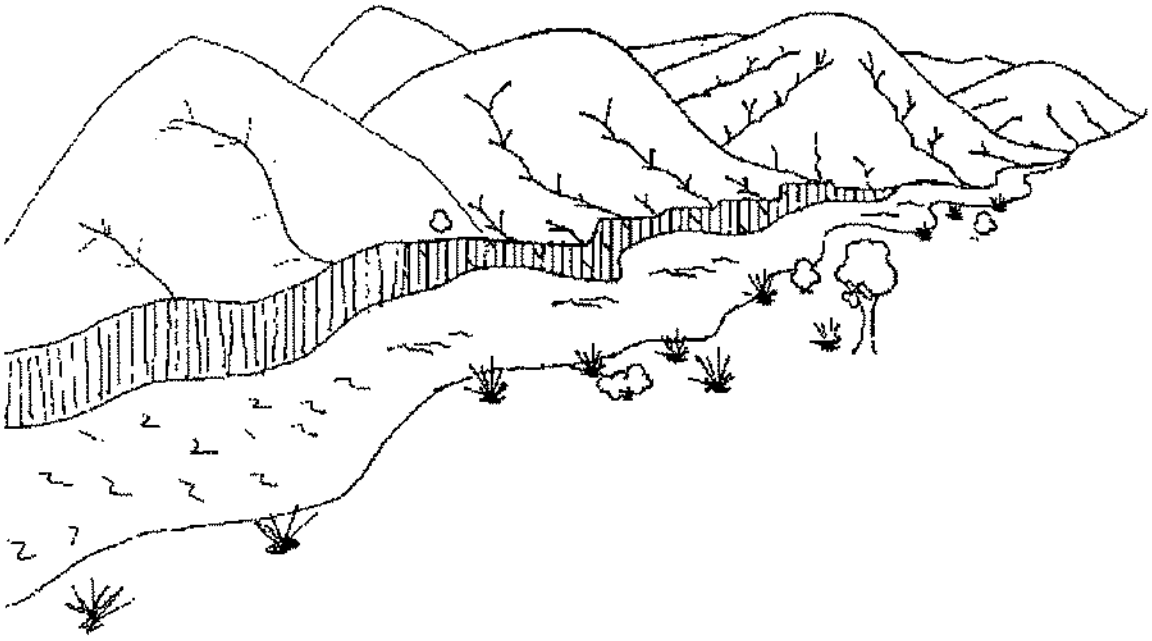
BUCK HOLLOW

Watershed Plan & Environmental Assessment

Sherman & Wasco Counties, Oregon



United States Department of Agriculture

Natural Resources Conservation Service

November 1994

The USDA, Soil Conservation Service was recently renamed the **USDA, Natural Resources Conservation Service.**

BUCK HOLLOW WATERSHED
Sherman and Wasco Counties, Oregon

WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT

NOVEMBER 1994

ABSTRACT

This document describes a land treatment project to solve water quality problems in the Buck Hollow Watershed, located in Sherman and Wasco Counties, Oregon. Land treatment primarily involves riparian and upland grazing management systems, crop land management systems, instream fish improvement, and other conservation practices. Formulation included a No-Action Alternative. Beneficial monetary, environmental and social effects outweigh cost. Project costs are $4,580,000.

This document is in accordance with the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.) and the Water Resources Council's principles and guidelines for water implementation studies. It serves as a basis for authorization of funding and is prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 830566, as amended (16 U.S.C. 1001-1008) and in accordance with the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321 et seq.).

Prepared by:

- Wasco County Soil and Water Conservation District
- Sherman County Soil and Water Conservation District
- United States Department of Agriculture
  Soil Conservation Service
- Oregon Department of Fish and Wildlife

For additional information contact:

Robert Graham, State Conservationist
USDA, Soil Conservation Service
101 SW MAIN, Suite 3000
Portland, Oregon 97204
Telephone (503) 414-3201 or Fax (503) 414-3277

Watershed agreement

between the

WASCO COUNTY SOIL and WATER CONSERVATION DISTRICT

and the

SHERMAN COUNTY SOIL AND WATER CONSERVATION DISTRICT

(referred to herein as sponsors)

STATE OF OREGON

and the

SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

(Referred to herein as SCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by the sponsors for assistance in preparing a plan for works of improvement for the Buck Hollow Watershed, State of Oregon under the authority of the Watershed Protection and Flood Prevention Act (16 U.S.C. 1001-1008); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to SCS; and

Whereas, there has been developed through the cooperative efforts of the sponsors and SCS a plan for works of improvement for the Buck Hollow Watershed, State of Oregon, hereinafter referred to as the watershed plan-Environmental Assessment, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through SCS, and the sponsors hereby agree on this plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this watershed plan and including the following:

1. