WATERSHED ACTION PLAN

UPPER WALLA WALLA RIVER SUBBASIN UMATILLA COUNTY, OREGON

PREPARED FOR THE
WALLA WALLA BASIN WATERSHED COUNCIL
MILTON-FREEWATER, OREGON

BY
BUREAU OF RECLAMATION
UPPER COLUMBIA AREA OFFICE
YAKIMA, WASHINGTON
AND
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BOISE, IDAHO

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ABBREVIATIONS, ACRONYMS, AND AGENCIES

°C .....degrees Celsius (temperature)
°F.....degrees Fahrenheit (temperature)
ACEC.....area of critical environmental concern (BLM term)
BLM.....Bureau of Land Management (of DOI)
BPA.....Bonneville Power Administration (of U.S. Department of Energy)
Corps.....U.S. Army Corps of Engineers
Council.....Walla Walla Basin Watershed Council of Milton-Freewater, Oregon (also WWBWC)
CREP .....Conservation Reserve Enhancement Program (of NRCS)
CRP.....Conservation Reserve Program (of NRCS)
CTUIR.....Confederated Tribes of the Umatilla Indian Reservation
DIC.....Hudson Bay District Improvement Company
DOE .....Washington State Department of Environment
DOI.....U.S. Department of the Interior
EQIP.....Environmental Quality Incentive Program (of NRCS)
ESA.....U.S. Endangered Species Act
FWS .....U.S. Fish and Wildlife Service (of DOI)
G&O.....Goals and Objectives, actions with measurable outcomes
GWEB.....(Oregon) Governor's Watershed Enhancement Board
ICBEMP.....Interior Columbia Basin Ecosystem Management Project (joint BLM and USFS)
NMFS.....National Marine Fisheries Service (of U.S. Department of Commerce)
NRCS .....Natural Resources Conservation Service (of USDA)
ODEQ .....Oregon Department of Environmental Quality
ODFW.....Oregon Department of Fish and Wildlife
ODOT .....Oregon Department of Transportation
OHV.....off-highway vehicle, four-wheel drive vehicle
OWRD .....Oregon Water Resources Department
POD.....point of diversion
RCD .....Columbia-Blue Mountain Resource Conservation and Development
Reclamation .....Bureau of Reclamation (of DOI)
RM .....river mile
SOLV .....Stop Oregon Litter and Vandalism
STELLAR .....Science Technology Environmental Land Lab and Research Program
STEP .....Salmon Trout Enhancement Program (of ODFW)
SWCD.....county soil and water conservation district (Umatilla SWCD in Oregon; Walla Walla SWCD in Washington)
TMDL .....total maximum daily load (water quality term)
USBR .....U.S. Bureau of Reclamation (of DOI)
USDA.....U.S. Department of Agriculture
USFS.....U.S. Forest Service (of USDA)
USFWS .....U.S. Fish and Wildlife Service (of DOI)
WAP.....Watershed Action Plan
WCD .....Umatilla County Weed Control District
WWBWC.....Walla Walla Basin Watershed Council
WWRID .....Walla Walla River Irrigation District

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1. INTRODUCTION

The Walla Walla Basin Watershed Council (the Council) was formed to address water and fish resource management issues on the Oregon portion of the Walla Walla River basin. The Council helps to provide a framework for coordination and cooperation among key interests in the development and implementation of a watershed action program. In May 1994, under provisions of the Oregon Watershed Health Program (HB 3441), the Council was designated by Umatilla County as the upper Walla Walla subbasin "watershed group." The 13-member volunteer board represents a broad range of local interests and it is supported in its efforts by a technical committee which includes resource specialists from local, State, Tribal, and Federal agencies.

MISSION, GOALS, AND OBJECTIVES

The Council's **MISSION** is to protect the resources of the watershed, deal with issues in advance of resource degradation, and enhance the watershed's health.

To fulfill its mission, the Council has set eight **GOAL*S***.

FORUM — to provide a forum for conflict resolution and decision-making.

EDUCATION — to improve communication among affected private individuals, interested citizens, and representatives of local, State, Tribal, and Federal agencies.

ADVISORY — to provide recommendations for the basin resources which will enhance the quality and quantity of river flow.

PLANNING — to develop an integrated, comprehensive watershed management program which includes an action plan to achieve and maintain watershed health.

PROBLEM SOLVING — to identify problems in the watershed and solutions based on the best available scientific information.

RESTORATION ACTIONS — to improve instream, riparian, and uplands habitat for the benefit of anadromous and resident fish, wild and domestic animals, and people in the Walla Walla watershed.

MONITORING — to promote ongoing monitoring of the health of the Walla Walla River watershed.

ADMINISTRATION — to establish and maintain an organization to carry out this mission and these goals.

For each goal, the Council has established **OBJECTIVES**, actions with measurable outcomes. A complete listing of these objectives is presented in chapter 5. Chapter 6 contains a chronological table of Council activities; with each activity is at least one goal and objective (**G&O**) from chapter 5. The names of the cooperators for each project are included. In a different presentation format, attachment A shows this same information organized by goal.

COUNCIL ACTIVITIES

The Council is addressing issues on the Oregon portion of the Walla Walla River basin. This includes the main stem of the Walla Walla River north to the Washington border and five tributaries. (This drainage area will be referred to as a "subbasin" and it is considered to have six watersheds).

In late 1997, the Council completed and distributed a watershed assessment. This provided information about the condition of the resources in the subbasin, the areas of concern, and potential solutions to problems.[1] It was developed with the advice and participation of the Council members, other concerned citizens, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Columbia-Blue Mountain Resource Conservation and Development Area, and local, State, and Federal agencies. This *Watershed Action Plan (WAP)* is a follow-up to the assessment. Factors affecting resource values are stated, along with activities underway (or in planning) to address them.

(It should be noted that CTUIR, the Walla Walla [Washington] Conservation District, and various Washington state agencies are implementing several projects in the Washington portion of the river basin. These efforts are addressing fish passage barriers, along with fish and wildlife habitat needs, thereby complementing Oregon efforts.)

As a community organization, the Council sees its role as a liaison between landowners and agencies, and it intends that its meetings be a forum for discussion between these groups. This contributes to the goal of maintaining and improving the ecological health of the region through education, discussion, and cooperation. Education must be a two-way process, with an agency able to explain its concerns and legislative mandates and the community members — as local residents, property owners, and land managers — able to explain their concerns and needs.

The Council also has been facilitating restoration programs with agencies and interested landowners, and providing its own labor and skills to assist with projects. The Council has been actively involved in stream restoration activities, such as volunteer tree planting and fence building, and has referred landowners to agencies for more extensive projects. The hands-on involvement by Council members has helped them accomplish much without a budget. Several potential projects to enhance the subbasin have been suggested as well as a need for additional monitoring, education, and landowner involvement. With this *WAP*, the Council will be able to develop these and other projects and locate funding for their implementation.

PUBLIC INVOLVEMENT

1 *Watershed Assessment, Upper Walla Walla River Subbasin, Umatilla County, Oregon* (October 1997). Prepared for the Walla Walla Basin Watershed Council, Milton-Freewater, Oregon, by Bureau of Reclamation, Upper Columbia Area Office, Yakima, Washington and Pacific Northwest Regional Office, Boise, Idaho

Beginning in February 1997, a series of community meetings was held to discuss issues related to specific sections of the watershed. Individuals and groups brought up a wide range of topics. Some of the topics did not represent a consensus of all those present at the meeting; however, they are relevant as concerns and observations by those living in the watershed. These comments were noted and summarized in the *Assessment* and are presented in this document as attachment B.
The information in this *WAP* has been adapted from reports produced by other entities and agencies (see References) and has been supplemented by local natural resource specialists. This approach was intended to present a document with the results of scientific research combined with input from the long-term landowners whose livelihood depends on those natural resources studied. Some of the original documents surveyed resources and issues related to the bi-state Walla Walla River basin.

There was general agreement that several issues related to water quality and quantity require urgent attention. Under the requirements of Oregon State laws and Federal laws (especially the Clean Water Act and the Federal Endangered Species Act), all rivers are examined for compliance of various water quality standards for uses such as drinking water, recreation, and fish habitat. Segments of the Walla Walla River have been declared "water quality impaired" because some water temperatures are too high and some flows are too low.

Oregon Governor Kitzhaber, through his Healthy Streams Partnership proposal, is asking communities and landowners to develop action plans and begin improving Oregon streams on a voluntary basis. Members of the community have met this challenge, looking for and finding local solutions to these water quality issues. This local support is critical since about 85 percent of the land is in private hands. By taking these actions and monitoring the change in conditions, there is strong potential that the streams can meet, if not exceed, State and Federal water quality standards while providing responsible and efficient utilization of the natural resources. With these improvements in water quality, there can only be benefit to resident and anadromous fish species.

INITIATIVES OF OTHER AGENCIES

There has been a high level of interest by other entities and agencies in the assessment and improvement of the Upper Walla Walla River subbasin. A great many of those activities coincide with the goals of the Watershed Council. This positive circumstance is complemented by continuing communication and cooperation between these entities and the Watershed Council. A list of these activities and how they relate to Watershed Council goals is presented later in this action plan.

2. DESCRIPTION OF WALLA WALLA SUBBASIN

LOCATION

The Walla Walla River originates in the Blue Mountains of northeastern Oregon. More than one-quarter — about 475 square miles — of the drainage area (river basin) is in Oregon; the balance is in Washington (see location map). The majority of the upper Walla Walla River is located in Umatilla County, Oregon, and in this watershed action plan, the drainage area will be referred to as a "subbasin." The subbasin is bounded by the Oregon-Washington State line (on the north), by the Blue Mountains (on the east and the south), and by the Columbia River (on the west). For the purpose of this action plan, the subbasin is considered to have six watersheds.

- Walla Walla River — from the Oregon-Washington State line at river mile (RM) 40 upstream to the confluence of the North and South Forks (RM 50.3). This watershed includes the Oregon branches of the Little Walla Walla River.
- Pine Creek, 32 miles long, which joins the main stem at RM 23.4 (north of the state line 4 miles).
- Dry Creek, 19 miles long, which joins Pine Creek about stream mile 7 (at a point about 3 miles south of the state line).[2]
- Couse Creek, 16 miles long, which joins the main stem at RM 47.
- South Fork Walla Walla River, 23 miles long.[3]
- North Fork Walla Walla River, 17 miles long.

The headwaters of Birch and Cottonwood Creeks are in Oregon, but the mouths are in Washington. The Council decided not to include the two watersheds in the *Assessment* or the action plan.

CLIMATE

Precipitation ranges from about 7 inches in a narrow band along the Columbia River to more than 40 inches at high elevations in the Blue Mountains. There are isolated storms during the summer and early fall. In late fall and winter, storms push in from the Pacific Ocean. Rain-on-frozen-soil and rain-on-snow events during the winters of 1995–96 and 1996–97 resulted in severe flooding and erosion damage.

Temperatures at lower elevations average 50–55 degrees Fahrenheit (°F). Extremes of 115 °F and minus 21 °F have been recorded.

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2 In the Walla Walla River basin, there are two watersheds called Dry Creek; the Dry Creek in Washington State enters at the right bank (the north side) of the Walla Walla River at river mile 27.2.

3 The main stem of the Walla Walla River nominally ends at river mile 50.3, where the South and North Forks meet; the measurement of main-stem river miles continue upstream on the South Fork

GEOLOGY

Elevations in the Walla Walla River basin are about 270 feet at the Columbia River, about 3000 feet along the toe of the Blue Mountains, and up to 6000 feet at mountain crests. Multiple lava flows exceeding 2,500 feet in thickness, known as the "Columbia River Basalt," underlie nearly all of the subbasin. The river basin is divided into two geologic regions.

The Blue Mountain geologic region includes the extreme northern extension of the Blue Mountains of Oregon and the long, tilted plateau extending northward into Washington State. It was formed by uplifting, folding, faulting, and erosion of the Columbia River Basalt and is characterized by flat-topped ridges, steep-walled canyons, and forested mountain slopes. Older volcanic, sedimentary, and metamorphic rocks are exposed along the crest of the Blue Mountains.

The mid-elevation areas of the Walla Walla geologic region are characterized by rolling, treeless uplands formed by deep deposits of loess (windblown silt and fine sand) overlying multiple lava flows. Alluvium deposited by present-day rivers and streams is common in valleys and flood plains.

HYDROLOGY

Water availability in the Walla Walla River basin is highly dependent on high-elevation snowpack in the Blue Mountains. Runoff occurs anytime during the precipitation period of November through June, with peaks occurring in April. Flows diminish rapidly after May, reaching their lowest levels in August and September. Streamflows increase in late fall and winter in response to storms pushing in from the Pacific Ocean.

Fractured basalt provides a major ground-water reservoir throughout the river basin. The basalt aquifer is thought to contain ancient water with limited recharge, mainly in the Blue Mountains. Water moves very slowly through the basalt, discharging into the Columbia and Snake Rivers and to a lesser extent into alluvial aquifers. The basalt aquifer system is comprised of a number of relatively thin tabular water-bearing zones found at the contacts between adjacent basalt flows.

A major alluvial aquifer underlies approximately 120,000 acres of the central river subbasin (the Milton-Freewater/Walla Walla area). Alluvial aquifers are recharged by streams, precipitation, the basalt aquifer, and infiltration of irrigation water.

In most places, these two major aquifer systems are separated by a thick, low-permeability clay layer which overlies the basalt. The alluvial aquifer and local rivers and streams are highly connected hydraulically. The basalt aquifer system is connected on a more regional scale to the Columbia and Snake Rivers.

A water-budget analysis conducted on the Washington portion of the river basin suggested that about 20 percent of precipitation enters aquifers (Washington DOE, 1995). About 16–20 percent of the recharge goes to ground-water development. The remaining amount exits the river basin as ground-water subflow or discharges to springs, rivers, and streams.

Summer streamflows in the Walla Walla River are completely diverted for irrigation at the upstream end of Milton-Freewater. Water rights currently exceed available streamflow and for all practical purposes waters within the subbasin are currently closed to further irrigation appropriations.

Low summer flows may also be related to the river recharging the shallow aquifer during low flow periods. After most irrigation withdrawal is discontinued in the fall, it can take a month or more before surface flows are reestablished because the gravel aquifer needs to be recharged.

The Milton-Freewater flood control project on the Walla Walla River protects the city. The original levees, completed by the U.S. Army Corps of Engineers (the Corps) in 1952, suffered major damage from unseasonable floods in December 1964 and January 1965. Rehabilitation by the Corps took place from September 1966 to October 1967 when the present levees were rebuilt or constructed to protect the city and selected locations. From the Nursery Bridge (RM 44.5), they extend upstream about 2 miles on both banks; downstream, there are about 2.1 miles of levee on the east bank and 1.7 miles of discontinuous levee on the west bank. The levees have 2:1 side slopes and are riprapped.

SOILS

A deep deposit of loess covers much of the subbasin. Loess is highly erodible, yielding sediment, particularly in the middle to lower reaches of the main stem Walla Walla River. The soils in the upper Walla Walla subbasin and their uses are briefly described below.

Alluvial soils are on nearly level to gently sloping valley bottoms near the rivers and creeks, fanning northwest from Milton-Freewater. They vary from excessively to poorly drained. These soils are often irrigated and are adapted to a wide variety of crops.

Athena-Palouse-Waha association of soils occur east of Milton-Freewater on the lower slopes of the Blue Mountains. Most of the Athena and Palouse and a part of Waha is cultivated in annual cropping rotation of winter wheat and green peas. The remainder of these soils is in range with a dominant native vegetation of Idaho fescue and bluebunch wheatgrass. These soils are well adapted to irrigation except in areas with unfavorable topography.

Ritzville-Starbuck association of soils is developed from loess and found mostly on the northwestern end of the subbasin. Most of the Starbuck and some Ritzville is used for range. Ritzville soils are well adapted for irrigation.

Sagemoor-Quincy-Taunton association of soils is formed on the medium-textured glacial sediments and also located in the northwestern corner of the subbasin. Winter range for sheep is the principal use of these soils with the vegetation being bluebunch wheatgrass, annual grasses, and sagebrush. A small portion of Sagemoor is producing wheat successfully. These soils are reasonably well adapted to irrigation.

Tolo-Klicker association occurs in the eastern subbasin, in the high country of the Blue Mountains with nearly level to gently sloping uplands which break off to very steeply sloping canyon walls. Most of these soils support a forest or mixed-forest-grass type vegetation which is used for summer

grazing of livestock. Minor areas of all the deep soils are cultivated and produce small grains, legumes, grass, and berries. The shallow, stony soils are used for range.

Waha-Snipe association is found on the lower slopes of the Blue Mountains from nearly level to very steep slopes. These soils are used mostly for relatively high-producing range. The major vegetation is Idaho fescue, bluebunch wheatgrass, and shrubs.

The Walla Walla series of soils has four phases, each developed from loess. Two are present in the subbasin — **Walla Walla** and **Walla Walla high rainfall** — and are used for wheat production in both a wheat-fallow rotation and a wheat-green pea rotation. Both would be very well adapted for irrigation.

VEGETATION

Vegetation in the headwaters of the drainage is primarily evergreen forest, dominated in the higher elevations by Douglas fir and grand fir. In the lower elevations, there is a more-open forest dominated by ponderosa pine. High elevation lands are dominated by forest with an understory of shrubs, grasses, and forbs (herbaceous plants that are not grasses); watershed conditions generally are good except where heavily affected by logging. As reflected by the proportion of grassland-steppe communities, the differences between northern and southern slope vegetation become more pronounced in direct correlation to decreases in elevation and lower precipitation.

Mid-elevation lands are characterized by stands of timber grading into brush and grass as the elevation declines. Some grazing practices and increased fire suppression have eliminated much of the native sagebrush and bunchgrass; these have been replaced by rabbitbrush, cheatgrass, yellow starthistle, and other undesirable grasses and broadleaf weeds. This is a transition zone, where farmland is intermingled with range. Often, the north slopes will be farmed while the west and south slopes, with their shallower soils, are used as range.

A riparian community dominated by cottonwood, white alder, willow, and various shrubs occurs throughout the river basin. Cultivation, domestic livestock grazing, residential and commercial build-up, and flood control activities have affected riparian vegetation throughout much of the mid-lower elevation reaches of the subbasin. Large mid-lower elevation areas have been converted into dryland farming. The resulting exposed soil results in increased erosion and sediment.

3. WATERSHED ISSUES AND RESOURCE VALUES

SPECIAL STATUS SPECIES

Some animal and plant species that under the Federal Endangered Species Act (ESA) are listed as threatened or endangered, proposed for, candidate for, or are "of concern" may occur within the upper Walla Walla River subbasin. These are listed below.

SPECIAL STATUS SPECIES, UMATILLA COUNTY, OREGON
(adapted from a list provided by U.S. Fish and Wildlife Service, Spokane, WA; 8/3/99)

LISTED SPECIES

Endangered — NONE *[Note: the peregrine falcon,* Falco peregrinus*, was formally removed from the list of "endangered species" by the Secretary of the Interior, effective August 25, 1999. The species will continue to be protected under the Migratory Bird Treaty Act, which essentially prohibits any interference unless specifically authorized by the Interior Department.]*

Threatened

- Bald eagle .....*Haliaeetus leucocephalus*
- Bull trout [Columbia River population]....*Salvelinus confluentus*
- Middle Columbia River steelhead .....*Oncorhynchus mykiss* (as of March 16, 1999)

PROPOSED FOR LISTING

- Canada lynx .....*Lynx canadensis*

CANDIDATE FOR LISTING — NONE

SPECIES OF CONCERN

Animals

- Columbia spotted frog (*Rana luteiventris*)
- Ferruginous hawk (*Buteo regalis)*
- Long-eared myotis (bat) (*Myotis evotis)*
- Long-legged myotis (bat) (*Myotis volans*)
- Margined sculpin (*Cottus marginatus*)
- Northern goshawk (*Accipiter gentilis*)
- Northern sagebrush lizard (*Sceloporus graciosus graciosus)*
- Olive-sided flycatcher (*Contopus borealis*)
- Pacific fisher (*Martes pennanti pacifica)*
- Pacific lamprey (*Lampetra tridentata)*
- Pacific western big-eared bat (*Corynorhinus (=Plecotus) townsendii townsendii)*
- Pale western big-eared bat (*Corynorhinus (=Plecotus) townsendii pallescens*)
- River lamprey (*Lampetra ayresi)*
- Small-footed myotis (bat) (*Myotis ciliolabrum*)
- Washington ground squirrel (*Spermophilus washingtoni)*
- Western burrowing owl (*Athene cunicularia hypugea*)
- Yuma myotis (bat) (*Myotis yumanensis*)

Plants

- Columbia yellow-cress (*Rorippa columbiae*)
- Hepatic monkeyflower (*Mimulus jungermannioides*)
- Laurence's milk-vetch (*Astragalus collinus* var. *laurentii*)
- Long-bearded mariposa-lily (*Calochortus longebarbatus longebarbatus*)
- Spalding's catch fly (*Silene spaldingii*)

FISH RESOURCES

Bull trout — The bull trout (*Salvelinus confluentus)* is a wide-ranging, typically non-anadromous species that inhabits most of the cold lakes, rivers, and streams throughout the Western states and British Columbia. In 1998, it was listed as a Federally "threatened" species under the ESA. Within the Oregon subbasins of the Walla Walla River, bull trout are found in the upper portions of the North Fork and South Fork; in the Washington subbasin they are found on the upper Touchet River,

Mill Creek, and some of their tributaries. Bull trout require cold water, with temperatures of 45–47 °F (7–8 °C) appearing optimal and 59 °F (15 °C) maximum. Spawning occurs in cool water below 48 °F (9 °C). The optimal incubating temperature range seems to be 36–39 °F (2–4 °C). Spawning occurs from August through November with eggs hatching late winter or early spring. Emergence is usually from late March through May, commonly following spring peak flows. Because of extended time in the substrate, bull trout are susceptible to mortality in unstable conditions. Successful reproduction requires channel and substrate stability and adequate winter water flow to prevent the substrate from freezing. Bull trout require complex forms of in-stream cover. Adults use pools, large woody debris, large boulders, and undercut banks for resting and foraging. Juveniles use these locations, along with side channels and smaller woody debris. Channels for moving between safe wintering areas and summer foraging areas are also necessary.

One of the problems facing bull trout is the number of passage impediments and barriers in the subbasin. During the winter, bull trout may migrate many kilometers within a given subbasin; this is because water temperatures are likely to have lowered to a level that allows them unrestricted travel. Their population is fragmented because passage impediments and barriers prevent them from reaching many areas of the subbasin. A cooperative interagency effort to increase passage for resident and anadromous fish is addressing these man-made barriers.

Anadromous fish — The Walla Walla River was once an excellent stream for spring chinook salmon (*Onchorhynchus tschawytscha)* and steelhead (*O. mykiss*), supporting significant runs of both species. CTUIR fisheries staff believe that fall chinook *(O. tschawytscha),* chum (*O. keta),* and coho (*O. kisutch*) occurred in the Walla Walla River in smaller numbers. Fishing sites along the Walla Walla River have been described in historical accounts where chum, coho, and steelhead were harvested. Salmon and steelhead spawned and reared throughout the middle and upper reaches of the Walla Walla River and its tributaries.

The U.S. Fish and Wildlife Service (FWS) reported that the lower portions of the river were not historically used for spawning because of the lack of gravels and the sluggish flows (Corps, 1992b). Some area biologists, however, feel historical conditions may have been adequate for fall chinook salmon.

The key problems and constraints on production of anadromous fish in the subbasin are low summer streamflows and physical barriers to passage. Irrigation withdrawals and elevated water temperatures compound the difficulties for juveniles and adults. The reach of the Walla Walla River at the Oregon-Washington border is chronically dry during September and October. However, there are year-round flows from the South Fork. Oregon Water Resources Department (OWRD) data showed that flows on the South Fork did not drop below 100 cfs anytime of the year during the periods of record (1903–18 and 1931–86). Juvenile mortality is increased when streamflows are depleted by the diversions into the numerous channels and rearing habitat is reduced and degraded. Also contributing to juvenile mortality, most significantly along the Washington reach of the river, are diversion bypass screens with outmoded designs, improper maintenance, and/or inefficient operation at low-flow levels.

Habitat degradation due to removal of riparian vegetation, bank and sheet erosion, elevated water temperatures, logging, grazing, poor water quality, and siltation has also contributed to the decline of runs. One estimate is that in the Washington portion of the river basin there has been a 50 percent

reduction in usable spawning habitat (Corps, 1992b); comparable estimates for Oregon have not been made. At present, most of the spawning and rearing occur in the uppermost reaches of the subbasin, where the effects of habitat degradation have not been as severe.

Summer steelhead — Summer steelhead are the only anadromous salmonid found at present in the Walla Walla River basin. Summer steelhead have been able to persist largely because the adult upstream migration, juvenile downstream migration, and spawning coincide with high winter and spring flows. Also significant is their biologic ability to wait for long periods of time, if necessary, for adequate migration conditions. Estimates of historical runs in the entire river basin have a wide range, with the differences coming from methodologies and approaches. FWS estimated a run from 4,000 to 5,000 fish, based on an estimate of the quantity of the once-available habitat (Corps, 1992b). CTUIR biologists believe that it is likely the run exceeded 10,000 fish (CTUIR, 1997b).

The population of native steelhead in the river basin is trending downward. It was estimated that during the period 1977–87, the run ranged between 1,090 and 1,817; this number was extrapolated from the number of fish caught. Estimates for the combined North Fork, South Fork, and Couse Creek runs, based on trap counts at Nursery Bridge Dam, were 815 native steelhead in 1992–93; 478 (in 1993–94); 384 (in 1994–95); 358 (in 1995–96); 298 (in 1996–97), and 375 (in 1997–98). There is no current data for the Touchet River and Mill Creek in Washington State.

Emergence from the gravels occurs from May through July. Most juveniles rear for 2 years prior to out-migration; however, substantial numbers of 1-year-old juveniles out-migrate from Oregon headwaters (ODFW, 1987). Most juveniles out-migrate from late April through May. No information on egg-to-smolt or smolt-to-adult survival rates exists. There are gaps in relevant data. Improved monitoring of fish numbers is needed; as well as data such as the location of key spawning and rearing sites, and how long the fry are in gravel before emergence.

With the objective of creating a run of 1,550 adult steelhead and creating a hatchery-fish-only sport fishery, the Washington Department of Fish and Wildlife (WDFW) in 1984 began releasing hatchery smolts into the Walla Walla River near the town of Touchet, Washington as part of the Lower Snake River Compensation Plan (Corps, 1992b). The size of the hatchery run in Washington (including Touchet River and Mill Creek) is estimated to be 2,000 to 3,200 fish, an amount extrapolated from harvest levels (Corps, 1992b). Information on harvests in Oregon is not available because the Oregon Department of Fish and Wildlife (ODFW) does not have a “creel” data collection program.

Salmon — The last significant run of spring chinook occurred in 1925, but as recently as 1958 ODFW’s predecessor projected runs of 100 spring chinook and 4,000 summer steelhead (Corps, 1992b). One estimate of the historical spring chinook run is about 5,000 fish, based on an estimate of the once-available habitat. In contrast with steelhead, spring chinook are very vulnerable to changes in water regimes. This is because three important biologic cycles coincide with the irrigation season — upstream migration (in May, June, and July); juvenile out-migration (peaking in late May); and spawning. Irrigation withdrawals adversely affect the quantity of water available for the fish and the temperature of the remaining water, among other matters.

Although spring chinook are no longer present in the Walla Walla River basin, re-introduction is proposed in the Northwest Power Planning Council plan for the subbasin. Fish managers believe the subbasin has significant potential for the natural production of spring chinook in the upper

Walla Walla River drainage and that it offers opportunity for hatchery supplementation and re-introduction (Columbia Basin System Planning, 1990). Fishery biologists consider a return of 2,000 adults to be a reasonable natural production objective. An estimated 61 stream miles of habitat for spring chinook rearing and spawning are present in the entire Walla Walla River basin (Corps, 1992b). Hatchery production would be the basis for the reintroduction, and an adult trapping facility may be required if it becomes necessary to haul fish around irrigation-depleted reaches. The CTUIR Phase I spring chinook holding and spawning facility on the South Fork Walla Walla River was completed in mid-1997. It will be operated as part of the Umatilla River Spring Chinook Program, and the eggs will be transferred to the Umatilla River hatchery for rearing and release. If and when there is resolution of passage and flow problems which currently block the entrance of spring chinook into the system, and if funding is assured, facility operations will be increased to provide fish for the entire Walla Walla River basin.

Resident fish — Habitat degradation and poor water quality have also influenced populations of resident fish. These influences have resulted in the elimination of resident trout in the lower reaches of the Walla Walla River and its tributaries. The upper reaches and the headwater areas are fair to good habitat for salmonids and support a significant resident population of rainbow trout, bull trout, and mountain whitefish. Dace, suckers, and other non-game species are present. An ODFW stocking program was discontinued in 1994 due to potential effects on native fish. The South Fork provides the highest-quality habitat. There is some concern that the bull trout have experienced a significant loss of connectivity among habitats.

WILDLIFE RESOURCES

Uplands — Large mammals such as Rocky Mountain elk, black bear, mule and white-tailed deer, coyote, mountain lion, and bobcat are common in the uplands, as are furbearers such as beaver, river otter, mink, and raccoon.

Ruffed grouse, woodpeckers, a variety of raptors, dippers, other aquatic bird species, hummingbirds, and dozens of songbirds inhabit the upper drainages. There have been 277 bird species recorded in Walla Walla County, Washington, and most of these, with the exception of some aquatic birds, are likely to be found in the upper Walla Walla River subbasin.

Lowlands — Increased human activity has resulted in shifts of dominant wildlife species. At lower elevations, riparian and upland habitats have been replaced by intensive agriculture, with the concurrent elimination of many of the wildlife species that once occurred there. Wildlife species found at lower elevations include white-tailed and mule deer, ring-necked pheasant, California quail, mourning doves, and a variety of songbirds and small mammals. Remnant riparian zones usually provide the only remaining significant wildlife habitat. In 1992, of those inventoried streams in the Walla Walla River basin in Oregon, 70 percent of the riparian zone is classified as in poor condition (Corps, 1992a). Wildlife species that persist are tolerant of disturbed and fragmented habitats and able to utilize adjacent agricultural lands.

COMMODITY PRODUCTION

Agriculture — Agriculture and its related trades and industries are the economic base for the area. Production of a number of important food crops has led to the development of a large food processing complex in the valley. Several canning and frozen food plants serve the processing needs of the area. These plants process a variety of fruits and vegetables, including up to one-third of the national output of green peas. In addition, several plants process grain for livestock and poultry feeds.

There are about 133,000 acres of cropland. Grains, predominantly wheat, account for about 50 percent of use (67,000 acres) and are grown on the higher dry-farmed lands, often in rotation with peas. Green peas (with a minor amount of other vegetables) account for 13 percent (17,600 acres) and are grown extensively on drylands where rainfall is adequate. Commercial vegetable production extends from Milton-Freewater to Walla Walla and fruit production is concentrated north of Milton-Freewater (together, about 9 percent; 11,800 acres). Other agricultural uses include pasture (8 percent; 11,200 acres); alfalfa and other hay (7 percent; 10,000 acres); and idle and fallow land, usually in rotation with wheat (about 11 percent; 15,200 acres).

There are about 28,000 acres of irrigable land on the Oregon portion of the river basin. Of these, about 14,000 acres are irrigated from surface flows and shallow wells and about 12,000 acres are dry-farmed. About 2,000 acres are served from deep wells.

The U.S. Department of Agriculture (USDA) determined in 1962 that of about 125,000 acres of grazing land, open rangeland represented almost 70 percent (86,300 acres) and forested land the balance (38,800 acres). Although agricultural practices have improved through increased soil conservation methods, there is still a loss of topsoil and a degradation of croplands in a number of areas. Downcut streams are limiting sub-irrigation. The drawdown of the basalt aquifer is threatening irrigated agriculture in several areas where pump lifts are approaching 1,000 feet. There is a shortage of late-season irrigation water in Dry, Pine, and Couse Creeks. Water losses in irrigation ditches are also a concern; because of its length, some of the largest losses are in the Hudson Bay Ditch, which is normally dry during late summer.

Livestock — Livestock production is important in the valley. The majority of the livestock industry in Umatilla County takes place at the western end, centered around Hermiston. It is estimated that the upper Walla Walla subbasin supports about 15 percent of the county's cow-calf operations (about 4,800 pairs), mostly on irrigated pastures. There are some feed lots in the subbasin. Much of the feed provided the cattle in the county is by-product from crop processing, the great majority of that from potato waste, but the by-products of vegetables processed in the Walla Walla River basin are also utilized.

The slopes of the Blue Mountains are steep, so grazing opportunities on public and private lands are limited. There is virtually no grazing activity on Federal lands in the North Fork and South Fork watersheds. At the very upper end of the South Fork, on the breaks, there is a small amount of use on U.S. Forest Service (USFS) land by sheep from allotments on the eastern side of the Blue Mountains. The Bureau of Land Management (BLM) has several scattered tracts in the upper Walla Walla River subbasin, but none are grazed.

Timber — Forested land in the subbasin is about 88,200 acres. Of this total, national forests comprise about 54 percent (48,700 acres), private holdings about 43 percent (37,900 acres), and State and local government less than 3 percent (1,560 acres). Beginning in the mid-1920's, private lands supplied the majority of the logs; significant harvest from national forests began after World War II. Through the 1990's, private lands were logged at a higher rate than the national forest. The USFS has proposed a "salvage and fire-break" timber sale on the ridges dividing the upper North Fork, upper South Fork, and Mill Creek watersheds. There is concern about how the removal of timber and related activities could affect water quality and seasonal flow regime.

Timber harvest, contract logging firms, and sawmills also contribute to the economy. The Port of Walla Walla has lumber and paper pulp production facilities. There has been some timber harvest on national forest lands in the North Fork watershed but not much on the South Fork watershed. There are limited opportunities for reforestation by planting or natural growth on the steep-slopes of canyons of the Blue Mountains; these limitations increase the likelihood of problems with sedimentation. There are strong concerns about the potential negative affects of timber harvest on water quality and quantity. Some timber harvest continues on private lands. Many of the forested hillsides are too steep for logging under Oregon forest practices laws and regulations. Extensive logging has occurred on the plateau of the Blue Mountains.

4. FACTORS AFFECTING RESOURCE VALUES

UPLANDS

Issues — Watershed conditions are heavily affected by past activities. Logging and grazing have affected the vegetation in the upper subbasin to varying degrees. The subbasin's soils are susceptible to erosion. In some areas, dryland farming yields large amounts of sediment.

Weed infestation is a major problem in both upland and riparian areas. Weeds are reducing the watershed's capability to adequately hold and release water. The yellow starthistle (*Centaurea solstitialis*) invasion is the worst weed problem. Pine Creek has the most infestation; a control program is needed before the whole canyon is infected. Dry and Cottonwood Creeks have bad infestations; the problem in Cottonwood Creek is being fought, but a bigger effort is needed in Dry Creek. In the Dry Creek area and south, common crupina (*Crupina vulgaris*) is a problem. Leafy spurge (*Euphorbia esula*) is found throughout the subbasin, but is not as significant a problem as yellow starthistle. There is a leafy spurge control program underway in Pine Creek.

Opportunities — Perennial grasses are recommended to replace weeds in areas of infestation. Such grasses could be either native or commercial (such as Covar® sheep fescue), with the selection based on availability and cost of seed. The treatment programs should be coordinated among neighboring landowners.

Participation in the USDA Natural Resources Conservation Service (NRCS) Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), and Environmental Quality Incentive Program (EQIP) could provide benefits to landowners. Under CRP, land with a high risk of erosion is planted with long-term, resource-conserving covers to improve soil, water, and wildlife resources for soil protection. EQIP emphasizes broader environmental concerns than CRP, including categories such as soil erosion, water quality, and wildlife cover, especially for species which are threatened or endangered.

Actions and Effects — The Umatilla County Weed Control District (WCD) has implemented a study and treatment program for common crupina. A yellow starthistle control program is ongoing, with ODFW and the Umatilla County WCD partnering with landowners. The Council began taking an active role in this program in spring 1999. The NRCS has local enrollment in the EQIP and other agency incentive programs. The Council has been assisting with the construction of grazing management fencing for rotation and exclusion.

LIST OF ACTIONS RELATING TO UPLANDS
(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")

C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning

G&O	ID	Status	Project Description
F-8	97–09	O	**Noxious weeds program**. Cooperators: about 7 landowners, Umatilla County WCD. Fall 1997–present.
F-8	98–36	P	**Yellow starthistle control and eradication program**. Cooperators: landowners, ODFW, Umatilla County WCD. Spring 1999.

RIPARIAN AREAS

Issues — Riparian conditions are generally good in the high elevation headwaters. Cultivation, domestic livestock grazing, and flood control activities have reduced riparian vegetation throughout much of the mid- to low-elevation reaches of the subbasin. Riparian zones have suffered from water yield and adversely altered timing of yield, resulting in destabilized streambanks and stream channels, increased sedimentation and water temperatures, and decreased fish cover and food availability.

There are also negative impacts by wildlife. Several landowners reported that following installation of fences to prevent livestock grazing in the riparian areas, opportunistic wildlife — deer and beaver — consumed the vegetation before it took hold, and downcutting continued. There also have been concerns about the potential incursion of beaver into orchards along the North Fork and the South Fork.

Many streams have rocky bottoms and unstable soils, making establishment of quality riparian plant communities difficult. This is particularly true of areas adjacent to artificially constrained or channelized portions of streams, and it is especially true of the North Fork, Dry Creek, and upper Pine Creek watersheds.

There is a lack of willow, alder, and cottonwood on much of the private land. The loss of willow is of particular concern because it helps stabilize cottonwood trees and stream banks, reducing the energy of high-flow events. Beaver are damaging riparian vegetation in some areas where riparian corridors are narrow or vegetation is limited, or both. There is limited natural woody debris throughout the subbasin.

Some sections of the North Fork and of Couse Creek are particularly lacking in riparian vegetation. Couse Creek riparian areas are in poor condition from the end of the road to a point about 5 miles further upstream.

Efforts to protect riparian areas are having only limited success. Landowners express frustration with recent high flows that washed out riparian projects and the lack of coordination with and cooperation from other land users.

Opportunities — It is generally acknowledged that the best solution to problems of riparian restoration is a total drainage basin management approach — from ridge-top to ridge-top. This is true for individual watersheds, and the entire upper Walla Walla River subbasin. Healthy watersheds catch and store precipitation. Properly managed vegetation dissipates the energy of the water, slowing the flow to the stream channel, releasing the stored water to the stream channel, and allowing more water to enter the soil and percolate down into the aquifer. Less sediment enters the stream to degrade water quality. More of the precipitation falling to the ground is available to contribute to late season streamflow, and high early season runoff is reduced. Healthier, more vegetated riparian areas would improve resource conditions for a variety of uses for local landowners.

Changes in grazing practices along upper Couse Creek and Dry Creek from the Highway 11 crossing downstream could provide such benefits as increased cattle production and improved stream quality.

On an individual basis, the highest priority areas for riparian restoration are on lower Dry Creek, Couse Creek, and the North Fork. The next level of priority is for areas on Pine Creek and on the main stem levees. More woody material is needed. Both riparian and upland grazing practices need to be modified. Rotational grazing should be implemented where appropriate. More out-of-stream watering opportunities for cattle can be developed. Larger riparian buffers would help improve riparian areas. Once appropriate vegetation has been sufficiently reestablished in the upstream riparian areas, the reintroduction of beaver with their dam-building attributes could help limit the impact of higher-flow events, enhance wetland areas, and increase late-season flows; however, the animals would need to be monitored to prevent damage to orchards.

If bull trout and summer steelhead are listed under the ESA, the North Fork could become the highest priority. The North Fork has both candidate species, while Couse Creek has steelhead only, and Dry and Pine Creeks essentially have rainbow trout only.

Actions and Effects — Previously, the 6-mile-long levee reach through the city of Milton-Freewater was intensively devegetated (by cutting and spraying with herbicides). This activity was conducted by the Milton-Freewater Water [Flood] Control District and accounted for a significant portion of its annual budget. Management practices of the flood control district changed following the arrival of two Council members. Since spring 1997, vegetation has been allowed to reestablish itself within and along the levee; it is now in the seral (willow) stage. This is stabilizing the amount of sediment transported down the river, providing greatly improved habitat for fish and wildlife, increasing shade for the river water, and reducing the rate of heating. Long-term recruitment of large woody debris as shelter for fish has also increased. At the current rate of reestablishment, cottonwood can be anticipated to come back in 10–20 years.

Riparian restoration is also occurring at landowner project sites along the river supported by the Council, and State, Tribal, and Federal entities.

LIST OF ACTIONS RELATING TO RIPARIAN AREAS
(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")

C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning

G&O	ID	Status	Project Description
F-2	95–01	C	**Survey and assessment — lower Pine Creek**. Cooperators: landowners. Summer 1995.
F-2	97–06	C	**Bank maintenance/ habitat improvement, Couse Creek — Leona Shumway property.** Cooperators: landowner, CTUIR, NRCS, ODFW. Winter 1997–98.
F-2	98–01	C	**Cash Hollow cleanup**. Cooperators: city of Milton-Freewater, SOLV (Stop Oregon Litter and Vandalism). Spring 1998.
F-2	98–05	O	**Main Stem levee removal and wetland restoration — Clark & Lyla Lampson property**. Cooperators: landowners, Corps, CTUIR, NRCS, ODFW, and OWRD.
F-2	98–07	O	**Native plant production, planting and distribution.** Cooperators: Milton-Freewater Unified School District No. 7.

LIST OF ACTIONS RELATING TO RIPARIAN AREAS *(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")*			
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F-2	98–23	P	**Riparian restoration, Dry Creek — Dick Stewart property**. Cooperators: landowner, NRCS, ODFW, and CTUIR.
F-2	98–24	O	**Riparian restoration, Pine Creek — Reitmann property.** Cooperators: landowner, NRCS, ODFW, and CTUIR. Fall 1998–present.
F-2	98–26	P	**Riparian restoration, Main Stem — Strickland property.** Cooperators: landowner, NRCS, ODFW, and CTUIR.
F-2	98–27	P	**Riparian restoration, South Fork — Peterson property.** Cooperators: landowner, NRCS, ODFW, and CTUIR.
F-2	98–28	P	**Riparian restoration, Main Stem — Lawrence property.** Cooperators: landowner, NRCS, ODFW, and CTUIR.
F-2	98–29	P	**Pine Creek Fish Passage Barriers**. Investigate viable options for removal of and/or reduction in size of barriers and determine likely cooperator.
F-2	98–33	P	**Riparian canopy inventory**.

