA workshops, including Pam Druliner, Bonnie Hunt, Eric Lietzinger, Keith Meyer, Tim Dykstra, and me – none of these biologists have indicated that Bruce Zoellick presented biased data in the QHA process.

- Response to comment #2

Thank you for the information on Rock Creek seasonal flows and lack of fish life.

- Response to comment #3

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We have taken note of your comments on Dry Creek (reach 1 and 2 on page 9 of the handout) and Shoofly Creek reach 3. We will consult with biologists that are familiar with these reaches and post any additional information or follow-up responses to your observations on the Owyhee.us web site.

- Response to comment #4

We agree that private land has important redband trout habitat, and encourage your participation in future restoration efforts.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

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Response to Jeanette Hemenway's Comments
May 16, 2004

Jeanette Hemenway
Grand View, ID 83624

Dear Jeanette Hemenway:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comments have been posted on the www.Owyhee.us web site:

- Comment #1: Jeanette Hemenway commented that she had come to the meeting because she had seen a program on television where the Indians claimed to have owned the Snake River. She said she was 86 years old, had lived here all her life, and has had established water rights. She explained that she has always respected the Indians, but can't understand why fish are more important than her and her descendants. Steve Vigg commented that he was not aware of this television program. Guy Dodson noted that she was most likely referring to a program that ran on Idaho Public Television (Channel 4).
- Comment #2: Jeanette Hemenway noted that her grandparents were here in 1904, and that there was not the amount of salmon present in the Snake River that people were claiming.

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following responses:

- Response to comment #1

I cannot foresee any circumstance in which the Owyhee Subbasin planning process will affect your established water right. Furthermore, the Owyhee Subbasin plan is not related to any Indian water rights litigation.

- Response to comment #2

We note your historical information based on your grandparents observation. Quantitative monitoring of anadromous salmon and steelhead spawning runs began with the construction of mainstem Columbia River system dams and ladders – for example, Bonneville Dam on the lower Columbia River in 1938. Data on numbers of salmon and steelhead entering the lower Snake River has been monitored by U.S. Army Corps of Engineers at mainstem dams since 1961. Since the Owyhee Dam (completed in 1933) did not have any functional passage facilities for adult or juvenile salmonids, the salmon runs ascending the Owyhee River could not be directly counted. Idaho Power Company has made estimates of pre-impact anadromous salmonid production in the Mid-Snake reach above Hells Canyon Dam (information is available on the IPC web site).

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation

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for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

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Response to Dana Rutan's Comments

May 16, 2004
Dana Rutan
Grand View, ID 83624

Dear Dana Rutan:
Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Dana Rutan expressed his concerns about the redband trout habitat designation in many of the stream reaches as they are not naturally cool enough to sustain redband trout populations. He further explained his concern that such an inaccurate designation will be used to justify the removal of cattle from these areas in the future, as this will be seen by land managers as the only solution.
- Comment #2: Dana Rutan stated that the bottom line solution will be to kick cattle off of the range. He questioned why we should get money to protect fish that have obviously adapted to existing habitat conditions.
- Comment #3: Dana Rutan stated that while the Owyhee Dam may have blocked some fish migration, it multiplied the amount of food produced within the area by more than fifty times.
- Comment #4: Dana Rutan commented that it is not right to rank streams with a zero confidence rating. Giving an area a low score without any data is not fair.
- Comment # 5: Dana Rutan noted that Combination Creek dries up. He also explained that Boulder Creek has lots of willows and is in very good riparian condition.

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

Redband trout presence has been verified in many of the habitats listed in the QHA analysis and water temperatures have been monitored in many more of the habitats. Any habitats that were known to have naturally occurring temperatures that are too high to sustain redband trout populations were deleted from the analysis.

- Response to comment #2

No one is proposing to eliminate cattle from the Owyhee range. Some habitats have changed for redband trout due to anthropogenic impacts, and in some cases measures are needed to protect and restore fish. As you noted in comment #1, redband trout can be excluded from some stream habitats if conditions are not suitable.

- Response to comment #3

We agree that irrigated agriculture in the Owyhee Subbasin currently provides significant amounts of human food production. We would be interested in scientific data that showed the relative biomass production from irrigated crops (currently) and pre-impact production of anadromous salmonids in the Owyhee River system.

- Response to comment #4

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The Qualitative Habitat Assessment tool was designed to incorporate various levels of information – “hard” (quantitative) scientific data, expert opinion of professionals, and inferences based on best available information and reasonable hypotheses. In cases where a quantitative assessment of habitat condition and/or redband trout population sampling had not been conducted on a specific reach – it is reasonable for fishery and habitat experts to make inferences from adjacent or nearby reaches that have similar characteristics. Stream reaches had a confidence ratings of "0" (zero) should not be eliminated from the QHA analysis and results according to Jeff Fryer (Oregon Technical Team). Dr. Fryer stated: “Biologists doing the rating who know the area can do a good job of inferring from other data how a reach should rate. If the biologist knows the land use, has data from upstream and/or downstream of the reach in question, or has knowledge of other similar reaches in the area, the rating given has a good chance of being accurate. Low confidence should be taken into account when looking at the results and coming up with a subbasin plan. For example, if a reach has high current or restoration value, but low confidence, filling in this data gap could well be one of the priorities of the subbasin plan.”

- Response to comment #5

We note your specific information on Combination Creek and Boulder Creek. It is our understanding that, although Combination Creek is dry during part of the year, it supports relatively high numbers of redband trout on a seasonal basis. Boulder Creek was given a fairly good rating on riparian condition in the QHA analysis., i.e. 2.0-2.5 for reaches of South Boulder Creek and 3.0-3.5 for North Boulder Creek.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

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Thank you,

Steven C. Vigg

Principal
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Response to John Urquidi's Comments
May 16, 2004

John Urquidi
34276 Hotcreek Rd.
Bruneau, ID 83604

Dear John Urquidi:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: John Urquidi asked if there were two Shoofly Creeks because he was only familiar with the Shoofly Creek that was located in the Bruneau drainage. Pam Smolczynski noted later that there is a Shoofly Creek in the Owyhee Subbasin. It is possible that the agency personnel and local landowners use different names for this stream reach.
- Comment #2: John Urquidi asked how Steve Vigg had documented that pre-1933 salmon runs existed in the Owyhee River Basin. He wondered where he had documented that these supposed salmon runs were eliminated by the construction of the Owyhee Dam.
- Comment #3: John Urquidi commented regarding the attribute rating and definition of normative used in the QHA models. He stated that normal conditions in the Owyhee drainage have unique variances from other areas. For example, spring temperatures are hotter in the Owyhees than in other areas, and juniper invasions cause dewatering of the drainages. These are just two of the many variances occurring within the Owyhee Subbasin. He stated his opinion that more work needs to be done to establish baseline data and the definition of normal.
- Comment #4: John Urquidi noted that a confidence rating of 0 is confusing. He stated that it should not have been ranked in all columns as 0 indicated no factual knowledge. He suggested that areas with 0 confidence should state not/rated in the notes of the model and only include numbers to meet the computer models requirements.

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following responses:

- Response to comment #1

Pam Smolczynski answered this question during the meeting — and replied that there is a Shoofly Creek in the Owyhee Subbasin.

- Response to comment #2

The Idaho Power Company has made estimates of pre-impact anadromous salmonid production in the reach above Hells Canyon Dam – refer to their web site for documentation. We understand that the Shoshone-Paiute Tribe is currently making estimates of pre-impact anadromous salmonid abundance {contact Guy Dodson (208-

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759-3246) for more information}. Refer to §4.2.1 of the Owyhee Subbasin Management Plan for historical data on salmon distribution in the Owyhee.

- Response to comment #3

We agree more baseline data on existing habitat conditions would be useful. The QHA does not use “normal” conditions as a reference point (which has a statistical definition); instead it uses a “normative” condition which is defined as: "ideal conditions for similar stream in this ecological province".

- Response to comment #4

The Qualitative Habitat Assessment tool was designed to incorporate various levels of information – “hard” (quantitative) scientific data, expert opinion of professionals, and inferences based on best available information and reasonable hypotheses. In cases where a quantitative assessment of habitat condition and/or redband trout population sampling had not been conducted on a specific reach – it is reasonable for fishery and habitat experts to make inferences from adjacent or nearby reaches that have similar characteristics. Even if the stream reaches had a confidence ratings of "0" (zero) it should not be eliminated from the QHA analysis and results according to Jeff Fryer (Oregon Technical Team). Dr. Fryer stated: “Biologists doing the rating who know the area can do a good job of inferring from other data how a reach should rate. If the biologist knows the land use, has data from upstream and/or downstream of the reach in question, or has knowledge of other similar reaches in the area, the rating given has a good chance of being accurate. Low confidence should be taken into account when looking at the results and coming up with a subbasin plan. For example, if a reach has high current or restoration value, but low confidence, filling in this data gap could well be one of the priorities of the subbasin plan.” We will utilize the confidence ratings (<1.0) to point out areas where additional research is needed.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

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Thank you,

Steven C. Vigg

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Appendix 1.5.5 Comments at the Nyssa, Oregon Meeting on April 6, 2004 – listed by stakeholder.

Dave Bunker's Comments

Comment #1:
Did quite a bit of research in the past couple of weeks before this meeting; BPA has approximately 154 million for 2004; In the past, most money was used to purchase land. There is a ranch in Malheur County that was purchased using BPA funds, and then the water was turned back to the Malheur River to increase in-stream flows for fish. This is not the best us of $1.7 million. It would be better to provide smaller amounts to ranchers and other landowners to make management improvements. BPA spent 3.2 million dollars on a ranch in Grant County. He proposed that there is a better use of 3.2 million dollars. It would have been better to give this money to irrigation districts – would have saved more water while maintaining economic production.

Comment #2:
What are some of the innovative projects being completed with the Council's money? Discussion followed.

Comment #3:
Asked if woody debris improved channel stability; Ray Perkins explained that it depends; discussion followed regarding historic practices.

Comment #4:
For the focal species – high temperature is virtually unimportant at all times; Ray explained that temperature during summer rearing is the most important (ranking of 0-2 instead of 1-4).

Comment #5:
What is the date that the plan is supposed to be completed – May 28, 2004? Is there any between the spill and the management plan? Tom Dayley stated that yes spill is part of the management plan. Discussion followed. Restore fish where habitat exists and where habitats can be reasonably restored. Do you have any projects that will affect water flows for irrigation?

Comment #6:
Asked if there is a change in the NWPCC policy in getting more of the money on the land that is not currently tribal. Tom explained that one of the legal requirements is to give deference to the State Fish & Game Departments, Federal Fish & Game Departments, and the Tribes.

Jay Chamberlin's Comment

Comment #1:
Explained that irrigation diversion makes a difference early in the season, but return flows increase flow later in the season.

Carl Hill's Comment

Comment #1:
Can Tom Dayley verify that this money will be allocated based on priorities? Tom explained that this planning process is suppose to level the playing field as project priorities will be established from the bottom up rather than the top down.

Jennifer Martin's Comment

Comment #1:
How does normative conditions take into account the current existence of dams such as the Owyhee; Ray explained that the process used a reference approach; point of process is to provide justification for projects within the Subbasin.

Ray Perkins' Comments

Comment #1:
We tried not to use the concept of 'pristine' in the ranking process. Everything was ranked a 4 historically and lowered if there was an anthropogenic effect causing degraded habitat conditions.

Comment #2:
BLM would not rank private lands, so he got stuck with it – did the best he could and guessed.

Ed Petersen's Comments

Comment #1:
OSU did a study on surface water temperature a little while back that found that the surface water temperature will move to the ambient air temperature; If this is true, the water is going to track to the higher temperature.

Comment #2:

Noted that everything presented tonight was BPA funding – most of this money goes to Tribes. There has been input about other restoration projects using other funding given to you – will this be included?

Harry Smith's Comments

Comment #1:
Number 5 (High Flow): does 1 mean high flow?

Paul Skeen's Comments

Comment #1:
Isn't there more woody debris since settlement? Early pictures do not show woody vegetation.

Comment #2:
Did you take into account all of the discharge going back into the river from irrigation? Ray explained that you have to look at how this relates to normative. Paul wondered how any of this relates back to anything.

Lou Wettstein's Comments

Comment #1:
What is a geomorphic perspective?

Darrell Williams' Comments

Comment #1:
Wondered what can be done about beavers. Discussion followed. Ray Perkins explained that reservoirs were thrown out and tried to only rank live streams.

Lawrence Ziemer's Comments

Comment #1:
Has there been any thought given to the aquifer that local irrigation creates? DEQ has some information on this. Tom Dayley suggested that this could be part of future strategies.

Comment #2:
Asked if they took temperature readings of the lower reaches of Cow Hollow Creek before it entered the Owyhee River?

Comment #3:
Why is the Indian Tribe the leader in improving habitat for Redband Trout. Why isn't ODFW stepping up and making the improvements? Ray Perkins explained that they have limited staff – him. What is the end result of this plan – are they going to put fish ladders in, take the dams out? Ray explained that this plan will be used to prioritize money for projects within the subbasin.

Appendix 1.5.6 Letters responding to the comments at the Nyssa, Oregon Meeting on April 6, 2004 – listed by stakeholder.

Response to Dave Bunker's Comments

May 23, 2004

Dave Bunker
2705 Heritage Dr.
Nyssa, OR 97913

Dear Dave Bunker:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Did quite a bit of research in the past couple of weeks before this meeting; BPA has approximately $154 million for 2004; In the past, most money was used to purchase land. There is a ranch in Malheur County that was purchased using BPA funds, and then the water was turned back to the Malheur River to increase in-stream flows for fish. This is not the best use of $1.7 million. It would be better to provide smaller amounts to ranchers and other landowners to make management improvements. BPA spent 3.2 million dollars on a ranch in Grant County. He proposed that there is a better use of 3.2 million dollars. It would have been better to give this money to irrigation districts – would have saved more water while maintaining economic production.
- Comment #2: What are some of the innovative projects being completed with the Council's money? Discussion followed.
- Comment #3: Does woody debris improved channel stability?
- Comment #4: For the focal species – high temperature is virtually unimportant at all times.
- Comment #5: What is the date that the plan is supposed to be completed? Is there any connection between the spill and the management plan? Discussion followed. Restore fish where habitat exists and where habitats can be reasonably restored. Do you have any projects that will affect water flows for irrigation?
- Comment #6: Asked if there is a change in the NWPCC policy in getting more of the money on the land that is not currently tribal.
-

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

The total BPA Fish & Wildlife budget for FY2004 is approximately $154 million (http://www.nwcouncil.org/fw/0405/soy.htm); based on general guidelines, it will be probably be distributed approximately 70% for anadromous fish, 15% for resident fish and 15% for wildlife. Land purchases or conservation easements are usually derived from the 15% allocated to wildlife mitigation and enhancement.

- Response to comment #2:

A summary of nine “innovative projects” funded in 2002 at a total cost of about $2 million is found at the following link on the Northwest Power and Conservation Council’s web site http://www.nwcouncil.org/library/releases/2002/0814.htm .

Columbia River systemwide:
Project No. 34008, compile and compare data from habitat restoration projects in multiple watersheds to enhance the rate of learning about effects of restoration actions on fish populations, optimize the design of future restoration programs and improve monitoring.
Project 34002, develop better protocols for spawning salmon in Columbia River Basin hatcheries and assess reproductive success of individual fish in hatcheries.
Project 34005, use recent advances in DNA microarray technology to address genetic issues underlying questions related to hatchery management and interactions of wild and hatchery fish populations.
Idaho:
Project 34019, evaluate the relationships among river discharge, subsurface (hyporheic) zone characteristics, and egg pocket water temperature in Snake River fall chinook salmon spawning areas and evaluate the potential for improving Snake River fall chinook salmon smolt survival.
Project 34022, identify population structure of indigenous chinook salmon in the Middle Fork Salmon River of Idaho from patterns of genetic variation.
Project 34036, develop a calibration tool to enable analysis of biological productivity for streams and rivers throughout the Columbia River Basin, to be demonstrated on a subbasin of the Salmon River in Idaho (yet to be determined).
Washington:
Project 34001, monitor the occurrence of salmon pathogens and assess sources, fate and transport of pathogens in the upper middle Columbia River.
Project 34030, increase water infiltration during high precipitation periods by adopting proper agriculture practices, and use land and aquifers to temporarily store water for subsequent release into streams for flow enhancement and temperature control. The project would take place in Asotin Creek.
Oregon:
Project 34023, test hydraulics and biological safety (injury and mortality) of a new design for fish screens. The design in question is called an undershot horizontal flat plate screen, in which water flows under the screen rather than over the top of it. The project would test the ability of the undershot design to pass fish, sediment and debris as compared to an overshot screen. The screen would be tested in Elliot Creek, a tributary of the Hood River.
Lower Columbia River, Oregon and Washington:
Project 34021, explore the role of American shad in Columbia River food webs to better understand shad and fall chinook salmon feeding ecology in the Columbia River. The study would take place in the lower Columbia River of Oregon and Washington.

- Response to comment #3:

During the meeting, Ray Perkins explained that it depends on the specific situation; discussion followed regarding historic practices.

- Response to comment #4:

Water temperature is a very important habitat attribute for redband trout in the Owyhee Subbasin – especially maximum temperatures during the summer. During the meeting, Ray Perkins explained that temperature during summer rearing stage was rated the highest; i.e., a rating of 2.0 – on a scale of zero to 2.0 – in the QHA Species Hypothesis.

- Response to comment #5:

The draft Subbasin Plan is scheduled for completion on May 28, 2004. During the public outreach meeting, Tom Dayley stated that yes spill is part of the management plan (referring to the Columbia Basin, not the Owyhee Subbasin). The Subbasin Plan outlines Objectives and Strategies – it doesn't propose specific projects. In the past, a water rental strategy has been employed by BPA to provide more instream flows in some other subbasins. The Owyhee Subbasin Plan does not include any specific objectives or strategies to reduce water flows for irrigation.

- Response to comment #6:

Tom Dayley explained that one of the legal requirements is to give deference to the State Fish & Game Departments, Federal Fish & Game Departments, and the Tribes.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Jay Chamberlin's Comment

May 23, 2004

Jay Chamberlin
Owyhee Irrigation District
17 S. 1st Street
Nyssa, OR 97913

Dear Jay Chamberlin:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: Explained that irrigation diversion makes a difference early in the season, but return flows increase flow later in the season.

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

I wish to thank you for the information you provided at the Nyssa Public meeting regarding irrigation return flows. I also appreciate your response to my additional request regarding water distribution and use for irrigated agriculture in the Owyhee Subbasin, and other statistics pertaining to the operation of the Owyhee Irrigation District. The information you provided has been incorporated into Sections "4.2.2.1 Water Use", and "4.2.2.2 Current Land Use" – of the Owyhee Subbasin Management Plan (Chapter 4).

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven Vigg
Principal
Steven Vigg & Company

SCV

Response to Carl Hill's Comment
May 22, 2004

Carl Hill
2221 Locust Rd.
Nyssa, OR 97913

Dear Carl Hill:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment has been posted on the www.Owyhee.us web site:

- Comment #1: Can Tom Dayley verify that the money will be allocated based on priorities?

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

During the public meeting, Tom explained that this planning process is supposed to level the playing field as project priorities will be established from the bottom up rather than the top down. The Council's ISRP has stated that the Subbasin plans should prioritize objectives and strategies – and this prioritization will be the basis for funding projects in the future.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Jennifer Martin's Comment
May 22, 2004

Jennifer Martin
Owyhee Watershed Council
2925 SW 6th Ave. Suite 2
Ontario, OR 97914

Dear Jennifer Martin:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: How does normative conditions take into account the current existence of dams such as the Owyhee; Ray explained that the process used a reference approach; point of process is to provide justification for projects within the Subbasin.

Your comment has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

In order for a specific Owyhee stream reach to be "normative" within the context of the QHA model, it would have to be "Ideal conditions for similar stream in this ecological province" -- and it therefore could not be impacted by a dam, for example the Owyhee Dam. To check on my interpretation of this issue, I consulted Jeff Fryer -- the TOAST expert on QHA who has advised us all through this process. The following are the questions I asked Jeff and the responses that he provided. 1) Regarding the definition of "normative". Within the QHA model that was used how do normative conditions take into account the current existence of dams such as the Owyhee? Jeff Fryer's Answer: Normative, the way it was used in the Owyhee, does not take into account the current existence of dams. This is quite similar to the way most of the rest of the subbasins are handling this issue; the reference condition is assumed to be circa 1840 or so conditions. If one of the reaches dominated by a dam were to rate highly for restoration, I suspect that at that point they would say for economic and social reasons we can't restore this reach. Or perhaps they might propose some way to manage the dam to provide some of those potential restoration benefits by, for example, proposing a fish ladder be built. (2) Would the 100% normative condition (rating of 4) include the existence of dams such as the Owyhee? Jeff Fryer's Answer: A rating of 4 would preclude the existence of dams, which I think is the correct way to rate dams as I mentioned in (1).

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the

clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Ray Perkins' Comments
May 23, 2004

Ray Perkins
Oregon Department of Fish & Wildlife
3814 Clark Blvd.
Ontario, OR 97914

Dear Ray Perkins:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comments, recorded by Jennifer Martin at the meeting, have been posted on the www.Owyhee.us web site:

- Comment #1: We tried not to use the concept of 'pristine' in the ranking process. Everything was ranked a 4 historically and lowered if there was an anthropogenic effect causing degraded habitat conditions.
- Comment #2: BLM would not rank private lands, so he got stuck with it – did the best he could and guessed.

Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

Ray, we thank you for your clarification of this issue at the public meeting. Your response was consistent with the following definition of "normative" that we used in the QHA workshops: In order for a specific Owyhee stream reach to be "normative" within the context of the QHA model, it would have to be "Ideal conditions for similar stream in this ecological province" -- and it therefore could not be impacted by a dam, for example the Owyhee Dam. Your response was also consistent with the interpretation of "normative" provided by Dr. Jeff Fryer, of the Oregon technical team. The following are two questions I asked Jeff and the responses that he provided. 1) Regarding the definition of "normative". Within the QHA model that was used how do normative conditions take into account the current existence of dams such as the Owyhee? Jeff Fryer's Answer: Normative, the way it was used in the Owyhee, does not take into account the current existence of dams. This is quite similar to the way most of the rest of the subbasins are handling this issue; the reference condition is assumed to be circa 1840 or so conditions. If one of the reaches dominated by a dam were to rate highly for restoration, I suspect that at that point they would say for economic and social reasons we can't restore this reach. Or perhaps they might propose some way to manage the dam to provide some of those potential restoration benefits by, for example, proposing a fish ladder be built. (2) Would the 100% normative condition (rating of 4) include the existence of dams such as the Owyhee? Jeff Fryer's Answer: A rating of 4 would preclude the existence of dams, which I think is the correct way to rate dams as I mentioned in (1).

- Response to comment #2

Ray, we thank you for your professional judgment on the ranking of streams on private lands. Dr. Jeff Fryer (Oregon Technical Team) made the following statement about the inferences made by local fish & wildlife experts: "Biologists doing the rating who know the area can do a good job of inferring from other data how a reach should rate. If the biologist knows the land use, has data from upstream and/or downstream of the reach in question, or has knowledge of other similar reaches in the area, the rating given has a good chance of being accurate."

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/regdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Ed Petersen's Comments

May 23, 2004

Ed Petersen
NRCS
2925 S.W. 6th Ave., Ste. 2
Ontario, OR 97914

Dear Ed Petersen:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: OSU did a study on surface water temperature a little while back that found that the surface water temperature will move to the ambient air temperature; If this is true, the water is going to track to the higher temperature.
- Comment #2: Noted that everything presented tonight was BPA funding – most of this money goes to Tribes. There has been input about other restoration projects using other funding given to you – will this be included?

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

A large body of research data and models exist related to factors affecting water temperature in streams – air temperature is one important contributing factor. Streams in arid country may have relatively deep pools that stratify during low flow conditions allowing for warm temperatures at the surface, while relatively cool water temperatures persist at the bottom. Furthermore, subterranean flow may connect stream reaches that are interrupted at the surface, i.e., exhibit alternating dry versus watered segments. The Corps of Engineers has developed a temperature model and study proposal for the Snake River mainstem reservoirs:
http://www.nwd-wc.usace.army.mil/TMT/2000/agendas/NMFStempmonitorproposal.htm
.

- Response to comment #2:

Yes, the Owyhee Subbasin Plan includes an "Inventory of Existing Restoration Activities" (Chapter 3) that summarizes available information on both BPA-funded projects and restoration projects from other sources. The information compiled by Jennifer Martin – from the Malheur County Soil & Water Conservation District, the Oregon Natural Resources Conservation Service, and questionnaire responses – will be included in the inventory.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Harry Smith's Comment

May 23, 2004

Harry Smith
3631 Lincoln Dr.
Ontario, OR 97914

Dear Harry Smith:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: Number 5 (High Flow): does 1 mean high flow?

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

The definition of Number 5 – High flow is "Frequency and amount of high flow events". In the QHA analysis, each attribute was rated on a scale of 0 to 4, according to the following key:

Score	Attribute Rating	Normative (definition)
0	0% of normative	Ideal conditions for similar stream in this ecological province. Note that this is more from a geomorphic perspective than a biological perspective.
1	25% of normative	
2	50% of normative	
3	75% of normative	
4	100% of normative	

Therefore, a rating of "1" for high flow indicates that the frequency and amount of high flow events was at 25% of the "normative" – i.e., 25% of the ideal conditions for similar streams in the Owyhee System and Mid-Snake Province. Thus, "1" means a relatively low frequency and low magnitude of high flow events.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Paul Skeen's Comments

May 23, 2004

Paul Skeen
2871 Clark Blvd.
Nyssa, OR 97913

Dear Paul Skeen:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Isn't there more woody debris since settlement? Early pictures do not show woody vegetation.
- Comment #2: Did you take into account all of the discharge going back into the river from irrigation? Paul wondered how any of this relates back to anything.

Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

Riparian and wetland habitats dominated by woody plants are scarce but important habitats found throughout the Owyhee Subbasin of southeast Oregon, southwest Idaho, and north-central Nevada. Mountain alder-willow riparian shrublands are major habitats in the forested zones of eastern Oregon. Eastside lowland willow and other riparian shrublands are the major riparian types throughout eastern Oregon at lower elevations. Black cottonwood riparian habitats occur throughout eastern Oregon, at low to middle elevations. White alder riparian habitats are restricted to perennial streams at low elevations, in drier climatic zones in Hells Canyon at the border of Oregon and Idaho, in the Malheur River drainage.

Eastside (Interior) riparian-wetlands habitat (Source: nwhi.org/ibis).

Quigley and Arbelbide (1997) concluded that the Cottonwood-Willow cover type covers significantly less in area now than before 1900 in the Inland Pacific Northwest. The authors concluded that although riparian shrubland was a minor part of the landscape,

occupying 2%, they estimated it to have declined to 0.5% of the landscape. Approximately 40% of riparian shrublands occurred above 3,280 ft (1,000 m) in elevation pre-1900; now nearly 80% is found above that elevation. This change reflects losses to agricultural development, roading, dams and other flood-control activities. The current riparian shrublands contain many exotic plant species and generally are less productive than historically. Quigley and Arbelbide (1997) found that riparian woodland was always rare and the change in extent from the past is substantial.

- Response to comment #2:

During the meeting, Ray Perkins explained that you have to look at how agricultural return flows relates to the normative stream flow condition – i.e., before irrigation water was removed from the river in the first place.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Lou Wettstein's Comment

May 23, 2004

Lou Wettstein
3689 Alameda Dr.
Ontario, OR 97914

Dear Lou Wettstein:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: What is a geomorphic perspective?

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

The term is used, in the context of QHA analysis, to put the "normative" definition into context:

Score	Attribute Rating	Normative (definition)
0	0% of normative	Ideal conditions for similar stream in this ecological province. Note that this is more from a **geomorphic perspective** than a biological perspective.
1	25% of normative	
2	50% of normative	
3	75% of normative	
4	100% of normative	

A "geomorphic perspective" relates to the attribute rating being referenced to "*ideal conditions"* given the "lay of the land" or natural environmental limitations within the Owyhee Subbasin; not necessarily the ideal conditions for the species within its optimum habitat – which would be the biological perspective. Therefore, "ideal conditions" from a geomorphic perspective is a lower standard than "ideal conditions" from a strictly biological perspective.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Darrell Williams' Comments
May 23, 2004

Darrell Williams
1349 Klamath Ave.
Nyssa, OR 97913

Dear Darrell Williams:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: Wondered what can be done about beavers.

Your comment has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

During the meeting, Ray Perkins explained that QHA was not conducted on reservoirs or ponds; and we only ranked flowing streams. American Beaver habitat is usually limited by agriculture. Riparian habitat along many water ways has been removed in order to plant agricultural crops, thus removing important habitat and food sources for beaver. All wetland cover types (e.g., herbaceous wetland and deciduous forested wetland) must have a permanent source of surface water with little or no fluctuation in order to provide suitable beaver habitat (Slough and Sadleir 1977). Beavers can usually control water depth and stability on small streams, ponds, and lakes. In riverine habitats, stream gradient is the major determinant of stream morphology and the most significant factor in determining the suitability of habitat for beavers (Slough and Sadleir 1977). Stream channel gradients of 6 percent or less have optimum value as beaver habitat; few beaver colonies are found in streams with a gradient of 15 percent or more. Woody and herbaceous vegetation comprise the diet of the beaver. Herbaceous vegetation is a highly preferred food source throughout the year, if it is available. Woody vegetation may be consumed during any season, although its highest utilization occurs from late fall through early spring. It is assumed that woody vegetation (trees and/or shrubs) is more limiting than herbaceous vegetation in providing an adequate food source. Food preferences of beavers throughout North America are: Aspen, Willow, Cottonwood; and Alder.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Response to Lawrence Ziemer's Comments

May 23, 2004

Lawrence Ziemer
2626 Mitchell Butte Rd.
Nyssa, OR 97913

Dear Lawrence Ziemer:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

- Comment #1: Has there been any thought given to the aquifer that local irrigation creates? DEQ has some information on this.
- Comment #2: asked if they took temperature readings of the lower reaches of Cow Hollow Creek before it entered the Owyhee River.
- Comment #3: Why is the Indian Tribe the leader in improving habitat for Redband Trout. Why isn't ODFW stepping up and making the improvements? What is the end result of this plan – are they going to put fish ladders in, take the dams out?

Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

During the meeting, Tom Dayley suggested that this could be part of future strategies.

- Response to comment #2:

We are not certain regarding the availability of water temperature measurements of the lower reaches of Cow Hollow Creek before it enters the Owyhee River.

- Response to comment #3:

During the meeting, Ray Perkins explained that they ODFW has limited fisheries staff in the Owyhee Subbasin – him. Ray further explained that this plan will be used to prioritize money for enhancement projects within the subbasin. The end result of the Owyhee Subbasin Plan will be the cost-effective implementation of high priority objectives and strategies to enhance fish, wildlife, and the habitats they depend on for survival and sustainability. The Owyhee Subbasin Plan does not recommend removing Owyhee Dam or constructing a fish ladder at the dam.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review

the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/regdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

Appendix 1.5.7 Comments at the Jordan Valley, Oregon Meeting on April 7, 2004 – listed by stakeholder.

Leonard Beitz's Comment

Comment #1:
The evaluation of the streams by DEQ includes natural pollutants.

Jerry Hoagland's Comment

Comment #1:
Asked if normative could be explained; Ray Perkins of ODFW explained that model uses reference condition (prior to European development) to compare with current conditions – if we made lots of changes, the reach got a low score – if few changes, got a high score.

Elias Jaca's Comment

Comment #1:
I don't want to be forced into using hand line sprinklers on my mountain pastures.

Vernon Kershner's Comments

Comment #1:
P.2 of the limiting factors in the middle Flint Creek #1 and Flint Creek #2 (on the Idaho side) – lower reach confidence is 0.5 and then they identified pollutants and fine sediment as a limiting factor. Where do we go to look to see what pollutants, etc.?

Comment #2:
Deer Creek (ID) has obstruction listed as the limiting factor – what obstruction are you talking about?

Comment #3:
Who are the biologists that did the assessments?

Tim Lowry Comments

Comment #1:
How will this plan impact agency plans? If the strategy is to improve riparian function for fish habitat – won't the agencies use this as a basis for management actions?

Discussion followed. Is this just for private land? No. BPA will not fund projects that are the responsibility of other federal agencies.

Comment #2:
Juniper Creek 1 and Juniper Creek 2 reaches attribute #6 (low flow) got a higher rating when it is dry. If you used BLM information in this area, you are on shaky ground. Attribute #10 pollutants are rated a 2- why is this area considered 50% of normative? His experience has been that when bad science and negative results get written down on paper, it becomes gospel and hurts local people. He is still suspicious that this will be used by people with an agenda.

Dennis Stanford's Comment

Comment #1:
The previous fish and wildlife program has affected us through BLM (in reference to the powerpoint presentation suggesting that previous NWPCC plans have not impacted the area).

Jesse White's Comments

Comment #1:
Jordan Creek #8 on page 3 (State Lands to Headwaters) pollutants are listed as a 1 – what are the pollutants in this reach? Is it the potential for pollution or actual pollution? Ray Perkins stated that in the Oregon portion they used actual pollution.

Comment #2:
It was suppose to be a consistent process throughout the subbasin, but it is obvious that there were inconsistencies between the assessments of the three different states; are man-made pollutants and natural pollutants rated in the same manner? No, if it is a natural pollutant that would not be a basis for restoration or a low score in this QHA model.

Pam White's Comment

Comment #1:
Questioned that if the vision is to mitigate the impacts to anadromous fish, why is this an issue if they did not exist in this subbasin; the mainstem of the Owyhee River is a warm water fishery – some of the feeder creeks are cold water, but the mainstem of the river never has been; prior to the 1930's there were sturgeon, trash fish, etc… but there were not salmon in the mainstem of the Owyhee River.

Michael Hanley's Comment Letter {Mailed April 13, 2004}

Dear Mr. Vigg:

On 7 April 2004 I attended the Owyhee Subbasin question and answer meeting at Jordan Valley. In Attendance were ranchers, farmers and Indians from Duck Valley.

All of us were and are concerned about our most valuable resource, water. However, the purpose of the Owyhee Subbasin Assessment relied heavily on what they called silver (fish) and bucks (deer). Also it was stated that the assessment was to determine a method of mitigating situations resulting from the Bonneville Power Administration appropriation of water for other purposes rather than those promised Indians under treaty.

Let me remind you, that other upstream users, ranchers and farmers in many cases appropriated water under state law for agricultural purposes prior to the Bonneville Administration origin.

I write this because I don't want the focus of the entire program directed toward Tribal objectives and not those of other prior users.

Nobody is more sympathetic to Tribal claims than me but the federal government encouraged settlement of the west and the infrastructure that made it economically viable. All of us benefit from the development of resources which includes hydro generation and all of us must share in mitigating circumstances that arose from it. That includes city people whom appear to be out of the picture. The focus is on the cowboys and Indians who have already given impropriation more that the others.

I don't know anything about the people who did the assessments for Oregon and Nevada, but I do know those who did it for Idaho. Individual ranchers, Owyhee County and Owyhee Cattlemen's Association have appealed the 1997 Owyhee as prepared by the BLM on the grounds that much of the data lacks scientific credibility. For example, the assessment claims that last summer Redband Trout were found on the Owyhee at the stretch from Three Forks to the Warm Springs. They claimed the feeder streams which I suppose were the Middle Fork and North Fork because too warm so they migrated to a cooler place. I'd question this because the river is very warm there because of the warm springs. Other reasons could have been the reason?

Perhaps it's mentioned in the assessment about the amount of water Juniper encroachment is taking from the basin.

I am also questioning mercury pollution which appears to be a problem both naturally and man caused. From the assessment it doesn't appear to be a problem in the Owyhee River on the Oregon stretch.

Sometimes I think we're trying to create a Polly Anna world on the Owyhee that never existed and never will. Back to silver and bucks. There has to be a balance because the interest demands it. Not everybody fishes or hunts, but all of us benefit from the power generated by the hydro power system and all of us enjoy the food produced with the electricity and water.