CHANNEL-SHAPING EVENTS

Issues — Flows are varied, due in part to a lack of natural (nonstructural) storage. There is too much development in the flood plain, putting property at risk and increasing channel restrictions. Levees are too close to the channel in many areas, constraining high flows and increasing erosion. Increased velocity and high runoff can adversely affect riparian areas. Riparian land is being lost in the upper river. Many landowners say they are having difficulty getting permits to do channel work to protect their property or to reestablish riparian corridors.

The river downstream from Milton-Freewater is subject to inundation damages. This area includes extensive, highly developed agricultural lands on which a relatively large food processing industry depends. The January 1965 flood peaked at Milton-Freewater at 9,000 cfs, the highest flow ever recorded there (Corps, 1992a). The preliminary estimate for the February 1996 high flows at Milton-Freewater is 8,000 to 9,000 cfs, considered to be a 125-year event (OWRD, 1997). There were no levee failures within the city limits, but levees were breached at numerous locations downstream from Nursery Bridge. There has been aggradation (gravel buildup) on the riverbed and there is concern that these deposits increase the potential for high flows to spill over the levees.

Several reaches of river were identified by the Corps as having need for flood control measures on the basis of the level of development in the flood plain; however, no specific actions have been identified. Three of these reaches begin at RM 50.3, the confluence of the North and South Forks. From this point, they extend:

- 2.8 miles upstream on the North Fork (to the location of a once-proposed storage reservoir)
- 2.8 miles downstream on the main stem to the Milton-Freewater levee
- 4.7 miles upstream on the South Fork to Flume Canyon

Riparian areas are being reduced throughout the basin; in recent times this reduction has been accelerated by high water events. Of particular concern is Pine Creek, where banks are collapsing in some areas, forming temporary silt dams. However, the floods of winter 1996 brought gains to upsteam fish habitat by dropping large woody debris and scouring out pools.

Many streams throughout the subbasin are downcut and channelized and no longer adequately connected with their flood plain.

Opportunities — Farmers upstream from Milton-Freewater report they have prevented damage from high flows by maintaining cottonwood trees as buffers on the river banks and establishing setbacks for their orchards; this approach could be expanded, but should include willows and/or other shrubs to stabilize the soil. Many property owners feel there needs to be institutional and regulatory changes to allow faster processing of permit requests for emergency in-stream work to protect their property. There should be increased outreach and coordination between permitting and natural resources agencies to educate landowners about the permit process and least-impact options for in-channel work.

Larger riparian corridors would help alleviate flooding by reducing velocity and increased late-summer flows, but caution must be taken to minimize conditions leading to aggradation of the riverbed and directing flows at downstream property. Removing levees in some areas could be considered; they could be moved back in other locations, especially the reach from Grove School to

13th Street, and possibly closer to town. The probable causes of the buildup of the gravel bars need to be determined and potential solutions examined. Removal of some gravel bars is a possibility, especially upstream from Milton-Freewater; but the next high water event could just refill the locations.

Actions and Effects — In the year following the removal of Marie Dorian Dam, there was downcutting within the ½-mile-long reach upstream. Increased awareness and enforcement of instream work regulations has reduced the disturbance of the riverbed which will also help stabilize the channel.

Gravel mining is now limited by the Oregon Division of State Lands to "newly recruited" materials. This takes place in only one area where mining historically has been (and currently is) permitted; this is a ¼-mile-long reach just below Nursery Bridge Dam.

LIST OF ACTIONS RELATING TO CHANNEL SHAPING EVENTS
(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")

C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning

G&O	ID	Status	Project Description
F-1	98–14	O	**Upland water storage ponds.** Cooperators: NRCS, ODFW, OWRD.
F-2 F-4	98–05	O	**Main Stem levee removal and wetland restoration — Clark & Lyla Lampson property**. Cooperators: landowners, Corps, CTUIR, NRCS, ODFW, and OWRD.
F-4	98–06	O	**Milton-Freewater levee setback**. Cooperators: Corps, Milton-Freewater Water Control District.

WATER QUANTITY

Issues — There are seasonal low flows in the North Fork, and Couse, Dry, and Pine Creeks. The North Fork would greatly benefit from increased flows from June through November, a period very important to rearing anadromous salmonids. Irrigation needs would also benefit from increased flows. Reduced flows during the spring of some years might enhance spawning conditions and also reduce bank erosion. The greatest needs for improved fish-attraction flows are in the main stem, the North Fork, and Couse Creek.

The Hudson Bay Road crosses over Pine Creek about stream mile 7. An in-stream concrete pad has created a barrier to fish. This grade-control structure was built to protect the bridge abutments, but a 15-foot drop has developed on its downstream end. In the near future, the aquatic ecosystems in Pine and Dry Creeks might not sustain salmonids because of this grade-control structure and because of low flows.

Average monthly flows in the South Fork are never below the instream levels recommended. Flows in excess of those required for optimum spawning and rearing occur in all months except for those in the summer (Corps, 1992a).

Average monthly flows in the main stem upstream from the Little Walla Walla River Diversion Dam appear adequate for spawning and rearing. However, one of the primary factors limiting fish production is flow reduction downstream from the diversion related to irrigation withdrawals, which use much of the water in the subbasin.

Oregon water permits currently exceed available streamflow, and under OWRD administrative rules waters within the subbasin are currently closed to further irrigation appropriations. Because of the unique soil and gravel characteristics of the subbasin, the 1930 Walla Walla River Adjudication decreed that there be no duty on surface water rights (post-decree water rights are limited by duty). Thus, there is no legal reason for those with adjudicated rights to conserve water. Usually, water rights with a priority date after 1903 are cut-off from diversion by summer. Washington irrigation water is also over-appropriated. Without an interstate agreement, streamflows added in Oregon would be subject to irrigation withdrawals after crossing the State line.

The Little Walla Walla River diversion, along with others, depletes flows in the main stem. In dry years the problem usually begins in May. The remaining flows between the Little Walla Walla River Diversion Dam and the Nursery Bridge diversion are regulated to 14 cfs during the summer. By May or early June, the Walla Walla River is usually dry from the Nursery Bridge Diversion Dam downstream until flows from springs and return flows from irrigation enter the river. A contributing factor to the low flows downstream from Milton-Freewater is the existence of the major alluvial deposit, which acts as a giant sink. Reduced flows downstream from the diversion dams greatly affect fish migration.

Levees also contribute to reduced late season flows. Hard surfaces cause the water to shoot on through instead of the water soaking into the riverbanks.

The first priority of CTUIR is flow augmentation for the out-migration of anadromous fish, especially the April–May steelhead run. CTUIR's position is that improvement in conditions for

adult chinook will also benefit the smolts. Smolts also begin out-migration in April, with the peak period in May. Other fishery agencies also place steelhead production as their primary priority for enhancement in the Walla Walla River.

CTUIR's second priority is flow augmentation for upstream migration of spring chinook during the critical May–July window; by this time, irrigation diversions are usually underway, dewatering the main stem. If salmon are reintroduced, a trap-and-haul program may be the most feasible short-term opportunity for action.

It has been CTUIR's position that a 150 cfs flow is appropriate in the lower main stem to allow the March–May upstream migration of spring chinook. This amount is usually not available from June through October due to water withdrawals from the main stem into the Little Walla Walla River irrigation system. This flow level was based on professional judgement of salmon needs, interpretation of flow observations reported in historic journals, and the limited contributions from rivers and creeks in Washington State to flows in the lower main stem.

A critical reach of the river is from RM 38 to RM 46 — from Yellowhawk Creek to the Little Walla Walla River diversion. The Corps has completed a reconnaissance-level study of this reach to estimate the flows which would permit in-migration for spring chinook (Corps, 1997). As criteria, the Corps set velocity at 4.8 meters per second (≈15.75 feet per second or ≈10.7 miles per hour) and water depth of 0.3 meters (1 foot). These are generally accepted standards for chinook salmon (the "Oregon Method"). Temperature range criteria is 3.3 to 13.3 °C (≈38 to ≈56 °F).[4]

Adequate location and flow records exist for the gravel wells in Oregon, and these records have shown that the wells mostly have fairly stable water-level trends. However, recharge of the shallow aquifer has decreased because of conversion from flood to sprinkler irrigation. There is a high degree of hydraulic continuity between the gravel aquifer and local rivers and streams, and development of the gravel aquifer has dried up springs and reduced streamflows. Further development will lead to still greater reductions in flows. Downcut streams have led to decreased bank storage and further reduction in streamflows.

Significant declines have been observed in wells that draw from the basalt aquifer system. These declines have been evident since pumping began in the 1940's; however, since the early 1970's, the rates of decline have reduced. Additional development from the basalt aquifer system will reduce ground-water discharge to the Columbia and Snake Rivers and will likely result in continued ground-water level declines.

Opportunities — There is a great need to focus on improving instream flows, now that issues of passage barriers and habitat enhancement are being addressed. The resources of the community and participating agencies should be used to examine the possible implementation of larger projects. These possibilities include off-stream water catchment, irrigation water pumped up from the Columbia River, irrigation water delivery by pipe rather than canal and ditch, and a groundwater recharge program to decrease pressure on surface water use. Individually and in combination, these and other activities could bring increased flows for water quality and fisheries concerns.

4 When the original data was on a single temperature scale, conversions have been provided.

Conservation of agricultural water is a potential method of reducing late-season shortages of irrigation water and augmenting instream flows. Under Oregon's conserved water statute, irrigators are eligible for public funds to assist them in implementing conservation projects. A portion of the saved water would be left instream, and a portion could be transferred, leased, or sold to other lands. Greater awareness as to the availability of these funds is needed, including eligibility requirements and application procedures.

The major channel losses downstream from Milton-Freewater should be investigated. There may be opportunities to reduce them without significant adverse effects.

There may be opportunities to physically store 4,000 to 5,000 acre-feet of water at potential off-stream reservoir sites in Pine or Dry Creeks, or both. Water could be used directly in those drainages, included in a water exchange program to benefit neighboring drainages, or both.

Small spreader dams (1 to 2 feet tall) or terraces could be used to store water at small off-stream sites in the uplands.

The vast network of canals and ditches lends itself to creative water exchanges and changes in points-of-diversion that could potentially focus flows in selected portions of the subbasin, especially the braided channels downstream from Milton-Freewater. An example of such an exchange would be providing the Hudson Bay Ditch users with water from springs closer to their delivery area and leaving their water in the river.

Consolidation of diversions within the Walla Walla River Irrigation District (WWRID) may improve flows in certain reaches. At the Eastside Diversion, planning for a two-phase piping project is in progress. Phase 1 involves installing two 1-mile segments of irrigation-water pipe bearing east then north from the present point-of-diversion (POD) at 8th Street. Phase 2 involves adding a 1-mile-long pipeline from the Little Walla Walla River downstream about 1 mile to the 8th Street POD.

Upstream, a filing has been made with OWRD for an additional diversion for Milton Ditch to be located at the Little Walla Walla River diversion. Once approved, this action would consolidate the Little Walla Walla River irrigation system, including the Hudson Bay District Improvement Company (Hudson Bay DIC) system. Once completed, the present diversion at Milton might be eliminated.

Flow measurement capability needs to be increased. OWRD operates three gauges along the upper Walla Walla River (table 2) and believes that a fourth gauge, located on the south end of the city and east of Grove School (about RM 46.5), would provide a significant contribution to flow data (OWRD, 1997).

There is increasing focus on water conservation. WWRID is developing a district-wide comprehensive water conservation plan, with support from Reclamation. Hudson Bay DIC, also with support from Reclamation, is working on a variety of techniques to reduce water loss in its laterals, including pipe installation.

Water could also potentially be piped from the Columbia River to lands served by Pine Creek, Dry Creek, and the Hudson Bay Ditch; this could be in exchange for upstream rights being left instream (similar to the Umatilla Basin Project). A hydroelectric generating system might be installed on the downhill side to defray some of the pumping costs.

The alluvial aquifer could be recharged with spring runoff. This action might extend the time period before the river downstream from Milton-Freewater goes dry. Also, irrigation water could be provided from shallow wells; this water might be exchanged with surface water rights during a portion of the irrigation season.

Actions and Effects — OWRD is now requiring water-flow measurement devices at all surface water diversions on the river.

LIST OF ACTIONS RELATING TO WATER QUANTITY *(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")*			
C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning			
G&O	**ID**	**Status**	**Project Description**
F-5	94–03	C	**Instream water rights lease, Couse Creek — Larry Williams property**. Cooperators: landowner, Oregon Water Trust, Inc. Initiated 1994. Agreement was finalized Fall 1998.
F-5	98–10	O	**Irrigation efficiency programs**. Cooperators: Hudson Bay District Improvement Co., Walla Walla River Irrigation District, Corps, CTUIR, OWRD.
F-5	98–11	O	**Irrigation system flow monitoring**. Cooperators: Reclamation, OWRD, GWEB. Application for continued funding has been made.
F-5	98–12	O	**Instream flows**. Cooperators: landowners, Oregon Water Trust, OWRD.

WATER QUALITY

GENERAL ISSUES — Water quality in the upper Walla Walla River subbasin headwaters can be characterized as being fairly good year-round and the same in the lower subbasin between irrigation seasons. However, water quality in the lower subbasin declines rapidly after diversions for agriculture begin. Four streams in the subbasin streams are on the Oregon Department of Environmental Quality (ODEQ) "303(d)" list (water-quality limited); these are shown in table 1. There is a desire locally to do what is necessary to have the streams delisted.

TABLE 1. WATER QUALITY LIMITED REACHES, WALLA WALLA SUBBASIN

Name [1] *Segment No.*	Description	Parameter	Comments
Mill Creek *28A-MILLO*	[2] From Washington border upstream to Tiger Creek (a decrease in segment length from 1994–96)	[3]Temperature: Bull trout (summer)	USFS data (site at water intake): 7-day average of daily maximum of 60 °F (1997) and 56.2 °F (1998) exceeded bull trout temperature standard of 50 °F in 1992/93. Additionally, Washington State has listed Mill Creek for temperature.
Walla Walla R. *28A-WALLO*	Mouth to confluence of North and South Forks	[3] Temperature — summer	The rearing temperature standard is 64 °F. Data taken at CTUIR site (RM 47.0). In 1993, the 7-day average of daily maximums was 67.3 °F (for 29 days). In 1994, the 7-day average was 70.3 °F (for 69 days).
North Fork Walla Walla R. *28A-WANFO*	Mouth to headwaters	[4] Flow modification	Steelhead have been reduced to a small fraction of their former abundance in part due to irrigation diversions (CTUIR, 1990).
North Fork Walla Walla R. *28A-WANFO*	Mouth to headwaters	[3] Temperature: Bull trout (summer)	CTUIR data (site at North Fork RM 6.0): 7-day average of daily maximum of 68.5 °F in 1993. Site at USFS boundary for 1995 was 64 °F and 1996 was 63 °F. Both sites exceeded bull trout temperature standard (50 °F).
South Fork Walla Walla R. *28A-WASFO*	Mouth to headwaters	[3] Temperature — summer	CTUIR data (site at South Fork RM 7.0): 7-day average of daily maximum of 61.3 °F in 1994. USFS boundary in 1995 was 54 °F and in 1996 was also 54 °F. Both sites exceeding bull trout standard of 50 °F.

Source: Oregon Dept. of Environmental Quality; *Final 1998 303(d) List of Water Quality Limited Waterbodies* (www.waterquality.deq.state.or.us; September 3, 1999)

1. ODEQ data base identifier
2. A 4-mile-long reach of Mill Creek flows through Oregon
3. Seasonally adjusted standards; however, waters with Oregon bull trout are not to exceed 50 °F (10 °C) on a 7-day moving average of daily maximum temperatures.
4. "...Water shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological community."

The high-elevation, timbered headwaters of the subbasin generally are cool, clear, low in pollutants, and high in dissolved oxygen. High levels of nutrients and toxic substances could affect any salmon or trout in the mid and lower reaches of the river; however, these factors have not been extensively

investigated. Pollutant levels are likely higher in these reaches during low flow periods. There is a need for improved monitoring to better understand water quality problems.

General Opportunities — Governor Kitzhaber has initiated a statewide "Healthy Streams Partnership" to address the issue of non-point source pollution. These voluntary partnerships include a broad range of entities and interests in the private and public sectors. Listing the goals for water quality management area plans, the mission statement said

> "...individual landowners and community groups, for example, watershed councils, SWCD's [soil and water conservation districts], and interest groups, will be eligible for project funding to improve and monitor water quality while area management plans are being developed, and to share in the implementation of water quality plans."

The upper Walla Walla River *WAP* describes river issues and those projects in the planning stage or implementation.

Action and effects — The Council initiated water quality monitoring in the spring 1999.

SEDIMENT ISSUES — Sediment in the river is one of the two main water quality problems, along with water temperatures. Contributions come from mountain streams, agricultural lands, grazing lands, river bank erosion, and irrigation return flows. This sediment has degraded fish habitat by filling pools, creating a wider and shallower channel, and covering spawning gravel. Several hundred acres of important wetland habitat at the mouth of the Walla Walla River also have been lost or degraded due to silt deposition. The large delta that has developed at the confluence with the Columbia is a graphic illustration of the amount of sediment carried by the Walla Walla and Touchet Rivers. Weeds on steeper slopes and pastures, especially knapweed and thistle, are shallow-rooted and lack the soil retention capability of native grasses and plants.

The total amount of sediment delivered to the Walla Walla River system (Oregon and Washington) is estimated to be about 800,000 tons annually. Most of this sediment comes from sheet and rill erosion on cropland, although erosion from stream banks and roads is locally significant. The likelihood of reductions of the amount of land enrolled in the NRCS Conservation Reserve Program (CRP) on the Walla Walla River is putting that area at risk of increased erosion. Recreational four-wheeling is leading to sediment problems in a number of areas. The headwaters of Birch and Cottonwood Creeks are in Oregon but the mouths are in Washington; these creeks yield amounts of sediment (measured in tons per square mile per year) into the Walla Walla River comparable to the other watersheds in the upper subbasin (U.S. Geological Survey, 1969).

There is an ongoing effort to reduce sediment loads from irrigation by improving farming techniques. Many acres of highly erodible croplands have been set aside and planted with various grasses under CRP. Alone, these programs will not adequately address the yield of sediment from agricultural land, particularly from extensive dryland farming operations on mid-elevation uplands.

Currently, most of the spawning by anadromous fish is upstream from the highest sediment-affected areas. However, grazing in the North Fork and Couse Creek may contribute to some elevated sediment levels in potential spawning areas. The effects of sediment on spawning areas in the subbasin have not been assessed in any significant detail.

Sediment Opportunities — Participation in the NRCS programs (CRP, CREP, and EQIP) can provide benefits to landowners while also reducing erosion and sediment from production lands and range lands. Greater awareness about these programs is needed, including eligibility requirements and application procedures. Perennial grasses should be used to replace weeds in areas of infestation (see "Uplands Opportunities").

STREAM TEMPERATURE ISSUES — The temperature of the water is one of the two main water quality problems, along with sediment. Temperature is the most significant water quality parameter limiting anadromous and resident salmonid populations in the Walla Walla River basin. (For greater detail, see "Bull trout" under the section **Fish Resources** above.) For salmonids, depleted streamflows and summer temperatures elevate water temperatures to lethal levels in the lowland reaches from July-August until the end of the irrigation season (when fall precipitation increases streamflows). At mid-elevations within the subbasin, streamflows generally are low and have elevated temperatures. Contributing factors include the extensive loss of riparian vegetation and irrigation diversions. In addition, the slower movement of water results in higher water temperatures, particularly in the lower reaches of the river basin.

The upper limit for preferred water temperatures for juvenile salmonids is approximately 58 °F (≈14.5 °C). On a sustained basis (24 hours or longer), temperatures greater than about 68 °F (≈20 °C) are considered unfavorable for anadromous species. This temperature threshold can be applied to both juveniles and adult salmon and to steelhead because of their similar temperature tolerances (Corps, 1992c).

Temperatures of 25–26 °C (≈77–79°F) are considered lethal to steelhead and salmon if maintained for a few days (Corps, 1992c). Such high temperatures would likely result in mortality and also would create habitat conditions that would result in secondary problems. These include increased incidence of disease, increased predation, delayed migration, and competition for rearing space from fish species that can tolerate higher water temperatures. These non-game fish include suckers, squawfish, red side shiners, and speckled dace.

Levees also contribute to higher stream temperatures, a result of the rock absorbing heat from the sun and from the lack of shade on those banks.

Upstream from the Milton Ditch diversion, high water temperatures do not appear to be a major problem, although data are limited. However, even in the headwaters of the Walla Walla River, such as the lower North Fork, temperatures can reach 72 °F (≈23 °C) in August.

The average of temperatures recorded once each August 1978–91 at the Milton Ditch diversion was 17.8 °C (≈64 °F). The highest temperature recorded was 23 °C (≈73°F). The maximum temperature in this area would be expected to be higher, but no continuously recorded information is available to determine the maximum.

Even with potential mitigation in the upper Walla Walla River, temperature problems will remain in the lower reaches of the river. From the Milton Ditch diversion dam downstream to the mouth, main stem water temperatures are too high for summer rearing of salmon or trout due in large part to near-zero flows from mid-June through October. Temperature data are fairly limited, but at the U.S.

Geologic Survey (USGS) gauge at RM 18.2 (downstream from the Touchet River), monthly data show that temperatures can rise above 68 °F (≈20 °C) by early June and continue into September. An extreme peak temperature of 83.1 °F (≈28.3 °C) has been recorded at the Touchet gauge.

Stream Temperature Opportunities — Increased monitoring of water temperatures at strategic locations could provide significant knowledge about reaches of rivers and streams, especially those critical for the needs of spring chinook.

Action and effects — By allowing the levee reach of the river to revegetate, shade has been provided for both the river and for the heat-absorbing rocks along of the walls of the levee.

LIST OF ACTIONS RELATING TO WATER QUALITY
(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")

C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning

G&O	ID	Status	Project Description
F-7	95–03	C	**Runoff abatement**. Cooperators: landowners, NRCS.
F-7	95–04	O	**Runoff abatement — Dick Piper property.** Summer 1995.
F-7	98–17	O	**Storm drain marking.** Cooperators: ODFW, Milton-Freewater Elks Lodge No. 2146.
F-7	98–19	O	**Groundwater study**. Cooperators: county residents, city of Milton-Freewater, Umatilla County Planning Department.
F-7	98–25	C	**Riparian restoration, Dry Creek — McIntire property.** Cooperators: landowner, NRCS. Fall–Winter 1998.
F-7	98–38	O	**Government Mountain Road improvement** (between North Fork Walla Walla and Cottonwood Creek). Cooperators: landowners, Oregon Dept. of Forestry. November 1998–present.
G	94-01	O	**Monthly meetings**. Summer 1994–present.
G-1	95–02	C	**Community education —** Cooperators: Adopt-A-Stream Foundation.
G-1	96–03a	C	**Watershed inventory and stream monitoring, Couse Creek**. Cooperators: landowner, Milton-Freewater Unified School District, Adopt-A-Stream Foundation. Summer 1996.
G-1	97–04	O	**Natural resource studies**. Cooperators: Milton-Freewater Unified School District No. 7; ODEQ. Summer 1997–Fall 1998.
G-1	97–05	C	**Bank maintenance, (former) Marie Dorian Diversion Dam.** Cooperators: Milton-Freewater Water Control District, CTUIR, ODFW. Winter 1997–98.
G-1	98–11	O	**Irrigation system flow monitoring**. Cooperators: Reclamation, OWRD, GWEB. Application for continued funding has been made.
G-1	98–30	P	**Water quality monitoring**. Cooperator: ODEQ.
G-3	98–30	P	**Water quality monitoring**. Cooperator: ODEQ.
G-3	98–35	P	**TMDL (total maximum daily load) reduction**. Cooperator: ODEQ.

ISSUES ABOUT OTHER POLLUTANTS — Applications of pesticides, herbicides, and fertilizers in cropland areas might have affected water quality to varying degrees, depending on how they are used. There is non-point source pollution from agricultural fields. Levels of total nitrates, ammonia, and phosphates appear somewhat elevated due to point and non-point sources, although natural background levels are not known. Comparisons between 1972–74 and 1986–91 data do not reveal any major changes in these parameters over the last 20 years, although upgrading of sewage treatment plants in Walla Walla, Waitsburg, and Dayton has reduced nutrient inputs from these point sources. However, levels of ammonia and nitrates in the Walla Walla River are considerably less than observed "LC-50 values"[5] for chinook and the recommended 4-day average ammonia concentration of salmonids.

Minor amounts of herbicides may be carried into irrigation ditches from limited applications along road banks. Pesticides are labeled with restrictions limiting their use near water. The irrigation ditch system doubles as a storm runoff system for the city of Milton-Freewater. It is likely that urban and residential uses of pesticides, herbicides, and fertilizers enter the surface-water and ground-water systems. Contaminants from city streets end up in irrigation ditches and eventually the river. There are 16 points where the city delivers untreated runoff to irrigation ditches.

A high water table combined with heavy population concentrations in upriver areas has led to some fecal coliform problems.

Because the gravel aquifer underlying the river basin is shallow, it is susceptible to degradation from agricultural chemicals and septic systems. Initial evaluations of an ongoing well-testing program in the Milton-Freewater vicinity indicate the presence of coliform and nitrate slightly above naturally occurring levels, but below the 5 ppm level of concern of DEQ and substantially below the U.S. Environmental Protection Agency maximum contamination level of 10 ppm. The testing program and analysis is not complete.

Opportunities for Other Pollutants — Improvements could be made to the Milton-Freewater sewer system; some possibilities are rural feeder and trunk lines and a separate storm runoff system.

Actions and Effects — The city is working on a stormwater plan. Careful monitoring of irrigation delivery systems will reduce or even eliminate return flows. By marking storm drains within the city of Milton-Freewater, it is hoped that the dumping of waste will be reduced or eliminated.

5 This is the lethal concentration of a chemical which will cause a 50 percent mortality of fish within a specified time period, usually from 24 hours to 4 days.

FISH HABITAT

Issues — There is a need to improve instream habitat for adult holding and juvenile rearing. The river system now supports only a limited steelhead run and some resident trout. The predominantly "rill" (small stream) habitat and general lack of instream habitat diversity limits smolt production capacity. Habitat has been affected by land management and stream alterations for various reasons.

There are extensive spawning gravels in the alluvium of the main stem Walla Walla River and its tributaries. Steep headwater topography contributes to rapid runoff and bedload movement that limit fish production in some areas.

In the upper North Fork drainage, steelhead habitat has been affected by logging and road building. However, in the upper South Fork drainage, steelhead habitat is relatively unaltered.

There has been a considerable reduction in the trout fishery, primarily due to channel and riparian changes. The South Fork still supports a viable fishery and the reach upstream from the county park has been declared an "area of critical environmental concern" (ACEC) by the Bureau of Land Management. In an ACEC, special management attention is required "…to protect and prevent irreparable damage to important resources… ," in this instance, primarily fish values. The next reach upstream is a Forest Service "OHV" (off-highway vehicle) four-wheel drive recreation area. Beyond that, the Forest Service is working to maintain conditions.

Opportunities — The Council believes that a total approach to watershed restoration will substantially increase the availability of water, which will permit fish migration; until then, catch-and-haul will be the interim opportunity until passage and barrier problems are mitigated and the new CTUIR holding and spawning facility on the South Fork undertakes salmon production.

Actions and Effects — By allowing the 6-mile-long reach of the river bounded by levee to naturally revegetate there is now increased channel complexity, as well as more shelter for fish.

LIST OF ACTIONS RELATING TO FISH HABITAT
(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")

C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning

G&O	ID	Status	Project Description
F-8	98–33	P	**Riparian canopy inventory**.
F-9	98–25	C	**Riparian restoration, Dry Creek — McIntire property.** Cooperators: landowner, NRCS. Fall–Winter 1998.
F-9	98–32	P	**Annual community volunteer clean-up program.** Cooperators: SOLV (Stop Oregon Litter and Vandalism).