Last thing: Perhaps of interest, maybe not, John Harney a longtime resident of Duck Valley told me when I asked him if he remembered salmon in the Owyhee. "When salmon come, they die in the water. Some wash up on the banks and others catch on gravel bars. It smelled so bad you can't ride a horse to the river."

I hope the Owyhee Subbasin Assessment doesn't wind up smelling like the salmon…. Time will tell.

s/ Michael Hanley

Mike Hanley
PO Box 271
Jordan Valley, OR 97910

{Handwritten letter typed by Laurie Pickering, Steven Vigg & Company on 4-16-04}

{Editorial Note: the following e-mail comments (attachment) received by Steve Vigg on 5-19-04}

COMMENTS/DISCUSSION ON THE DRAFT OWYHEE SUBBASIN MANAGEMENT PLAN (version presented by Steve Vigg April 28, 2004)

Comments will be referenced to section number and/or page whichever is more appropriate for clarity.

Steve,

I provide the following comment and discussion and request this be incorporated into the draft Owyhee Subbasin Management Plan:

Page 35, Section 4.2.2.2 Current Land Use:

Section 4.2.2.2.6, Page 37: BLM Grazing Allotments: The data cited regarding percentages of Owyhee Resource Area riparian areas not in satisfactory condition has been repeatedly challenged by permittees and by Owyhee County. (see Owyhee County comment on draft BLM-ORMP on page 3) Challenges have been raised on the quality of the data, absence of data, use of untrained personnel to collect data, and the agency's failure to adhere to the established BLM process for conducting riparian assessments. For example, much of the data upon which the PFC assessments were made was collected by a contractor, Scott Miles working for Riparian Resources, who was working as a lone individual doing both data collection and completing riparian PFC assessments. (see Report to Owyhee County Natural Resources Committee by Dr. Chad Gibson page 14) This is clearly not consistent with BLM procedures which require a qualified team for conducting PFC. During his contract employment with BLM in fact, Mr. Miles became uncomfortable with his PFC assessments and ceased to make the assessment, restricting his work to only collecting the data for later analysis by BLM personnel who were not present during data collection. But even this approach is not correct in that the BLM process for PFC requires a team evaluation and the evaluation of one man's collected data, by even a "team" of analysts back in the BLM office does not comply with the intent of the procedure for accurately assessing PFC. In addition to the questions regarding the data and stream condition determinations which were derived from the suspect data, the question of why streams in the area are warm is also in dispute. Knowledgeable local persons maintain that the stream temperatures found on many reaches that were determined to be higher than the allowable standard were not related to human activity but rather to natural climatic conditions of the area. This area is hot, high desert country with intermittent streams and a large number of hot springs that feed the heads of the streams or add water flows below the headwaters in those stream segments that continue to contain water late in the season. Further, the "higher than acceptable" water temperatures are based on an artificially established standard for temperature that is not appropriate for this part of Idaho and this fact has been recognized by Idaho Department of Environmental Quality in their comments on EPA's proposed temperature standards for state and tribal governments, and by Don Essig, IDEQ, (The Dilemma of Applying Uniform Temperature Criteria in a Diverse Environment: An Issue Analysis. Nov. 1998). Perhaps the most important fact to consider in regard to stream temperatures in the area is that these warm waters support thriving populations of native Redband Trout. It should also be noted that the "excessively warm" water temperatures noted in such streams as the main stream of the Owyhee support healthy populations of warm water species such as bass, perch, and crappie and these introduced warm water species have outperformed the salmonids in those reaches.

Since the Taylor Grazing Act was passed in 1934, livestock grazing management has become more scientific in its approach and application. Despite the vast improvements made since passage of the Act, livestock operators have significantly improved the condition of the range on which they operate, yet these improvements are frequently ignored or downplayed by individuals, groups, and even agency persons who wish to remake the instructions of the Congress and remove livestock in favor of increased recreational or other uses of the lands.

The document names specific grazing allotments and provides information which is inaccurate, misleading, or unnecessary. On page 38, Sec. 4.2.2.2.6., the Nickel Creek Allotment for example, the plan cites 303d list information which is no longer valid as there has been a completed and approved TMDL on the cited riparian sections. That TMDL found sediment to be the only pollutant present while the draft subbasin plan still leads the reader to believe that other pollutants must be addressed. Of the specific allotments, only the Nickel Creek Allotment did not refer to a PFC assessment in the draft. As previously noted, the riparian assessments and the data from which they were made have been repeatedly challenged by permittees and Owyhee County. No useful subbasin planning purpose is served by presenting the disputed information in this way. Many of the allotment decisions based on the information presented have been appealed by permittees and those appeals are still pending in the Interior Board of Land Appeals system. Inclusion of allotment-by-allotment data in the subbasin plan appears to be yet another attempt by BLM to get disputed data into a published document in an attempt to lend weight to proposed grazing reductions. Because of the published nature of the plan, it can be used as a reference by entities who would file frivolous lawsuits against grazing interests. The inclusion of the allotment-by-allotment data report does not make the subbasin plan better or more complete, it simply provides more opportunity for dispute, conflict, and will potentially lead to resistance on the part of permittees and landowners when asked to become involved in projects that may be developed through this planning process. This cooperative approach to the plan, and its subsequent projects, will be a key need if good things are to be done in the subbasin. It will also be a significant, and welcome, change from the unsuccessful approach used by BLM. In recent years, landowners and permittees have suggested alternatives to grazing management that were capable of accomplishing the stated goal of riparian improvement while maintaining economically viable livestock operations. Each of these suggested solutions have been rejected by BLM staff in favor of the BLM's preferred approach.(see Owyhee County's Comments on the draft BLM-ORMP Page 3) The resulting protests and appeals of allotment decisions are overwhelming the BLM staff's ability to perform effective management and are detrimental to any reasonable attempts to make progress on riparian conditions. If the subbasin plan is to be successful it should avoid the contentious approach that has not worked for BLM and focus instead on a cooperative means of achieving goals that are agreeable to all stakeholders.

A better way to address this section of the plan is through a simple statement of current conditions across the subbasin planning area that would include the geologic or topographic data found as on page 37 of the April 28th draft, a statement of stream conditions by percentages as PFC, unsatisfactory but improving, and unsatisfactory not improving under the current management plan. In addition to reporting data in this more general way, the plan should indicate the source for the above reported percentages and should make specific note as to which reports of unsatisfactory conditions were completed by a process other than the team approach specified by BLM (as with the work done by Riparian Resources/Scott Miles for example).

Section 4.5.1 Endangered Species Act Requirements, Page 80, re Pygmy Rabbits:

The draft plan incorporated some of the arguments raised against using Pygmy Rabbits as a focal species, however the failure to include the entire statement made in opposition to the selection of this species as a focal species tends to misrepresent the reason for the opposition. The draft plan correctly related our concerns that selection of the pygmy rabbit as a focal species

would lead to restrictions on human activity in projects that may be selected to improve habitat for the species. However the draft plan left out important points made in the body of the position paper -- points which indicate that the body of scientific data currently available on the status of the species within the subbasin area is so uncertain as to determine its status-- and also left out the concluding sentences of the position paper which indicated why such restrictions on human activity would be inappropriate. The draft should be revised to include the pertinent points cited from the studies done on Idaho populations of the species showing the differences between the listed population in Washington and the variety of conditions of populations within Idaho. It should also be revised to include the final sentences of the concluding paragraph of the position paper which indicate clearly why human activity should not be restricted in favor of pygmy rabbit projects. Those sentences are as follows: "*With the lack of knowledge available on the species and the questions that are raised by the Idaho State Study, such restrictions and potential economic harm are not supportable. What the group should determine to do with the Pygmy Rabbit, rather than using it as a focal species, is to select the species for more study in order to provide for funding of projects to address the data gaps indicated in the study.*"

Thank you,

Jerry L. Hoagland
13528 Reynolds Creek Rd.
Wilson, ID 83641

References from my Comments:

OWYHEE COUNTY'S COMMENTS ON DRAFT ORMP

In the development of the Owyhee Resource Management Plan, four alternatives were considered. Alternative A was to continue management as was currently occurring. Alternative B was Owyhee County's Plan. Alternative C was BLM's preferred plan, Alternative D was the extreme use Plan, and Alternative E was the environmental plan.

Owyhee County is providing the following comments in reference to the WATER RESOURCES. RIPARIAN WETLANDS. AND FISHERIES HABITAT sections of the Draft RMP. In many cases the comments provided here are equally applicable to other sections of the draft. We trust that you will take action to make necessary and appropriate changes where ever they are applicable.

• The management action proposing to close allotments on July 15 unless they have an approved and implemented grazing plan presents a false premise. Almost all grazing plans will require additional fencing,

fence modifications and or water development to support such plans. The bureau is well aware that permittees could not get clearance for these actions within the 2 year limit. This management action suggests that closures could be avoided by approving and implementing grazing plans, however, the reality is that it could not.. It is simply impossible for a grazing plan to be approved and implemented in 2 years on all of the affected allotments. A realistic time for development, approval and implementation of a grazing plan would be 5 years as is proposed in Alternative B. Alternative B would result in developed, approved and implemented grazing plans while the preferred alternative C would result in allotment closures on July 15.

- Alternative B is the only proposal which advocates a process allowing management decisions to be made on the basis of site specific situations and potential impacts on a variety of resource values. Alternative B, also recognizes that adjudicated grazing preference rights must be accommodated and safeguarded under the Taylor Grazing Act. Grazing plans developed on an allotment basis can provide for both the needs of the resource and the livestock operator. All options for the livestock operator are disregarded under the one-size-fits-alt prescriptions of the BLM staff preferred alternative and Alternative D.
- The conclusions that "Beneficial uses are either not supported, partially supported, or supported but threatened on the majority of stream segments in the resource area." is not supported by the documentation. The discussion indicates that 24 stream sites have been monitored. It is simply not credible that 24 sample sites on 500 miles of water could support the conclusion quoted above. There is no data presented in the DEIS from the 24 sample sites to indicate the kind and degree of difference from Idaho Water Quality standards found at these sample sites. The degree of divergence from the standards should be a significant factor in evaluating and selecting appropriate management actions. Recent review by Owyhee County of stream segments identified as being in unsatisfactory condition in the 1978 survey, show many of these segments now to be in satisfactory condition. This again indicates that the above quote from the DEIS is highly questionable. A listing of stream segments along with all of the available monitoring data shows that 78 of the 129 listed stream had insufficient data to determine either condition or trend in 1992. The list shows that 18% had no data, 35% had only one observation, 6 segments had just two observations and 2 segments had only outdated 1976 data.
- On page Ill-7 the DEIS indicates that "A lack of measurable change in riparian area condition indicates that

no trend exists in water quality condition." This statement is highly misleading and inaccurate. In truth, there is a lack of measurements of riparian condition trend, not a lack of measurements indicating positive change. Considerable evidence exists which does indicate significant improvement in riparian areas and consequently improvement in water quality. Owyhee County has made such data available to the Bureau for review. Owyhee county has also reviewed Bureau data which indicates significant improvement in stream segments. Documentation of the stream segments, kind of monitoring information and dates obtained, show conclusively that there is not enough information to support the above statement. Any statement as to stream habitat conditions or water quality issues should be confined to those situations where adequate supportive data is available. A lack of data cannot be viewed as negative information.

- Water Resources, page IV-B-3, environmental consequences.
- The discussion of Water Resources, page IV-B-3 of the environmental consequences again fails to acknowledge that seral juniper invasion is a significant change agent for water quality. The impact of these sites on watersheds is well documented and the consequent impact on water resources is unquestionable. The authors statement under Forest Management, (page 111-14,) "Jt appears that the deep. loamy sites are likely to be occupied in time by dense stands of juniper with virtual elimination of desirable understory vegetation." , fully acknowledges the ongoing destruction of watersheds from seral juniper. However, there is no mention of this problem in the environmental consequences of the BLM staff preferred alternatives C, where prescribed fire treatment of invading juniper is only 1,500 acres annually while expansion is estimated at 2,500 acres.
- The discussion indicates that an 11% increase in livestock grazing would occur. However, it does not point out that the increase is dependent upon monitoring data indicating the increase is sustainable without detrimental impact on the range resource. This statement is a false representation of Alternative B.
- The estimate that 166 miles of the total 512 stream miles would support beneficial uses in 20 years under alternative B is extremely low. These areas have a relatively high rate of improvement compared to uplands. The current rate of improvement combined with improved grazing systems, off stream water developments, creation of riparian and upland pastures and vegetation treatments would result in much greater improvement than estimated by BLM.

• Bureau guidelines for assessment of riparian areas since 1993 has been based on a determination of Proper Functioning Condition (PFC). The bureau has little if any data assessing functional condition and has improperly used the old assessments of satisfactory or unsatisfactory condition to classify the functionality of riparian areas. The objective presented in the DEIS equates unsatisfactory condition with non functioning and functional at risk and proposes to improve all such systems. There is no logical way to equate the old assessments with the PFC evaluation process adopted in 1993. This process of equating functionality with old data is exactly backward to what current guidelines dictate. A true assessment of PFC should be completed first. The subjective estimates used to make a determination of satisfactory condition does not translate to, or provide the analysis necessary to do a proper assessment of functionality.
• The riparian objective calls for improvement of all unsatisfactory or functional at risk riparian areas. By definition many "functional at risk" riparian areas are not in that category because of a need for improvement. They may be in that category simply due to a risk factor peculiar to the system even though it is functioning properly. The objective also calls for maintaining all satisfactory and functioning riparian areas. There need be only one satisfactory system change to unsatisfactory for this objective to fail. There is an extremely high likelihood that within the 20 years there will be a storm event that will cause this objective to fail. If even one riparian area fails to improve the objective will not be achieved. It is totally unrealistic to believe this objective could be met under any circumstance.
• The BLM staff preferred alternative C addresses the riparian/wetland objective through LIMITING USE and does not attempt to apply active management that would both provide for use of the land and riparian needs. It limits recreational vehicle use, livestock grazing use following fire, all livestock grazing after July 15, and is some cases virtually all livestock grazing. The proposed limits presumes that there is no other alternative management of recreational vehicle use or livestock grazing that will produce "improvement." That premise is totally false. Since there are many management options, the July 15 appears to have been chosen to reduce livestock not because it is the only way to meet the objective. The BLM staff preferred alternative C also fails to consider all of the adverse impacts of water diversion, roads, fire, upland condition and wildlife disturbance factors related to riparian areas.
• The BLM staff preferred alternative management actions to dispose of and or acquire riparian areas have

nothing to do with this objective. Neither would have an impact on maintenance or improvement of existing riparian areas and both management actions should be removed from the DEIS.

- Alternative B addresses riparian areas in the same manner as it does soils and vegetation, by taking an active and comprehensive approach to all of the disturbance factors that affect riparian areas. It provides management that seeks to achieve public use of the public lands while considering and mitigating the impacts of that use on riparian areas.
- Under the Riparian Wetland Areas, affected environment on page Ill-10, The authors states that "The impact of livestock on riparian zones can be considerable." This statement is followed by a lengthy discussion of the negative impacts of livestock grazing on riparian areas. The narrative implies that current livestock grazing practices are resulting in all of these negative impacts. However, there is no data or discussion supporting the implication. The negative impacts have been identified through experimental designs employing excessive grazing practices. Not one of the negative impacts discussed are pertinent to the resource area without documentation that the same grazing treatments and results are occurring in the resource area. Since, no such information is presented these statements are meaningless and misleading and should not have been in the Draft EIS.
- The authors also indicates that "Riparian vegetation provides shade which lowers water temperatures. preventing lethal water quality conditions for fish.' This is an extremely misleading statement, since shade contributes very little to the cooling of water in streams. There is no evidence referenced in the document that water temperatures have ever had lethal impacts on fish. While water temperatures can affect spawning, the spawning temperature standard is not exceeded during the spawning season. The most important temperature regulating factors include the amount of stream flow, source of water, upstream diversion or impoundment, and micro climatic conditions created by woody vegetation. The authors refer readers to Appendix RIPN1 for characteristics of riparian areas in satisfactory and unsatisfactory condition. It does not alert the reader to the fact that this information is largely 20 years old and was based on entirely subjective estimates. There has been significant positive change documented since that information was obtained. The information also does not reflect the new PFC standard for riparian areas.
- The statement that all unconfined stream segments are in unsatisfactory condition and the inference that only two segments of confined stream segments are in satisfactory condition is again extremely misleading. The

maps and tables provided in the DEIS do not support either of these statements. A list of stream segments provided by BLM with all of the available monitoring data, shows that 78 of the 129 listed streams had inadequate or outdated information and very little actual data.

- The authors lists livestock grazing, mining, roads and recreation as concerns for riparian habitat. It is inconceivable that expanding seral juniper stands were not listed. Expanding juniper pose a greater threat to riparian function, water quality and fisheries habitat than any of the listed concerns. Current estimate of over 300,000 acres of seral juniper, expanding at 2,500 acres annually, is evidence that juniper is having a very significant negative impact on riparian areas. The narrative indicates that

"Once removed, it is the intent to keep seral juniper encroachment in check through periodic prescribed fire." In the very next sentence the draft indicates that certain areas (SRMAs, ACECs, and WSAs covering some 640,000 acres) will not be considered for treatment to remove or prevent seral juniper. These statements are directly contradictory. The bureau cannot possibly eliminate these areas from prescribed fire treatments and meet the goal of eliminating and controlling seral juniper invasion. The proposed acreage limitations on prescribed fire under the Air Quality objective (9,000 ac) will not allow the bureau to correct seral juniper invasion and prevent the continued expansion of seral juniper. The BLM staff preferred alternative proposes to treat only 1,500 acres annually with expansion estimated at 2,500 acres. The bureau could not follow the preferred alternative land use plan as is required by law when objectives and management actions are in direct conflict.

- Riparian Wetland Areas, pagelV-B-8, environmental consequences.
- The discussion as to type of impacts for Alternative A, referenced on this page, is very misleading. The discussion and cited statements are observations and opinions and do not have direct research to support them. Further, the cited opinions and observations are not pertinent unless there is also some documentation that the cited conditions for cause and effect are present in the Owyhee Resource Area. The only factor cited as a cause of deterioration is "too much use during the hot season (July to September)." There is no data presented that indicates the degree of such use or that the resulting trend in riparian areas is down. In most cases riparian trend is up and therefore hot season use is not contributing to degradation as is claimed in the discussion. Current levels of hot season use are actually supporting an upward trend. The rate of change could be improved to a degree, by

improved management of hot season use. Total elimination of hot season use as proposed in the preferred alternative is a drastically exaggerated measure that is not needed to increase the rate of improvement. As is pointed out in the narrative, grazing systems would result in a significant increase in rate of improvement. The estimate that only 142 miles of riparian would improve is a drastic under estimate. Since improvement is already occurring, it is obvious that the implementation of improved grazing systems and significant vegetation treatments would further increase the rate of improvement and result in far greater stream miles in Proper Functioning Condition.

- The listed change agents failed to include the enormous expansion of western juniper into upland sites formerly occupied by sagebrush-grass plant communities. These sites covering at least 300,000 acres, pose a significant threat to riparian areas. When these sites approach the closed canopy state as many of them have, they will increase the sediment production, reduce stream flows and increase water temperatures, resulting in significant degradation of riparian areas. Alternative B would support improved grazing systems with an aggressive program to reduce and prevent seral juniper invasion of upland sites. Watershed function cannot be maintained while allowing the continued spread of seral juniper and failing to address already invaded sites. Alternative C does not propose even to keep up with the expansion of juniper and will do nothing for those sites where the closed canopy state occurs or will eventually occur.
- A simple comparison of map FORS1 and maps RIPN3 and FISH1 demonstrate conclusively that at least half of the riparian and fish habitats are under the degrading influence of seral juniper. The contention that 90% or 587 miles of riparian habitat would improve under the preferred alternative is not possible. This cannot be accomplished without a significantly greater effort to stop seral juniper invasion and reduce juniper on invaded sites. Under Alternative B, virtually all of the 652 miles of riparian areas would achieve significant improvement and objective RIPN1 would be fully met.
- FISHERIES HABITAT
- Fisheries Habitat, page 11-54, description of alternatives.
- The objective to have all perennial streams in satisfactory condition for fish habitat in 20 years is totally unrealistic. The Owyhee Resource Area is an arid land subject to frequent storm disturbances that will at times destroy satisfactory stream fisheries habitat. Only if the bureau devises a means to control the climate of this resource area will this objective be achievable. Natural

occurrences will not likely support more than 80% of all streams in satisfactory fisheries habitat condition. Where down cuts have resulted from beaver activity, road crossings and other causes in the past, it is extremely unlikely that all such perennial streams would recover to a satisfactory condition within 20 years.

- Seral juniper invasion is having a significant negative impact on fisheries habitat through reduction of stream flows, increased water temperatures and increasing sediment loads into streams. This negative impact was not addressed in any manner under this objective in the BLM staff preferred alternative C. By totally ignoring the seral juniper situation, the bureau has virtually ensured that the objective would not be met and would not be met even if it were a more realistic 80% of all streams.
- The preferred alternative calls for a management action to limit livestock grazing to July 15 of each year. This is proposed as an alternative to development of an "approved and implemented grazing system" within 2 years. To date, the bureau has not acknowledged that they would approve any system that does not eliminate grazing in riparian areas after July 15. Even if a system including hot season use could be approved, it could not be developed and implemented within 2 years. While the management action indicates that there are options available, in reality there is only one and that is to end all grazing by July 15.
- The scientific community endorses early grazing use as one method of achieving improvement in fisheries-riparian systems, however it is not the only method. Wayne Elmore, who heads the national riparian team for BLM and the USFS says that he has seen every kind of system work and every kind of system fail. Early grazing is also a system that does not always work as evidenced by the McBride creek riparian demonstration project. The preferred alternative would impose the same grazing system on all allotments without regard to site specific conditions and or situations that may indicate a better system. This proposal also does not consider impacts on use of private lands within affected allotments or to adjudicated grazing preference rights of the permittees. There are numerous alternative grazing systems supported by good science that can be and are effectively used. The approach taken in Alternative B would identify and implement those alternative systems.
- Fisheries Habitat, page 111-19, affected environment.
- The statement that "Resource areawide. 91% of the stream miles inventoried were found to be unsatisfactory condition" is extremely misleading and is not supported by the facts. Data supplied by the BLM show that 18% of the

stream segments have no monitoring data. The implication that this situations have not changed in the past 20 years is totally false.

- The narrative also states that "Throughout the resource area, the primary management concern and the biggest impact to fish communities is the degradation of riparian habitat which leads to loss of pool and riffle habitat, loss of instream cover, elevated water temperatures, and fine sediment deposition. Livestock grazing is the primary cause of this degradation." This again is extremely misleading, since it indicates that all of these negative impacts are continuing to occur and that livestock grazing is the primary cause. By any measure possible there is an upward trend in riparian areas and by necessity in fish habitat values. The authors also conveniently failed to even mention that seral juniper stands over 300,000 acres are causing the same negative impacts as attributed to grazing use. With these stands over 300,000 acres and expanding at 2,500 acres annually they are the biggest cause of riparian degradation and also the biggest continuing threat.
- Fisheries Habitat, page IV-B-12, environmental consequences.
- The grazing management proposals and vegetation treatments in Alternative B would result in improvement of virtually all fisheries habitat and over 20 years and would likely achieve satisfactory condition on 80% of these areas. The projected improvement for the preferred alternative is vastly over estimated. Alternatives C and D would not possibly achieve the degree of improvement indicated because neither of these alternatives would address the seral juniper invasion situation. Over the next 20 years a significant number of riverine systems with unsatisfactory fish habitat would remain in that category or would be degraded to that category without greater vegetation treatments.

IDAHO WATERSHEDS PROJECT, et al. v. MARTHA HAHN, STATE DIRECTOR, et al., CIV 97-0519-S-BLM, US DISTRICT COURT, DISTRICT OF IDAHO, (Filed Oct. 31, 1997)

December 5.2000

Owyhee County Natural Resources Committee

Report on BLM riparian monitoring protocol and procedures used to determine compliance with the terms and conditions in the February 29 2000 court order of Judge Lvnn B. Winmill

On May 9 2000 BLM sent out a letter listing the four terms and conditions imposed by judge Winmill. In the same document they released the protocol for measuring, Stubble Height on Streambanks, Woody Species Utilization (Twig Count), Key Species Method for riparian utilization and Monitoring Streambank Stability and Current Year Alteration. During the fall of 2000 BLM personnel inspected various streams to monitor compliance with the court ordered terms and conditions. There are significant discrepancies between the court ordered terms and conditions, BLM protocol and the actual monitoring methods used by BLM.
The terms and conditions as ordered by the court are listed below along with the primary BLM protocol procedures. BLM protocols and actual monitoring methods and procedures are discussed for each term and condition.