BARRIERS TO FISH PASSAGE

Low- or No-flow Barriers — Out-migration of juvenile fish is impeded by the existing conditions of naturally low summer streamflows and the lack of flow downstream from diversion structures. Irrigation diversions dewater stretches of river, and impede or block fish passage. It has been estimated that up to 50 percent of the steelhead run can be blocked from upstream passage in low-flow years. It is likely this would be an even greater problem for spring chinook salmon, because the latter part of the run typically migrates upstream during June and would have to compete for flows with irrigation withdrawals.

Physical Barriers — Two permanent, concrete irrigation diversion structures exist on the Walla Walla River, the Burlingame and Nursery Bridge Dams (see figure 2 and table 2). The Marie Dorian Dam already had been slated for removal, but when undermined by spring floods most of the structure was removed in April 1997 by ODFW, CTUIR, and Bonneville Power Administration (BPA). The actions being taken regarding known barriers to passage are listed below; these are either in planning or have been implemented.

- On the main stem in Washington State, the Old Lowden pushup diversion (RM 29.2) is a barrier. During low flows, passage is limited for the pushup diversions Garden City (RM 30.4), Lowden No. 2 (about RM 30.7), and Bergevin/Williams (about RM 31.2); consolidation of the three barriers is being considered.
- There is no operable fishway on the Burlingame Diversion Dam (RM 36.0); adult fish passage is impeded at all flows and can be blocked during low flows. Gardena Farms Irrigation District No. 13, the owner-operator of the dam, is working with CTUIR, WDFW, and BPA to upgrade the facility. A fish ladder was installed fall-winter 1998–99. A modification is underway to address low-flow passage problems for adult fish.
- Nursery Bridge Dam (RM 44.5) has effective adult fish passage facilities with adequate streamflow but better fish-attraction flows are needed at the ladder entrance; most years the entire river is diverted from July through September, dewatering about 3 miles of the river through Milton-Freewater. The Nursery Bridge Dam and ladder structure is slated for reconstruction during summer 2000.
- The Frost Ditch intake (RM 44.5) needs to be screened. This will be part of the Little Walla Wall River diversion consolidation, a joint project of CTUIR and Reclamation. This project will serve Milton Ditch (which partially obstructs fish passage to Couse Creek), Eastside Ditch, Frost Ditch, and Smith Ditch.
- The Smith Ditch diversion (RM 45.0) needs to be screened. This will be part of the Little Walla Wall River diversion consolidation.
- The Walla Walla River Diversion Dam (RM 45.9) impedes fish passage at low streamflows; a low-flow ladder is needed. Also needed are a protective facility at the mouth to prevent adults from entering the irrigation system, an improved smolt trapping capability for a trap-and-haul program during low flow periods, and development of a juvenile release site in the lower river associated with this program. The Little Walla diversion is being reconstructed with a new fish screen which meets ODFW and National Marine Fisheries Service (NMFS) standards.
- The 6-mile reach of river downstream from Nursery Bridge is usually dry from July through September, a result of irrigation diversions. Until appropriate flows can be reestablished, a catch-and-haul is likely the only program which will provide passage for migrating fish.

- The grade-control structure about mile 7 on Pine Creek is a barrier to fish and has been identified by Umatilla County SWCD for removal. However, because of lack of funding sources and anticipated high costs, it is a low priority.

If spring chinook are reintroduced to the river basin, a trap-and-haul program would have to be implemented to capture the fish and transport them above the low-flow problem areas. Additional attraction flows in the lower river would be necessary for a trap-and-haul program to work effectively. In order to minimize stress on in-migrating spring chinook that would be subject to a trap-and-haul program, they should travel upriver as far as possible. The Corps feels that trap-and-haul could be limited to an 8-mile reach of the main stem, from RM 46 (the Little Walla Walla River diversion) downstream to RM 38, where Yellowhawk Creek enters the main stem. The Corps has completed a reconnaissance-level study of this reach to estimate the flows which would permit in-migration for spring chinook (Corps, 1997).

Actions and Effects — If resources are available, the results of the above actions will be monitored and included in the *WAP* when it is revised.

TABLE 2. INVENTORY OF STRUCTURES AND LANDMARKS ON THE WALLA WALLA RIVER	
River mile	**Structure/Function**
18.2	USGS gauge 14018500 (3.4 miles downstream from Touchet River)
23.4	Pine Creek enters main stem (L)
29.4	Old Lowden diversion; pushup (R); diverts into a short ditch and water is pumped upward about 15–20 feet
30.4	Garden City diversion; pushup (L)
30.7	Lowden No. 2 diversion; pushup (L)
31.2	Bergevin/Williams diversion; pushup (R)
33.6	Mill Creek enters main stem Walla Walla River (R)
33.7	Return — West Prong [branch] Little Walla Walla Rivers rejoins main stem (L)
36.7	Burlingame Diversion Dam; permanent, concrete
37.5	Return — East Prong [branch] Little Walla Walla River rejoins main stem (L)
38.0	Yellowhawk Creek enters main stem (diverted from Mill Creek below dam)
	Downstream end of 8-mile reach investigated by Corps for, among other matters, the use of the existing irrigation system for fish migration (Corps. *Walla Walla River Watershed, OR and WA, Reconnaissance Report, October 1997).*
40.0	**Oregon-Washington State border**
42.4	Downstream end of Corps levee project. Upstream from this point, there are about 2.1 miles of levee on the east bank to protect the city and 1.7 miles of discontinuous levee on the west bank to protect selected locations.
42.4	Tumalum Bridge
44.5	Nursery Bridge Diversion Dam; permanent, concrete. A fish ladder on the left side is scheduled to be replaced with a new ladder on the right side as part of Corps changes and upgrades of the levee system.
	Levees were rebuilt or constructed on both banks for over 2 miles upstream from the Nursery Bridge
	UP Railroad Bridge across river, Milton-Freewater
44.5	Eastside diversion; pushup (R)
44.5	Frost Ditch intake (L); no screen; supplemental water used March–May; original POD for Hudson Bay Ditch
45.0	Smith diversion; pushup (L)
0.2 miles west of 44.9	"The Frog" 50 yards north of the "dead end" of NE 9th St. Three headgates (from left to right, looking downstream): Hudson Bay Irrigation Company; Ford Ditch (the West Prong Little Walla Walla River); and Crockett Ditch (the East Prong Little Walla Walla River).
45.9	Little Walla Walla River diversion fish screen (L). Does not meet ODFW or NMFS standards; in progress for replacement by BPA and CTUIR.
	Cemetery Bridge at SE 9th Street
	Little Walla Walla River point of diversion and headgate (L)
	On Little Walla Walla River, 0.2 miles downstream from headgate, former USGS gauge 14012100, now operated by OWRD
46	Upstream end of 8-mile reach investigated by Corps for, among other matters, the use of the existing

TABLE 2. INVENTORY OF STRUCTURES AND LANDMARKS ON THE WALLA WALLA RIVER	
River mile	**Structure/Function**
	irrigation system for fish migration
(continued on next page)	
(continued from previous page)	
47.0	Milton Ditch diversion; pushup (L) begins in mid-river; non-conforming fishscreen 0.1 mile down canal
	Couse Creek enters Walla Walla River (L). Migrating fish swim upstream past the Milton Ditch diversion, enter a backwater channel parallel to the river, then swim 30 yards to Couse Creek
47.1	Site of decommissioned USGS gauge 14011500 (1918–1929)
47.6	Site of former Marie Dorian Diversion Dam, removed in April 1997. There are concrete remnants on both banks, which create no barrier and are to be removed as part of the Corps's Nursery Bridge fish ladder project
	Marie Dorian Park (city of Milton-Freewater); site of defunct city hydroelectric plant, which was fed by (a still existing) penstock from (defunct) sidehill flume
	Headgate (L) of former underground city flume.
48.5	Upstream end of dike system
50.3	Main stem formed by confluence of North and South Forks
57	CTUIR Phase I steelhead holding and spawning facility (space reserved for spring chinook rearing and release)
58.3	Upstream end of Umatilla County's Harris Park; road closure at entrance to BLM land
59.1	Former USGS gauge 14010000 (1931–1991); now operated by OWRD
North Fork 1.2	Former USGS gauge 14010800 (1969–1991); now operated by OWRD
Looking downstream — (L) = left side of river; (R) = right side of river	

Figure 2. Existing Irrigation Conveyance Facilities (11” by 17” fold-in)

AGRICULTURE

Issues — Cropland farming practices over the past 135 years in the Walla Walla River watershed have resulted in changes in cover which have increased erosion rates. Loss of valuable top soils, reduced water infiltration rates, reduced water retention capabilities of soils, and increased rapid runoff rates have all contributed to reduced summer instream flows. Pesticides, herbicides, and fertilizers are applied to some degree in cropland areas. Limited testing of a few scattered wells provided limited indication of small amounts of nitrates in the ground water; there is no data on nitrates in surface water.

Irrigation diversions reduce available flow which can result in decreased spawning and rearing habitat. For example, the Walla Walla River from Milton-Freewater several miles downstream is typically dry during the period from May-June through October. The lack of flow in this reach eliminates a portion of the summer rearing habitat and potential spawning and incubation sites for steelhead. It has been noted that after major irrigation withdrawal is discontinued in the fall, it can take up to a month before surface flows are reestablished throughout this reach; this is because the large gravel aquifer needs to be recharged.

Opportunities — Some of the conveyance systems could be improved by installing pipelines or by lining ditches. Diversions could be consolidated, which would decrease infiltration and reduce physical barriers to fish passage. Increased adoption of various farming practices, such as conservation tillage, crop rotation, contour farming, strip-cropping, terracing, grass waterways, and use of filter strips and riparian buffers could provide benefits for the participating farmers and improve water quality. Participation in the NRCS programs (CRP, CREP, and EQIP) can provide benefits to landowners.

Actions and Effects — There has been some participation in CRP, CREP, and EQIP. The area of Umatilla County is about 1.65 million acres; the Walla Walla River watershed (in Oregon) is about 305,000 acres, approximately one-fifth of the county. Just over 82,000 acres county-wide are currently enrolled in the three programs. Therefore, it can be reasonably estimated that there are about 15,000 to 20,000 enrolled acres in the Walla Walla subbasin. Additional acreage is pending approval for the CREP program countywide, including about 505 acres for riparian buffers or grass filter strips and waterways.

GRAZING

Issues — Domestic livestock grazing activities have affected riparian and upland vegetation throughout much of the mid-lower elevation reaches of the subbasin. Overgrazing is a contributing factor to diminished quality and quantity of available livestock/wildlife forage, increased erosion and surface-water runoff rates, reduced water-retention capabilities of soils, and increased sediment delivery to downstream areas. Inadequate grazing strategies and management, along with a lack of off-stream water sources, have resulted in livestock concentrations for long periods of time in riparian areas during the spring vegetative reproductive season, a time of vulnerability.

Noxious weed infestations such as yellow starthistle are common in many rangeland areas. Studies indicate that only 40 percent of rangelands with the problems mentioned above have received adequate resource treatment. Treatment is not feasible on 12 percent of these areas due to topography or soil limitations.

Opportunities — Perennial grasses should be used to replace weeds in areas of infestation (see "Uplands Opportunities").

Actions and Effects — The Umatilla County Weed Control District (WCD) has implemented a study and treatment program for common crupina. A yellow starthistle control program is ongoing with ODFW and the Umatilla County WCD partnering with landowners. The Council will begin taking an active role in this program in spring 1999. NRCS has local enrollment in the EQIP and other agency incentive programs. The Council has been assisting with the construction of grazing management fencing for rotation and exclusion.

LIST OF ACTIONS RELATING TO GRAZING
(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")

C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning

G&O	ID	Status	Project Description
F-8	97–09	O	**Noxious weeds program**. Cooperators: about 7 landowners, Umatilla County Weed Control District. Fall 1997–present.
F-8	98–36	P	**Yellow starthistle control and eradication program**. Cooperators: landowners, ODFW, Umatilla County WCD. Spring 1999.

TIMBER HARVEST

Issues — Forest harvest practices have not adequately addressed resource protection; this is more pronounced on private lands where operations are conducted under Oregon laws and regulations, which are less confining than standards for Federal lands. In the last 3–4 years, the harvest rate on smaller wood lots has increased and some downstream owners are expressing concern that, in the newly opened areas, snow retention has decreased and surface flows from snow melt have increased.

Logging roads, skid trails, and landing areas often have not been replanted following harvest activities. These have become severe sediment-yielding sites during runoff periods. These disturbed areas also result in growth of undesirable weeds, many of which are on the noxious weed list. There is a tendency toward not leaving enough trees in harvested areas. There are not enough incentives for reforesting private lands, resulting in insufficient reseeding of many areas due to high costs. Insufficient reseeding leads to brush growth on previously timbered lands. Forest harvest activities have often taken place in and across stream channels (both perennial and intermittent), resulting in loss of riparian vegetation, erosion of streambanks, and increased sediment delivery to downstream areas within the watershed.

Opportunities — New sources of labor for tree planting should be considered, such as volunteers, the "Salmon Corps," and prison labor. Reforestation and treatment efforts should be increased, especially in the North Fork. More alders should be planted to shade and facilitate pine growth. There could be changes in State policies and law that would encourage wood-lot owners to follow practices that minimize erosion potential.

Actions and Effects — The Oregon Department of Forestry is working with private timber owners to ensure compliance with the Oregon Forest Practices Act. USFS is working within multi-agency guidelines.[6]

LIST OF ACTIONS RELATING TO TIMBER HARVEST
(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")

C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning

G&O	ID	Status	Project Description
F-1	98–14	O	**Upland water storage ponds.** Cooperators: NRCS, ODFW, OWRD.
F-1	98–21	O	**Provide comments and suggestions for proposed U.S. Forest Service timber sale**

6 The U.S. Forest Service and Bureau of Land Management utilize "PACFISH" (Pacific Northwest Fish) and "INFISH" (Inland Columbia River Fish); these are interim guidelines to preserve options for anadromous fish management.

ROAD CONSTRUCTION AND MAINTENANCE

Issues — Road and railroad building and maintenance activities have contributed to watershed health problems, and so has cultivation in right-of-way areas. County road authorities, the State highway department, and the railroads have constrained stream channels in the watershed. These constraints resulted in downcutting, thus affecting natural floodplain function and water quality. Removal of vegetation in right-of-way areas through cultivation has resulted in erosion of top soils and affected water quality in nearby streams.