1. "Key herbaceous riparian vegetation, where streambank stability is dependent upon it, will have a minimum stubble height of 4 inches on the streambank, along the greenline, after the growing season."
The protocol calls for the identification of a "key area" that best represents the level of riparian use along accessible portions of the streambank. It also calls for a decision as to the "key species" depending on stream type, condition and management objectives. Measurements are taken on the greenline, which is the first perennial vegetation above the stable low water flow. The measurement is made on the leaf blade closest to the toe of the boot. Where a key species is not present, bare ground, forb or woody shrub is recorded if that is all that is present. The protocol also allows the observer to select the nearest plant up to three feet away from the greenline when a plant is not located at the toe of the boot.
The monitoring practice does not objectively identic a key area nor does it examine and identic a key species. Measurements are taken up to three feet from the greenline regardless of plant density. The assessments automatically include all grass and grass like species. Either no determination is being made as to whether a streambank is dependent upon stubble height, or there is an assumption of dependence where it is clearly not justified. Furthermore, the selection of an individual leaf is a very imprecise and subjective action.
The BLM monitoring procedure did not adhere to the established protocol for measurement of stubble height. Furthermore, the procedure does not evaluate the specific factor(s) established by the court order.

2. "Key riparian browse vegetation will not be used more than 50% of the current annual twig growth that is within reach of the animals."
The protocol calls for marked plots (usually 10 on each side of the stream). It requires random selection of 20 twigs (five from each side of the plant) counted as grazed or ungrazed. The protocol notes that caution should be used as wildlife and livestock may graze each terminal bud indicating 100% use. This caution is made because 100% use of terminal buds does not reflect 100% use of "current year's growth". The caution is necessary because the protocol is based on a twig count method that estimates only the incidence of use and not the actual utilization.
In practice, BLM personnel did not establish marked plots for evaluation. Shrubs used for twig counts are subjectively selected, as are the twigs that are counted. Absent a random process of selecting both shrubs and twigs there is no way to prevent inadvertent or intentional observer bias.
The protocol does not establish a procedure for measuring the "utilization" of riparian shrubs as required by the court order. Furthermore the monitoring procedure does not follow the established protocol nor does it measure the factor ordered by the court.

3. "Streambank damage attributable to grazing livestock will be less than 10% on a stream segment."
The protocol states that streambank alterations are physical changes to the streambank attributed to large herbivores, i.e., livestock, wild horses, buffalo, elk, deer, antelope, and moose, during the grazing season. Study sites are to be identified with a permanently located reference post at each end of the 363 foot (110 meter) transect site. The protocol admits that this method is most appropriate for streams with gradients of 4 percent or less and is not appropriate for stream channels dominated by cobbles, boulders, or bedrock. The protocol also requires documentation of any deviations from the established procedures. At each step on a 110 meter transect along the bank full line, a two foot transect line is placed perpendicular to the stream channel with the center at the toe of the boot. Any alteration observed along the line is counted. Alteration is identified as bank shearing from animal use, animal tracks causing a depression or displacement of % inch of soil. Assuming a step is one meter there would be 220 observations at each site. Each observation would be two feet for a total of 440 feet. Just 22 tracks four inches wide would constitute 10% alteration. The actual impact would be 7 feet of 440 or 1.6% instead of 10% value resulting from the BLM protocol.
In practice, the BLM method did not permanently identic the study site. The protocol inclusion of wildlife trampling damage conflicts with the T&C that relates only to livestock use. The protocol method is biased because the estimate of damage is calculated in a manner that vastly overestimates actual trampling impact. The livestock impact identified by the protocol does not relate to the "damage" referred to w the court order. Damage is an impact that will not fully recover by the next grazing season. Clearly, cattle tracks displacing only Vi inch of soi]

do not constitute "damage".
The BLM procedure does not follow the established protocol anri does not evaluate the specific factor(s) established by the court order.

4. "Key herbaceous riparian vegetation on riparian areas, other than the stream banks, will not be grazed more than 50% during the growing season, or 60% during the dormant season."
The protocol proposes to use the Key Species Method to estimate utilization. This method is based on an ocular estimate of the amount of forage removed by weight on individual key species. The protocol states that the method is reasonable accurate depending on the ability of the examiner. The examiner must first compare their ocular estimates against actual weight values obtained by clipping and weighing.
The practice of this method has not been demonstrated on the two stream segments where BLM assessments have been observed. No estimate was made for this utilization standard.

Dr. Chad C. Gibson

Appendix 1.5.8 Letters responding to the comments at the Jordan Valley, Oregon Meeting on April 7, 2004 – listed by stakeholder.

Response to Martin Andre's Comment

April 23, 2004

Martin Andre
P.O. Box 234
Arock, OR 97902

Dear Martin Andre:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment has been posted on the www.Owyhee.us web site:

- Comment #1: If the vision is to return the Owyhee fisheries to what it was, how are you planning on doing this without regulation and without affecting water storage, etc.?

Your comment has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

As I explained in the Jordan Valley Public meeting, the vision of the Owyhee Subbasin Plan is not to restore all Owyhee River fisheries to what they were before European settlement, e.g., pre-1800's. The vision statement of the Owyhee Subbasin management plan is:
"We envision the Owyhee Subbasin being comprised of and supporting naturally-sustainable, diverse fish and wildlife populations and their habitats, that contribute to the social, cultural, and economic well-being of the subbasin and society."

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Response to Leonard Beitz's Comment

May 22, 2004

Leonard Beitz
1112 Mendiola Rd.
Nyssa, OR 97913

Dear Leonard Beitz:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: The evaluation of the streams by DEQ includes natural pollutants.

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

At the Jordan Valley meeting, I replied that DEQ information was not directly used as a basis for determining the QHA ratings for the various stream reaches. The Owyhee Subbasin team includes a representative from Idaho Department of Environmental Quality – Pam Smolczynski – she has expressed awareness during several team meetings – that some potential pollutants (e.g., high water temperatures) may exist naturally in the Owyhee Subbasin. We are also aware that heavy metal pollution (e.g., mercury) in the Owyhee Subbasin can be derived from both natural geologic formations and by man caused disturbances, such as mining.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company
SCV

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Response to Jerry Hoagland's Comment

May 16, 2004

Jerry Hoagland
HC 79 Box 44
Melba, ID 83641

Dear Jerry Hoagland:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: Asked if normative could be explained; Ray Perkins of ODFW explained that model uses reference condition (prior to European development) to compare with current conditions – if we made lots of changes, the reach got a low score – if few changes, got a high score.

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1:

In addition to Ray Perkin's response -- "Normative" is defined (for QHA) as: "ideal conditions for similar stream in this ecological province". In other words, the best a stream can be in the ecological province containing the Owyhee Subbasin. The caveat to the definition of the pre-European cultural impact "reference" condition is that climatic variability and catastrophic natural events (e.g., earthquakes) can change the ambient natural environment and thus result in a new "reference" condition.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Thank you,

Steven C. Vigg

Principal
Steven Vigg & Company

SCV

42418 East Larch Mountain Road, Corbett, OR, 97019 ● vigg@earthlink.net ● (503) 695-3433

Response to Elias Jaca's Comment:
May 16, 2004

Elias Jaca
Jordan Valley, OR 97910

Dear Elias Jaca:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: I don't want to be forced into using hand line sprinklers on my mountain pastures.

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

I can't envision any circumstance that the Owyhee Subbasin Plan would force you to use hand line sprinklers on your mountain pastures. This plan has no authority to dictate irrigation practices to private land owners. We will take your comment into consideration as we develop restoration strategies in the Owyhee Subbasin Management Plan.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

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Response to Vernon Kershner's Comments
May 22, 2004

Vernon Kershner
Flint Creek Rd.
Jordan Valley, OR 97910

Dear Vernon Kershner:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comments have been posted on the www.Owyhee.us web site:

- Comment #1: P.2 of the limiting factors in the middle Flint Creek #1 and Flint Creek #2 (on the Idaho side) – lower reach confidence is 0.5 and then they identified pollutants and fine sediment as a limiting factor. Where do we go to look to see what pollutants, etc.?
- Comment #2: Deer Creek (ID) has obstruction listed as the limiting factor – what obstruction are you talking about?
- Comment #3: Who are the biologists that did the assessments?

Your comments have been reviewed by the Owyhee Planning and Technical teams and we provide the following responses:

- Response to comment #1:

We consulted with Paul Seronko, BLM abandoned mine-lands coordinator, to get more information about the pollutants in the Flint Creek #1 and #2 reaches. In these stream reaches, tailings from an abandoned gold mine deliver sediment and heavy metal pollution during overland water flow events. The instream concentration of mercury is about 10 ppm and that for zinc is about 100 ppm. At these levels, Mr. Seronko recommends not to move tailings and sediment, at this time. Given this level of information, we could probably raise the reach confidence from 0.5 to 2.0.

- Response to comment #2:

We are looked into the situation on Deer Creek and found that the limiting factor should not be listed as "obstruction". Therefore, "fine sediment load" (also rated 2.0) is determined to be the limiting factor for this reach. We will make the appropriate changes in our data tables, if we discover any additional relevant data we will let you know.

- Response to comment #3:

As I stated in the Jordan Valley meeting, all of the biologists and other participants at the QHA workshops are listed in the Oregon, Idaho and Nevada QHA workbooks ("Setup" worksheet) which are posted on the Owyhee.US website.

A more complete description of participants at the QHA workshops follows. The first QHA workshop was on November 6th 2003 in Vale, Oregon. The participants were: Jeff

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Fryer (TOAST), Tim Dykstra (Shoshone-Paiute Tribes), Jack Wenderoth (BLM hydrologist) and Steve Vigg (Consultant/Owyhee Subbasin Plan Coordinator). During this meeting we set up the initial version of the river reach system for the Oregon Portion of the Owyhee. On November 25th 2003, we conducted the second QHA workshop at the Vale BLM office. Participants were Cynthia Tait (BLM biologist), Brent Grasty (BLM GIS support), Jack Wenderoth, Ray Perkins (ODFW biologist), Jennifer Martin (OWC), Carl Hill (OWC), Tim Dykstra, Tom Dayley (NWPCC) and Steve Vigg. During this meeting we finalized the river reach system for the Oregon portion of the Owyhee, and completed the "current" and "reference" redband trout habitat ratings.

The Idaho QHA workshops were initiated on January 14th-15th 2004 in Boise. The participants of the first meetings were Pam Druliner (BLM Biologist), Bonnie Hunt (BLM Resource Specialist), Tim Dykstra, Brad Nishitani (GIS consultant), and Steve Vigg. During these meetings we developed the initial version of the river reach system for the Idaho Portion of the Owyhee. Bruce Zoellick (BLM Biologist) provided additional input on the Owyhee-Idaho river reach system after the initial meeting.

The participation at the January 29th, 2004 QHA Workshop in Boise included the following technical and planning members:

- Bonnie Hunt BLM-Owyhee
- Pat Ryan BLM-Owyhee
- Jim Desmond Owyhee County, Natural Resources Committee
- Steven Vigg Steven Vigg & Co.
- Eric Leitzinger IDFG
- Jerry Hoagland Owyhee Watershed Council
- Jennifer Martin Owyhee Watershed Council
- Leonard Beitz Ash Grove
- Carl Hill Owyhee Watershed Council
- Pam Druliner BLM-Owyhee
- Bruce Zoellick BLM-Bruneau
- Randy Wiest DSL
- Guy Dodson Sr. Shoshone-Paiute Tribe
- Tim Dykstra Shoshone-Paiute Tribe
- David F. Ferguson Idaho Soil Conservation Service
- Duane LaFayette IACSD
- Bradley Nishitani BioAnalysts, Inc.
- Tracy Hillman BioAnalysts, Inc.
- Tom Dayley NWPCC

During this workshop, redband trout habitat ratings were discussed and scoring was initiated for the Idaho Portion of the Owyhee Subbasin. Since the ratings were not completed for the entire river reach system, a third QHA Workshop was convened on February 5th 2004 in Boise. The participants at this workshop included the following fish & wildlife biologists and managers: Eric Leitzinger, Pam Druliner, Bonnie Hunt, Tim Dykstra, Guy Dodson, and Steve Vigg. Tom Dayley (NWPCC Coordinator) also attended to provide Council guidance. During this third Idaho workshop, redband trout QHA ratings were completed for the Idaho Portion of the Owyhee Subbasin.

During March 9th and March 10th 2004, a QHA Workshop was conducted for the Nevada portion of the Owyhee Subbasin in Elko, Nevada. The participants were: Patrick

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Coffin (Fishery Biologist, NV-BLM), Robert Orr (Natural Resource Specialist, NV-BLM), Gary Johnson (Fish & Wildlife Biologist, NDOW), Tim Dykstra, Guy Dodson, and Steve Vigg. During the first day, we set-up the QHA river reach system for Nevada Portion of Owyhee and rated specific stream reaches for redband trout habitat "current" conditions versus "reference" conditions. On the second day of the workshop, we finished the habitat ratings and scored species range worksheet "current" vs. "reference". Ray Lister (Supervisory Biologist, NV-BLM) briefly attended the workshop, and later met with me regarding BLM documents that were relevant to the Owyhee Subbasin Planning process. We obtained both electronic and hardcopy documents from Ray Lister, BLM.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
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Response to Tim Lowry Comments

May 22, 2004

Tim Lowry
Jordan Valley, OR 97910

Dear Tim Lowry:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comments have been posted on the www.Owyhee.us web site:

- Comment #1: How will this plan impact agency plans? If the strategy is to improve riparian function for fish habitat – won't the agencies use this as a basis for management actions? Discussion followed. Is this just for private land?
- Comment #2: Juniper Creek 1 and Juniper Creek 2 reaches attribute #6 (low flow) got a higher rating when it is dry. If you used BLM information in this area, you are on shaky ground. Attribute #10 pollutants are rated a 2- why is this area considered 50% of normative? His experience has been that when bad science and negative results get written down on paper, it becomes gospel and hurts local people. He is still suspicious that this will be used by people with an agenda.

Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

This Subbasin Plan will probably have little impact on other Agencies' resource management plans in the Owyhee Subbasin. BPA's policy is to not fund projects that are the primary responsibility of other federal agencies – due to the "in lieu" provisions of section 4(h)(10(A) of the Power Act. The section of the Act requires that "[expenditures of [BPA] pursuant to this paragraph shall be in addition to, not in lieu of, other expenditures authorized or required from other entities under other agreements or provisions of law." 16 U.S.C. 839b (h)(10)(A). The BPA Fish & Wildlife Division Director has stated: "*our policy of funding only those projects that are Bonneville's responsibility as outlined in the Basinwide Salmon Recovery Strategy (All-H Strategy) and consistent with the in lieu provisions of the Northwest Power Act. … In the All-H Strategy, the members of the Federal Caucus communicated their expectation that Federal land management agencies assume the lead responsibility for implementing elements of the strategy on the lands within their respective jurisdictions. Bonneville's habitat focus is primarily on non-federal lands where others do not have responsibility.*" (Letter to BPA project sponsors from Sarah R. McNary, Director of Fish & Wildlife, BPA, January 28, 2002). The conceptual design of the Owyhee Subbasin Plan includes a comprehensive approach that will coordinate with ongoing Federal Fish & Wildlife habitat restoration efforts, evaluate the effectiveness of ongoing state and Tribal BPA-funded projects and provide incentives and funding for voluntary habitat enhancement on private lands.

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- Response to comment #2.

Idaho DEQ data show that "flow alterations" contribute to Juniper Creek's listing on the 303(d) impaired waters list (WQL-SEG 2644 in HUC 17050107). The limiting factor that we identified for upper Juniper Creek #1 is "low flow" with a QHA rating of 1.0 – which seems consistent with the your statements and the IDEQ data. We will re-examine the lower Juniper Creek (#1) segment that was rated 2.0 for both "high temperature" and "pollutants". Based on the IDEQ information, flow alterations and/or "obstructions" may also be important factors in Juniper Creek; we will research that issue in more detail as time permits. We will also change our data tables according to these data and any additional information that we discover.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
Principal
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Response to Dennis Stanford's Comment
May 16, 2004

Dennis Stanford
P.O. Box 167
Jordan Valley, OR 97910

Dear Dennis Stanford:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) has been posted on the www.Owyhee.us web site:

- Comment #1: The previous fish and wildlife program has affected us through BLM (in reference to the powerpoint presentation suggesting that previous NWPCC plans have not impacted the area).

Your comment(s) has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

BLM bases its' Resource Management Plans on long term monitoring data, and extensive recent data collection conducted and/or funded by BLM – it does not depend on Bonneville Power Administration (BPA) funding to conduct its land management responsibilities. In fact, nearly all BPA-funded fish & wildlife work in the Owyhee Subbasin has been conducted by the Shoshone-Paiute Tribes on the Duck Valley Indian Reservation, i.e., not on BLM lands.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Principal
Steven Vigg & Company

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Response to Jesse White's Comments:

May 16, 2004

Jesse White
3580 Hwy 95 W
Jordan Valley, OR 97910

Dear Jesse White:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment(s) have been posted on the www.Owyhee.us web site:

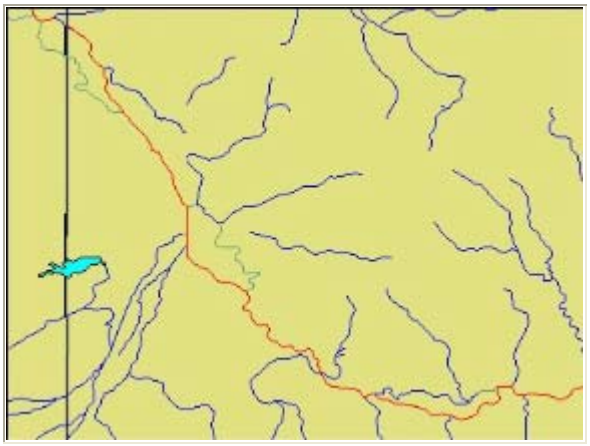
- Comment #1: Jordan Creek #8 on page 3 (State Lands to Headwaters) pollutants are listed as a 1 – what are the pollutants in this reach? Is it the potential for pollution or actual pollution? Ray Perkins stated that in the Oregon portion they used actual pollution.
- Comment #2: It was suppose to be a consistent process throughout the subbasin, but it is obvious that there were inconsistencies between the assessments of the three different states; are man-made pollutants and natural pollutants rated in the same manner? No, if it is a natural pollutant that would not be a basis for restoration or a low score in this QHA model.

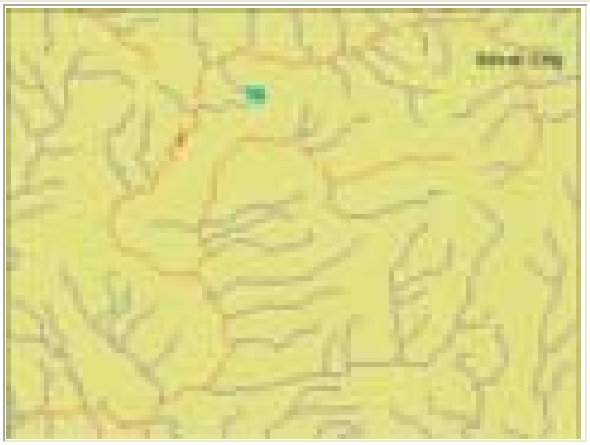
Your comment(s) have been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

Actual measureable pollution, not potential for pollution, was used consistently in all portions of the Owyhee. The type of pollutant could vary from place to place, e.g., coliform bacteria, mercury, other heavy metals, or pesticides.

The following data are from EPA 303(d) water quality assessments:

Idaho JORDAN CREEK WILLIAMS CREEK TO OREGON LINE		• PESTICIDES • BACTERIA/ PATHOGENS • METALS - MERCURY • OIL/GASOLINE • SEDIMENT • TEMPERATURE Sources of Impairment: 1.

Idaho JORDAN CREEK HEADWATERS TO WILLIAMS CREEK		• PESTICIDES • BACTERIA • METALS - MERCURY • OIL/GASOLINE • SEDIMENT • TEMPERATURE Sources of Impairment: 1.

- Response to comment #2 – Yes, there were consistent guidelines used during all the QHA workshops – in Oregon, Idaho and Nevada. The question about man-made pollutants and natural pollutants was answered during the meeting (see above).

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg

Steven C. Vigg
Principal
Steven Vigg & Company

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Response to Pam White's Comment
May 23, 2004

Pam White
3580 Hwy 95 W
Jordan Valley, OR 97910

Dear Pam White:

Thank you for providing input at the public outreach meeting regarding the development of the Owyhee Subbasin Plan. Your comment has been posted on the www.Owyhee.us web site:

- Comment #1: Questioned that if the vision is to mitigate the impacts to anadromous fish, why is this an issue if they did not exist in this subbasin; the mainstem of the Owyhee River is a warm water fishery – some of the feeder creeks are cold water, but the mainstem of the river never has been; prior to the 1930's there were sturgeon, trash fish, etc… but there were not salmon in the mainstem of the Owyhee River.

Your comment has been reviewed by the Owyhee Planning and Technical teams and we provide the following response:

- Response to comment #1

Historical documentation of the presence of anadromous fish in the Owyhee River System prior to 1933 is presented in section "4.2.1.4.2 Owyhee River Basin Fisheries - Spring, Summer, Fall Seasons" found in Chapter 4 of the draft Owyhee Subbasin Plan – which can be accessed on the www.Owyhee.US web site. Anadromous salmonids must have, at least, migrated through the mainstem Owyhee River in order to reach the upstream tributary spawning areas where they were observed and caught for food. Fall-run Chinook salmon, also historically observed in the Owyhee River System, generally spawn in the mainstem river reaches instead of small tributaries. As I explained in the Jordan Valley public meeting, the vision of the Owyhee Subbasin Plan is not to restore all Owyhee River fisheries to what they were before European settlement, e.g., pre-1800's. The vision statement of the Owyhee Subbasin management plan follows:
"We envision the Owyhee Subbasin being comprised of and supporting naturally-sustainable, diverse fish and wildlife populations and their habitats, that contribute to the social, cultural, and economic well-being of the subbasin and society."

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

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Thank you,

Steven C. Vigg
Principal
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May 12, 2004

Mike Hanley
PO Box 271
Jordan Valley, OR 97910

Dear Mr. Hanley:

We thank you for attending the Owyhee Subbasin public outreach meeting at Jordan Valley on 7 April 2004. The Owyhee Subbasin Plan team appreciates the time that you and other stakeholders took to provide input to this planning process. We can all agree that water is one of the most valuable resources in the Owyhee Subbasin and has been central to the utilization of the region – both by humans and fish & wildlife for millennia. It is true that the purpose of the Owyhee Subbasin Plan is about fish & wildlife restoration – protection, mitigation and enhancement as called for under the Northwest Power Act and implemented by the Northwest Power & Planning Council's Fish & Wildlife Program. As you noted, I concluded my presentation with the message that the Owyhee Subbasin Plan was not about money (bucks and silver), but about bucks (wildlife) silver (fish).

I stated that the fish & wildlife mitigation responsibilities of the Bonneville Power Administration are related to losses caused by the development and operation of the Federal Columbia River Power System (FCRPS). Although I didn't talk about Native American Tribe's Treaty rights in my presentation, it is true that Bonneville Power Administration (BPA), and all Federal natural resource management entities, have trust responsibilities to recognized Indian Tribes in the Columbia Basin. We are aware that other upstream users, including ranchers and farmers, appropriated water in the Owyhee Subbasin for agricultural purposes – from the time the region was first settled by European immigrants in the early 1800's, i.e., prior to the development of the FCRPS and the establishment of BPA. In fact the water resource development in the Owyhee River system was conducted by the Bureau of Reclamation, and the dams it constructed are not part of the FCRPS.