LIST OF ACTIONS RELATING TO ROAD CONSTRUCTION AND MAINTENANCE *(for greater detail, see attachment A, "List of Council Activities by Goals and Objectives")*			
C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning			
G&O	**ID**	**Status**	**Project Description**
F-7	98–38	O	**Government Mountain Road improvement** (between North Fork Walla Walla and Cottonwood Creek). Cooperators: landowners, Oregon Dept. of Forestry. November 1998–present.

Some culverts are not sized correctly; some are not well maintained. Many roads are washing out, restricting streams, and introducing sediment. There are maintenance problems with a number of private logging roads. Many logging roads need to be reseeded. Many road banks are bare and need to be reseeded; filter strips are needed. A number of roads need to have the angles of their cut-and-fill slopes decreased; some should probably be abandoned and the land restored.

Opportunities — When in poor condition, selected roads should be relocated or re-engineered; others should be closed. Some culverts could be modified.

Actions and Effects — The Oregon Department of Transportation (ODOT) is surveying the road system and, among other items, is inventorying culverts which may be creating barriers to fish passage. The ODOT report is anticipated for release in fall 1999.

5. MISSION, GOALS, AND OBJECTIVES

The Council's MISSION is to protect the resources of the watershed, deal with issues in advance of resource degradation, and enhance the watershed's health.

To fulfill its mission, the Council has set eight GOALS.

FORUM — to provide a forum for conflict resolution and decision-making.

EDUCATION — to improve communication among affected private individuals, interested citizens, and representatives of local, State, Tribal, and Federal agencies.

ADVISORY — to provide recommendations for the basin resources which will enhance the quality and quantity of river flow.

PLANNING — to develop an integrated, comprehensive watershed management program which includes an action plan to achieve and maintain watershed health.

PROBLEM SOLVING — to identify problems in the watershed and solutions based on the best available scientific information.

RESTORATION ACTIONS — to improve instream, riparian, and uplands habitat for the benefit of anadromous and resident fish, wild and domestic animals, and people in the Walla Walla watershed.

MONITORING — to promote ongoing monitoring of the health of the Walla Walla River watershed.

ADMINISTRATION — to establish and maintain an organization to carry out this mission and these goals.

For each goal, the Council has established OBJECTIVES, actions with measurable outcomes.

GOAL A. FORUM — to provide a forum for conflict resolution and decision-making.

- A–1 Provide a setting for debate.
- A–2 Allow all sides of an issue to be presented and discussed prior to making a decision.
- A–3 Provide an avenue for healthy criticism and feedback for both Council and non-Council (outside agency) activities.

GOAL B. EDUCATION — to improve communication among affected private individuals, interested citizens, and representatives of local, State, Tribal, and Federal agencies.

- B–1 Sponsor meetings to address issues.
- B–2 Bring informational speakers to meetings, seminars, events.
- B–3 Provide liaison between landowners and outside agencies, and between agencies.
- B–4 Use local media to educate and inform community on issues.
- B–5 Promote local issues and concerns to state, federal, and local agencies.
- B–6 Assist with natural resource education in area schools.

GOAL C. ADVISORY — to provide recommendations for the basin resources which will enhance the quality and quantity of river flow.

- C–1 Provide local insight and knowledge on management decisions, project design, and implementation.
- C–2 Maintain local economic viability in balance with an ecologically based program.

GOAL D. PLANNING — to develop an integrated, comprehensive watershed management program which includes an action plan to achieve and maintain watershed health.

- D–1 Address issues and implement activities within a long-term, strategic plan.
- D–2 Update or adjust action plan bi-annually.

GOAL E. PROBLEM SOLVING — to identify problems in the watershed and solutions based on the best available scientific information.

- E–1 Assessment of conditions.
- E–2 Find agreeable solutions to Council and non-Council (outside agency) issues.
- E–3 Find outside assistance for those actions beyond landowner or local scope.

GOAL F. RESTORATION ACTIONS — to improve instream, riparian, and uplands habitat for the benefit of anadromous and resident fish, wild and domestic animals, and people in the Walla Walla watershed. This goal includes planning, design, and implementation necessary for restoration.

- F–1 Address upland conditions to reduce sediment and increase natural water storage capabilities.
- F–2 Improve riparian areas by assisting the restoration programs of non-Council agencies.
- F–3 Assist landowners with restoration projects.
- F–4 Assist with property flood protection.
- F–5 Improve flows for fish and irrigation.
- F–6 Remove fish passage barriers.
- F–7 Conduct activities that will improve water quality, including erosion control.
- F–8 Restore natural vegetation.
- F–9 Improve instream habitat.
- F–10 Increase population of anadromous and resident fish.

GOAL G. MONITORING — to promote ongoing monitoring of the health of the Walla Walla River watershed.

- G–1 Record baseline situation.
- G–2 Monitor effects of watershed restoration activities.
- G–3 Monitor water quality parameters currently listed on the “303(d)” list.

GOAL H. ADMINISTRATION — to establish and maintain an organization to carry out this mission and these goals.

- H–1 Office as clearinghouse/ library of information.
- H–2 Council as locally based promoters of watershed health.
- H–3 Staff as locally based project facilitator.

6. COUNCIL INITIATIVES

These activities support the efforts of our local, State, Tribal, and Federal partners to improve water quality, water quantity, and overall watershed health in the Walla Walla River basin.

TABLE 3. CHRONOLOGICAL LIST OF ACTIVITIES, COOPERATORS, AND GOALS & OBJECTIVES

No.	Status	ACTIVITY	G&O
C = Completed activity, projects, or action; **O** = Ongoing projects and activities; **P** = Potential projects in planning			
94-00	C	**Formal recognition**. In May 1994, the Walla Walla Basin Watershed Council of Milton-Freewater was designated as the Walla Walla River watershed group by the Umatilla County Commissioners, under provisions of the Oregon Watershed Health Program (HB 3441).	H-2
94-01	O	**Monthly meetings**. WWBWC projects and activities are discussed and planned, information is presented, and recommendations for agency actions are made. Summer 1994–present.	A, B, C, D, E, F, G
94-02	C	**Erosion control, Couse Creek/Nichols Canyon**. Brought landowners and agencies together to work on reducing erosion from steep farmland above Walla Walla River and Couse Creek tributary. NRCS completed a lands assessment by acreage, and contour plowing was initiated as a demonstration project. Cooperators: landowners, NRCS, Umatilla SWCD, and Umatilla County. Fall 1994.	B-3 E-1, E-2
94–03	C	**Instream water rights lease, Couse Creek — Larry Williams property**. As a result of 94-02, brought together Oregon Water Trust and a local farmer (wheat and pea) for purpose of water rights lease for instream flows. Cooperators: landowner, Oregon Water Trust, Inc. Initiated 1994. Agreement was finalized Fall 1998.	E-3 F-5
94-04		**WWBWC funding**. Submitted a grant proposal to U.S. Environmental Protection Agency for Council funding. Proposal denied. Cooperator: Umatilla SWCD. Winter 1994.	H. Admin
94–05	C	**Community education and awareness seminar**. The WWBWC organized, promoted, and sponsored the event, "The Walla Walla River, Water Issues and Your Future" (held January 25, 1995). Presenters included city of Milton-Freewater, CTUIR, ICBEMP (Interior Columbia Basin Ecosystem Management Project), OWRD, Umatilla National Forest, Umatilla SWCD, Whitman College Dept. of Geology, and Walla Walla River Irrigation District. Cooperators: Friends of the Walla Walla, WWRID. Winter 1994–95.	B-2 B-3
95–01	C	**Survey and assessment — lower Pine Creek**. Surveyed Pat Kelly Ranch and the Harris Ranch. Recommendations include planting willows, erecting fences, relocation of beavers until sufficient vegetation is reestablished to support them, and weed control. Cooperators: landowners. Summer 1995.	E-1 F-2 F-3 F-4
95–02	C	**Community education —** Facilitated series of meetings with Couse Creek residents. Teachers and landowners were trained in monitoring of stream conditions. Cooperators: Adopt-A-Stream Foundation.	B-1 G-1

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TABLE 3. CHRONOLOGICAL LIST OF ACTIVITIES, COOPERATORS, AND GOALS & OBJECTIVES			
No.	**Status**	**ACTIVITY**	**G&O**
(continued from previous page)			
95–03	C	**Runoff abatement**. Lobbied for aerial seeding of burnt hillside above Couse Creek to stabilize soil. Cooperators: landowners, NRCS.	F-3 F-7
95–04	O	**Runoff abatement — Dick Piper property.** Sponsored meeting to examine opportunities to reduce storm runoff into city from tilled fields on hill above Milton-Freewater. Landowner continues to work with NRCS on soil stability and erosion control measures. Summer 1995.	B-3 F-7
96–01	C	**WWBWC administrative support**. An intern was assigned to the Council for 12-month period by the University of Oregon (UO) Graduate School of Planning. The intern's primary duties were to support planning and funding efforts. UO RARE (Resource Assistance for Rural Environment), Americorps, and NRCS provided financial assistance for the position. The Columbia-Blue Mountain RCD (Resource Conservation and Development) donated office space and guidance. August 1996–August 1997.	H. Admin
96–02	O	**Interstate planning and cooperation** Community representatives and various agencies in the Milton-Freewater/Walla Walla area held a series of meetings with the objective of establishing an umbrella group to coordinate watershed health activities and to exchange information. Information sharing continues. Cooperators: Columbia-Blue Mountain RCD, Walla Walla Soil and Water Conservation District. January 1996–present.	B-3 H-2
96–03a	C	**Watershed inventory and stream monitoring, Couse Creek**. This mapping and monitoring of Leona Shumway project site established a baseline at beginning of a riparian fencing and revegetation project. Cooperators: landowner, Milton-Freewater Unified School District, Adopt-A-Stream Foundation. Summer 1996.	E-1 G-1
96–03b	C	**Riparian improvement, Couse Creek — Leona Shumway property**. As result of 95–02, riparian fencing constructed, willows and cottonwoods planted, rock barbs placed to divert floodwaters away from eroding bank and improved fish habitat. Cooperators: landowner, ODFW, NRCS. Planned Summer 1995; constructed Spring 1996.	F-3
96–04	C	**Watershed protection and enhancement plan, Couse Creek** . A subbasin assessment and action plan was completed. Cooperators: landowners, Adopt-A-Stream Foundation, NRCS. Fall 1995–Fall 1996.	D-1
96–05	C	**WWBWC brochure**. Design, production, and distribution of an educational and promotional pamphlet describing the watershed health effort, WWBWC activities, local issues, and persons to contact. Cooperators: ODFW, Columbia-Blue Mountain RCD. Fall 1996.	B–5 H-2
96–06	C	**Fundraising** for WWBWC "capacity" (GWEB term for Council projects and overhead expenses). Columbia-Blue Mountain RCD, USBR. Fall 1996–Summer 1997.	H. Admin
(continued on next page)			
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97–01a	C	**Watershed assessment and action plan — Phase 1: issues scoping.** In the first part of a three-phase project, the WWBWC conducted a series of meetings with the general public and also with residents of each subbasin. From these meetings, an initial assessment of issues and opportunities for watershed improvements was	A. Forum D. Planning

TABLE 3. CHRONOLOGICAL LIST OF ACTIVITIES, COOPERATORS, AND GOALS & OBJECTIVES			
No.	**Status**	**ACTIVITY**	**G&O**
		produced and completed. Cooperators: the community, landowners, and concerned agencies — local, State, Tribal, and Federal. *(See attachment A for a complete list).* Spring—Summer 1997.	
97–01b	C	**Watershed assessment and action plan — Phase 2: assessment report**. Utilizing the results of the scoping meeting, an assessment document was produced. This document, following a year of review and comment, is the core of the WWBWC action plan. Cooperators: the community, landowners, and concerned agencies (local, State, Tribal, and Federal). *(See attachment A for a complete list).* Spring–Fall 1997.	D. Planning
97–02a	C	**Establish a WWBWC office**. Purchased necessary materials, equipment and supplies. Cooperators: Milton-Freewater Unified School District No. 7. Fall 1997.	H. Admin
97–02b	C	**Search and hire of a permanent WWBWC coordinator.** Cooperators: USBR, CTUIR, GWEB, ODEQ. Fall 1997.	H-3
97–03	C	**South Fork Walla Walla recreation trail.** Received, consolidated, and relayed community comments and recommendations to the combined Forest Service and Bureau of Land Management proposals for reconstruction of this trail, discussion of issues of access and administration for this busy recreation area. Fall 1997.	A–3 C-1
97–04	O	**Natural resource studies**. Provide equipment and training for local teachers and students to conduct stream studies, habitat improvement projects, and field trips. Funding from EPA "319" nonpoint source program. Cooperators: Milton-Freewater Unified School District No. 7; ODEQ. Summer 1997–Fall 1998.	B-6 G-1
97–05	C	**Bank maintenance, (former) Marie Dorian Diversion Dam.** Assisted in planning for the stabilization of riverbanks upstream from the city using natural debris (recently fallen trees already in river) for log revetments which were to be cabled to the bank. Project was canceled after determination there would be only limited reduction of flood hazard, and debris is improving the fish habitat. Cooperators: Milton-Freewater Water Control District, CTUIR, ODFW. Winter 1997–98.	F-4 G-1
97–06	C	**Bank maintenance/ habitat improvement, Couse Creek — Leona Shumway property.** Cabling of log revetments, grass seeding, and additional revegetation. Cooperators: landowner, CTUIR, NRCS, ODFW. Winter 1997–98.	F-2 F-4
97–07	C	**Native grass seed viability study**. Assisted STELLAR [Science Technology Environmental Land Lab and Research] Program students (K–12) in completing this study for the Umatilla National Forest. Cooperators: Milton-Freewater Unified School District No. 7; Umatilla N.F. Winter 1997–Spring 1998.	B-6 E-1 E-2
97–08	C	**Native plant propagation**. Directed a team of STELLAR Program students in testing methods for growing riparian vegetation which has been planted out at a Couse Creek restoration project (Shumway). Cooperators: landowners, Milton-Freewater Unified School District No. 7. Winter 1997–Spring 1998.	B-6 E-1 E-2 F-2
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97–09	O	**Noxious weeds program**. Addressing infestations of common crupina in Dry, Couse, and Pine Creeks. Cooperators: about 7 landowners, Umatilla County Weed Control District. Fall 1997–present.	F-8
97–10	O	**Communications with local newspapers** to increase their awareness of watershed issues and introduced them to cooperators to be information sources for series of	B-4