The intent of the Council's Subbasin Planning process is to achieve a broad base of local stakeholder participation and support – e.g., ranchers, farmers, hunters, fishers, recreationists, conservation groups, local governments, states and Tribes. Thus the Council's fish & wildlife program is not focused only on Tribal objectives, nor does it ignore Tribal interests. With respect to past BPA-funded fish & wildlife activities, however, the Owyhee Subbasin is rather unique because the Shoshone-Paiute Tribes have a proven track record as the leaders in fish & wildlife restoration. To date, the states of Idaho, Oregon and Nevada have not yet developed BPA-funded fish & wildlife projects or proposals focused on the Owyhee Subbasin. Thus, an appropriate strategy for the Owyhee Subbasin is to maintain ongoing Tribal projects that can be proven effective by monitoring & evaluation, while planning for a more diverse base of projects in the future. As I stated in the presentation, we cannot expect that the subbasin planning process in itself will generate more funding that will be brought in to the Owyhee Subbasin – but instead that it will provide a means to allocate limited funding to projects that have the highest probability of success, based on available information and adaptive management..

It is true that the federal government historically encouraged settlement of the west and developed the infrastructure that made it economically viable. It is also recognized that

fish, wildlife, and the habitats they depend on for long term sustainability have suffered losses due to the development of natural resources for settlement. The Northwest Power Act was designed to balance the beneficial use of water for hydro-electric development with the equitable mitigation for fish & wildlife losses.

We are aware that individual ranchers, Owyhee County, and the Owyhee Cattlemen's Association have initiated law suits pertaining to Bureau of Land Management (BLM) resource management plans -- on the grounds that assessment data lack scientific credibility. We will include a synopsis of events relative to the Idaho Watersheds v. Martha Hanon (BLM State Director) concerning the Owyhee Resource Area. If you have specific questions or comments on the habitat ratings for specific reaches in the Qualitative Habitat Assessment (QHA) in the Owyhee Subbasin assessment (handed out at the public outreach meeting you attended) we will take those specific data into consideration.

The issue of increased water consumption (evapotranspiration) by increased Juniper encroachment has been noted. By inspection of the current versus historic maps of the distribution of old growth western Juniper and Mountain Mahogany Woodlands habitat (Source: www.nwhi.org/ibis) – it is apparent that this habitat type has increased in the Owyhee Subbasin. This habitat is dominated by fire-sensitive species, and therefore, the range of western juniper and mountain mahogany has expanded because of federal fire suppression policies (Crawford and Kagan 2004; Wayne Burkhart cited by Jerry Hoagland, Personal Correspondence, April 2004). Quigley and Arbelbide concluded that in the Inland Pacific Northwest, Juniper/Sagebrush, Juniper Woodlands, and Mountain Mahogany cover types now are significantly greater in extent than before 1900; however, this habitat is generally in degraded condition because of increased exotic plants and decreased native bunchgrasses. As far as I am aware, no scientific studies have been conducted to estimate temporal changes in water loss by Junipers in the Owyhee Subbasin (mid-1800's to present). However, I understand that cooperative research has been initiated by USDA, University of Idaho, Oregon State University, and BLM – to study the effects of Juniper woodlands on stream flow in the Owyhee Subbasin and the Burns, Oregon area.

We are also aware that mercury pollution in the Owyhee Subbasin can be derived from both natural geologic formations and by man caused disturbances, such as mining.

The story about the magnitude of salmon carcasses in the Owyhee River that you related – from John Harney a longtime resident of Duck Valley is very interesting: "*When salmon come, they die in the water. Some wash up on the banks and others catch on gravel bars. It smelled so bad you can't ride a horse to the river.*" This observation is actually quite significant from an ecological perspective. It is a well known natural phenomenon that as soon as adult salmon enter fresh water during their spawning migration, that their physiology begins to change, and ultimately the anadromous salmon are programmed to die after spawning in the upriver tributaries. Since Pacific salmon die within a few days of spawning, the nutrients contained in their carcasses become available to the ecosystem, in our case far inland from the ocean where the nutrients were derived. These salmon-transported nutrients are important for the maintenance of ecosystem biodiversity and fish production (Stockner and Ashley 2003). In Idaho streams, Thomas et al. (2003) reviewed the role of marine derived nutrients and concluded that nutrient delivery by anadromous salmon may have been ecologically significant under historic spawning densities. Thus, the elimination of anadromous

salmon from the Owyhee System in 1933 could have resulted in significant nutrient losses to both aquatic and terrestrial ecosystems in the Owyhee Subbasin over the past seven decades.

Public input is very important to the development of the Owyhee Subbasin Plan and we appreciate the time that you took to attend the public outreach meeting and provide specific comments. Enclosed is a mini desk clock as a small token of our appreciation for your participation. Please note the web site — www.Owyhee.us — is etched on the clock. We hope this will serve as a reminder that you can access our web site to review the latest documents pertaining to the Owyhee Subbasin Plan and provide additional comments at any time at the following link http://www.owyhee.us/reqdtoc.htm.

Thank you,

Steven C. Vigg
Principal
Steven Vigg & Company

SCV

May 25, 2004

Jerry L. Hoagland
13528 Reynolds Creek Rd.
Wilson, ID 83641

Dear Mr. Hoagland:

This letter is in response to the comments regarding the April 28th Draft of the Owyhee Subbasin Plan that you e-mailed to me on May 19th, 2004.

Regarding your statement " Inclusion of allotment-by-allotment data in the subbasin plan appears to be yet another attempt by BLM to get disputed data into a published document in an attempt to lend weight to proposed grazing reductions." Jerry this statement is simply not true. I decided to use the BLM grazing allotment assessment information in the "Land Use" section of the OSP because I consider it to be very relevant to habitat conditions in the Owyhee Subbasin where the majority of the land is used for grazing and managed by the BLM. Back in January, Tim Dykstra (Shoshone-Paiute Tribes' subbasin plan biologist) requested numerous documents (in electronic format) from the Owyhee Area BLM office and he subsequently made copies for me. **No one** from the BLM suggested that I use the allotment assessment information or tried to influence me in any way regarding the use of this information, or any other BLM data as far as that goes. I think the allotment data presented in the OSP provides a representative subset of the grazing allotments; we were only limited by the assessments that were available in electronic format at the time of the request. When the plan is revised in the future, I think this section should be expanded to include all available assessments of grazing allotments. I will note in the OSP that "allotment decisions based on the information presented have been appealed by permittees and those appeals are still pending in the Interior Board of Land Appeals system."

Regarding your statement "The document names specific grazing allotments and provides information which is inaccurate, misleading, or unnecessary. On page 38, Sec. 4.2.2.2.6., the Nickel Creek Allotment for example, the plan cites 303d list information which is no longer valid as there has been a completed and approved TMDL on the cited riparian sections. That TMDL found sediment to be the only pollutant present while the draft subbasin plan still leads the reader to believe that other pollutants must be addressed."

This comment references the following excerpt form the OSP:

"Streams on the Nickel Creek Allotment include all or portions of: the North Fork Owyhee River and Deep Creek and its tributaries (Nickel, Smith, Little Smith, Thomas, Little Thomas, Wilson, Beaver, Trap, Castle, Skunk, Jobe, Current, Corral, Dons, and Stoneman creeks). Additionally, Porcupine Creek is a tributary to the Owyhee River.

The North Fork Owyhee River forms a portion of the western boundary of the allotment and flows southwesterly to the Owyhee River in Oregon. The majority of tributaries to Deep Creek flow easterly from Juniper Mountain. Deep Creek flows north to south to the Owyhee River.

In 1998, four water bodies in the Nickel Creek Allotment (one in the Middle Owyhee HUC# 17050107 and three in the upper Owyhee HUC# 17050104) were classified by the Environmental Protection Agency (EPA) under 303(d) of the Clean Water Act as water quality limited for the following reasons:

- HUC #17050107
  - North Fork Owyhee River - Excessive sediment, high temperature, flow alteration
- HUC #17050104
  - Deep Creek - Excessive sediment and elevated temperature
  - Nickel Creek - Excessive sediment
  - Castle Creek - Excessive sediment and elevated temperature"

I checked with Pam Smolczynski regarding your assertions and she provided me with information from the TMDL. The following information is derived from: the Upper Owyhee Watershed Subbasin Assessment and Total Maximum Daily Load Owyhee County, Idaho (IDEQ January 2003).

"The goal of the total maximum daily loads is to achieve state of Idaho water quality standards for temperature and sediment, and to restore and maintain a healthy and balanced biological community for the full support of cold water aquatic life and salmonid spawning. The load allocations and targets will consist of heat reductions for temperature and sediment allocations based on land use. Surrogate measures of total shade and substrate targets will be presented to assist in achieving the load allocations.

Table B. Upper Owyhee Watershed 1998 §303(d) listed Segments and Recommended Actions. (

Water Body	Pollutant(s)	TMDL(s) Completed	Recommended Changes to 1998 §303(d) list	Proposed Future Listing- Pollutant of Concern	Justification
Blue Creek Reservoir	**Sediment**	**Yes Sediment**	**None**	**None**	**None**
Juniper Basin Reservoir	**Sediment**	**Yes Sediment**	**None**	**None**	**None**
Deep Creek	**Sediment and Temperature**	**Yes Sediment and Temperature**	**List Dissolved Oxygen as Pollutant of Concern**	**None**	**None**

Water Body	Pollutant(s)	TMDL(s) Completed	Recommended Changes to 1998 §303(d) list	Proposed Future Listing-Pollutant of Concern	Justification
Pole Creek	Sediment, Temperature and Flow[1]	Yes Temperature	De-List Sediment as a Pollutant of Concern	None	None
Castle Creek	Sediment and Temperature	Yes Sediment and Temperature	None	None	None
Battle Creek	Bacteria	No	De-List Bacteria as a Pollutant of Concern, List Temperature as a Pollutant of Concern	Temperature	BLM[2] Temperature Data Indicated Exceedence of Temperature Criteria
Shoofly Creek	Bacteria	No	De-List Bacteria as a Pollutant of Concern	None	None
Red Canyon Creek	Sediment, Temperature and Flow	Yes Temperature	De-List Sediment as a Pollutant of Concern	None	None
Nickel Creek	Sediment	Yes Sediment	List Temperature Organic Enrichment and Metals as a Pollutants of Concern	None	Idaho DEQ Temperature Data Indicated Exceedence of Temperature Criteria

1 No TMDL for Flow per Idaho DEQ policy, 2 Bureau of Land Management

Thus the information on Deep Creek, Nickel Creek and Castle Creek in the OSP is completely consistent with that from the TMDL. Furthermore, the TMDL stated that DEQ temperature measurements exceeded Thermal criteria for Nickel Creek, and recommended to list temperature, organic enrichment and metals as "Pollutants of Concern". Pam told me that for the North Fork Owyhee River, the data were revised and excessive bacteria was the only pollutant listed. Pam also confirmed that just because a

TMDL is written for a given area, it doesn't necessarily follow that the water pollution problems have been corrected and that the stream can be removed from the 303(d) list.

Re: your comment on the "Taylor Grazing Act was passed in 1934,…" The previous narrative you provided on the implementation of this Act was incorporated into the version of the OSP delivered at the May 19th OSP meeting.

Re: your comment on "Section 4.5.1 Endangered Species Act Requirements, Page 80, re Pygmy Rabbits" The fact is that the three issue papers regarding the pygmy rabbit as a potential focal species are on the Owyhee.US web site in their entirety, and I see no need to need to include all the points made in all three papers regarding that past issue since the context in the OSP section (referenced above) was not the intended to discuss merits of the pro vs. con arguments regarding the rabbit as a focal species in the OSP. Since the decision was made by the OSP planning Team months ago to exclude the rabbit as a focal species – that is a mute point. I have no problem including the two concluding sentences from the Jim Desmond's issue paper, as you suggested: "*With the lack of knowledge available on the species and the questions that are raised by the Idaho State Study, such restrictions and potential economic harm are not supportable. What the group should determine to do with the Pygmy Rabbit, rather than using it as a focal species, is to select the species for more study in order to provide for funding of projects to address the data gaps indicated in the study.*" I agree with Jim that we should recommend more studies of the pygmy rabbit in the Owyhee Subbasin.

Thank you,

Steven C. Vigg

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