TABLE 3. CHRONOLOGICAL LIST OF ACTIVITIES, COOPERATORS, AND GOALS & OBJECTIVES			
No.	**Status**	**ACTIVITY**	**G&O**
		articles on the river and watershed.	
97–11	C	**Community education and awareness seminar**. Organized, promoted, and sponsored this event titled, the "Future of the Walla Walla River," held on January 22, 1998. Over sixty people attended. Cooperators: OSU Extension, Friends of the Walla Walla.	B-1
98–01	C	**Cash Hollow cleanup**. Revegetation, fencing, signing, and education project on a tributary of the Walla Walla where illegal dumping occurred (Spring 1998). Cooperators: city of Milton-Freewater, SOLV (Stop Oregon Litter and Vandalism). Spring 1998.	F-2
98–02	C	**Fish rescue**. Assist with planning, logistics, and gathering of volunteers for capture of stranded steelhead, trout, and other resident fish in the Walla Walla River. Cooperators: ODFW, CTUIR, Tri-State Steelheaders. Summer 1998.	F-10
98–03	O	**Restoration of natural vegetation**. Outreach to potential voluntary participants to use natural organic materials (e.g. willows, cottonwoods) to stabilize erosion, increase proper floodplain function, provide shade and cover, and decrease sediment loading in Walla Walla River tributaries. Cooperators: landowners, NRCS.	F-8
98–04	C	**Watershed assessment and action plan — Phase 3: the action plan.** Initiated and completed the final phase of the WWBWC's internal planning and action guidelines. This document will help WWBWC more effectively direct its efforts and more efficiently utilize its limited resources of volunteers, time, and money. Cooperators: U.S. Bureau of Reclamation. Summer 1999.	D-1
98–05	O	**Main Stem levee removal and wetland restoration — Clark & Lyla Lampson property**. Brought landowners together with other cooperators to develop a plan for 20 acres of a former orchard located along a ½-mile reach of the Walla Walla River (commencing about RM 47.5). Cooperators: landowners, Corps, CTUIR, NRCS, ODFW, and OWRD.	F-2 F-4
98–06	P	**Milton-Freewater levee setback**. With primary focus on the city reach of the Walla Walla River, working to determine the feasibility of voluntary setbacks. These would increase flood capacity and improve fish and wildlife habitat. Cooperators: Corps, Milton-Freewater Water Control District.	F-4
98–07	O	**Native plant production, planting and distribution.** Helping STELLAR Program students with riparian restoration projects. This is related to but separate from 97–08. Cooperators: Milton-Freewater Unified School District No. 7.	B-6 E-1 E-2 F-2
98–08	O	**Financial support**. Seeking and soliciting funds and in-kind services for 1998–99 fiscal year projects, personnel, and overhead needs.	H. Admin
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98–09	O	**Removal/Fill permitting**. Assisting landowners in getting their plans through the "404" instream work process. Cooperators: Oregon Division of State Lands, Umatilla SWCD.	E-3
98–10	O	**Irrigation efficiency programs**. Working to increase in-stream flows by improving delivery systems to irrigators. Cooperators: Hudson Bay District Improvement Co., Walla Walla River Irrigation District, Corps, CTUIR, OWRD.	F-5

TABLE 3. CHRONOLOGICAL LIST OF ACTIVITIES, COOPERATORS, AND GOALS & OBJECTIVES			
No.	**Status**	**ACTIVITY**	**G&O**
98–11	O	**Irrigation system flow monitoring**. Using gauged weirs to gather data about water flows and losses in order to promote efficiency of water conveyance systems. Cooperators: Reclamation, OWRD, GWEB. Application for continued funding has been made.	F-5 G-1
98–12	O	**Instream flows**. Working to locate participants in voluntary program to sell, lease, or donate unused out of stream water rights back to the river. Cooperators: landowners, Oregon Water Trust, OWRD.	F-5 B-3
98–13	O	**Promote alternatives to gravel push up diversion dams.** Possibilities include pumps, infiltration galleries, and low profile permanent dams — reducing or eliminating the need to rebuild dams each season, which can increase sediment, and can create fish barriers. Cooperators: NRCS, ODFW, OWRD.	F-6
98–14	O	**Upland water storage ponds.** Determine feasibility and interest for several, small off-channel ponds to recharge system by holding back part of the spring floods and slowly releasing them through the summer. Cooperators: NRCS, ODFW, OWRD.	F-1
98–15	O	**Fish screens.** Inventory locations of existing screens which need to be upgraded; determine sites where new screens should be installed; determine appropriate sources for funding. Cooperators: CTUIR, ODFW, OWRD.	F-6
98–16	O	**Bull trout/ESA implication report** for Walla Walla River community. Cooperator: USFWS.	C-1 H-1
98–17	O	**Storm drain marking.** Assist Junior Elks in identifying and marking street drains in city of Milton-Freewater which connect to irrigation canals or the river. This is to remind community that contaminants will enter the water system and reduce illegal dumping (used car oil, antifreeze, etc). Cooperators: ODFW, Milton-Freewater Elks Lodge No. 2146.	B-6 F-7
98–18	O	**Trout and steelhead incubation** and rearing for release into specified lakes and rivers. Cooperators: Milton-Freewater High School biology class, Oregon STEP (ODFW's Salmon Trout Enhancement Program).	B-6 F-9
98–19	P	**Groundwater study**. Assist in study of the contamination issues and solutions for area north of Milton-Freewater. Cooperators: county residents, city of Milton-Freewater, Umatilla County Planning Department.	E-1 F-7
98–20	O	**Establish a local non-profit organization dedicated to watershed issues.** This would enable the WWBWC to receive project funding and donations available only to non-profits.	H-2
98–21	O	**Provide comments and suggestions for proposed U.S. Forest Service timber sale** in the respective headwaters of the North Fork, the South Fork, and Mill Creek.	C-1 F-1
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98–22	P	**Riparian restoration projects in planning phase:** Cooperators: landowner, NRCS, ODFW, and CTUIR.	F. Restoration actions
98–23	O	**Riparian restoration, Dry Creek — Dick Stewart property**. Assist with revegetation, off-stream watering, and bank stabilization for this 2-mile-long, 17 acre riparian buffer project.	F-2 F-3

TABLE 3. CHRONOLOGICAL LIST OF ACTIVITIES, COOPERATORS, AND GOALS & OBJECTIVES			
No.	**Status**	**ACTIVITY**	**G&O**
98–24	O	**Riparian restoration, Pine Creek — Reitmann property.** Fencing and revegetation of 12 acres along ½-mile reach of stream bank. Fall 1998–present.	F-2 F-3
98–25	C	**Riparian restoration, Dry Creek — McIntire property.** Erosion control and revegetation of 2 miles of stream bank and instream habitat. Cooperators: landowner, NRCS. Fall–Winter 1998.	F-7 F-9
98–26	P	**Riparian restoration, Main Stem — Strickland property.** Revegetation and bank stabilization.	F-2 F-3
98–27	P	**Riparian restoration, South Fork — Peterson property.** Revegetation project.	F-2 F-3
98–28	P	**Riparian restoration, Main Stem — Lawrence property.** Revegetation and bank stabilization.	F-2 F-3
98–29	O	**Pine Creek Fish Passage Barriers**. Investigate viable options for removal of and/or reduction in size of barriers and determine likely cooperator.	F-2 F-3
98–30	C	**Water quality monitoring**. Program focusing on water temperatures, dissolved oxygen, pH, conductivity, sediment, and macro-invertebrate presence. Cooperator: ODEQ.	E-1 G-1, G-3
98–31	P	**Fish population sampling**. Assist with this effort by providing volunteers, plus assistance in procuring funding for necessary equipment. Cooperator: ODFW.	E-1 F-10
98–32	P	**Annual community volunteer clean-up program.** Select a reach of river or creek for removal of trash. Cooperators: SOLV (Stop Oregon Litter and Vandalism).	H-3 F-9
98–33	P	**Riparian canopy inventory**. Using photos, maps, and "groundtruthing" (in-field reconfirmation), determine miles of shaded river and changes over the last decade.	E-1 F-2 F-8
98–34	P	**Agricultural water-quality management plan**. Assist in establishing planning group, identifying issues, and recommendations to local growers. Cooperators: Oregon Department of Agriculture.	H-3 B-3 C-1
98–35	P	**TMDL (total maximum daily load) reduction**. Assist in data collection, establishment of goals, and implementation of actions for reduction of pollutants as required by the Federal Clean Water Act. Cooperators: ODEQ.	E-1 E-2 B-3 G-3
98–36	P	**Yellow starthistle control and eradication program**. Facilitate coordination between participants to implement treatment of North Fork subbasin. Cooperators: landowners, ODFW, Umatilla County WCD. Spring 1999.	E-2 F-8
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98–37	O	**Bull Trout Working Group.** Assisting ODFW in the completion of a bull trout conservation strategy for the Oregon subbasin. This plan is being complemented by similar activities in the Washington State subbasin with the mutual goal of a combined strategy. Cooperators: ODFW, CTUIR, USFWS. December 1998–March 1999.	C-2 E-2 F-10
98–38	O	**Government Mountain Road improvement** (between North Fork Walla Walla and Cottonwood Creek). Helping assemble a funding proposal with the objective of reducing sedimentation by improving a primary haul road from private timber lands	E-2 F-7

TABLE 3. CHRONOLOGICAL LIST OF ACTIVITIES, COOPERATORS, AND GOALS & OBJECTIVES			
No.	**Status**	**ACTIVITY**	**G&O**
		and main access route to recreation at USFS land. Cooperators: landowners, Oregon Dept. of Forestry. November 1998–present.	
99–01	O	**Upriver Water management.** Assist OWRD and upriver irrigators with intensive irrigation management and efficiency program.	B-1, B-2, B-3, B-5, E-3, F-2, F-5

INITIATIVES OF OTHER AGENCIES

There has been a high level of interest by other entities and local, State, Tribal, and Federal agencies in the assessment and improvement of the Walla Walla River basin. A great many of their activities coincide with the goals of the Watershed Council. This positive circumstance is complemented by continuing communication and cooperation between these entities and the Watershed Council. Table 4 below lists the known actions and projects of these other entities and those Watershed Council goals that they match.

TABLE 4. INITIATIVES OF OTHER AGENCIES REGARDING THE WALLA WALLA RIVER

AGENCY	ACTIVITY OR ACTION	WWBWC Goals							
		A	B	C	D	E	F	G	H
COMPLETED PROJECTS *(1997 TO PRESENT)*									
U.S. Bureau of Reclamation	*Upper Walla Walla River Basin Assessment* (October 1997)	✓	✓	✓	✓	✓			
	Provided assistance and design for water measurement structures to Walla Walla Irrigation District and Hudson Bay District Improvement Co.					✓	✓		
	Provided support to WWBWC for seepage tests with portable flumes					✓	✓		
Army Corps of Engineers	*Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report* (October 1997), Walla Walla, WA			✓	✓	✓			
	Removal of Marie Dorian Dam (April 1997)						✓		
Bonneville Power Administration	Little Walla Walla diversion screening plan				✓	✓	✓		
	Burlingame Irrigation Dam fish ladder renovation (Washington)						✓		
Oregon Department of Fish and Wildlife	Bull trout redd survey, South Fork (1996–98)							✓	
	Steelhead trap and count (1992–97)							✓	
Walla Walla Irrigation District	Irrigation conservation plan (with USBR)					✓	✓		
ONGOING PROJECTS AND ACTIVITIES									
Army Corps of Engineers	Milton-Freewater Levee setback study (with Milton-Freewater Water Control District)				✓	✓	✓		
	Columbia River water exchange study				✓	✓			
	Water storage study				✓	✓			
Bonneville Power Administration	Little Walla Walla River diversion screening						✓		

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TABLE 4. INITIATIVES OF OTHER AGENCIES REGARDING THE WALLA WALLA RIVER

AGENCY	ACTIVITY OR ACTION	WWBWC Goals							
		A	B	C	D	E	F	G	H
Confederated Tribes of the Umatilla Indian Reservation	Basin assessment (with Washington State University)		✓	✓	✓	✓			
	Levee setback — Lampson property		✓				✓		
	Habitat restoration — Shumway property (with ODFW, WWBWC, others)		✓				✓		
	Adult passage improvements at irrigation diversion dams and grade control structures			✓		✓	✓		
	Irrigation diversion screening (with ODFW)			✓		✓	✓		
Hudson Bay District Improvement Co.	Irrigation conservation plan (with USBR)					✓	✓		
	Irrigation delivery efficiency improvements					✓	✓		
Natural Resources Conservation Service	CRP, CREP, EQIP sign-ups		✓	✓			✓		
Oregon Department of Fish and Wildlife	Bull trout recovery plan	✓	✓	✓	✓	✓			
	Angling regulations changes to protect steelhead and bull trout		✓				✓		
	Irrigation diversion screening (with CTUIR)			✓		✓	✓		
Oregon Department of Forestry	Government Mountain Road sediment reduction		✓			✓	✓		
Oregon Water Resources Department	Diversion inventory — South Fork Walla Walla R.		✓					✓	
	Surface water irrigation use and loss assessment							✓	
	Well registering		✓					✓	
	Intensive management of upriver water use					✓	✓	✓	
Umatilla County, Oregon	Groundwater study (north of Milton-Freewater)	✓	✓	✓	✓	✓		✓	
Walla Walla Irrigation District, Walla Walla WA	Irrigation delivery efficiency improvements					✓	✓		
Walla Walla River Irrigation District, Milton-Freewater OR	Irrigation conservation plan (with USBR)					✓	✓		
	Monitoring of headworks flows by telemetry, reported by radio to computer; with potential for remote canal automation (demonstration project with USBR)			✓	✓	✓			
	Irrigation delivery efficiency improvements					✓	✓		
Weed Control District [of Umatilla County]	Common crupina weed containment and control						✓	✓	
	Yellow starthistle control						✓		

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TABLE 4. INITIATIVES OF OTHER AGENCIES REGARDING THE WALLA WALLA RIVER									
AGENCY	ACTIVITY OR ACTION	WWBWC Goals							
		A	B	C	D	E	F	G	H
PROJECTS IN PLANNING									
City of Milton-Freewater	Urban stormwater management plan		✓		✓		✓		
Oregon Department of Fish and Wildlife	Irrigation diversion screening			✓		✓	✓		
Walla Walla Irrigation District	Irrigation diversion consolidation			✓		✓	✓		

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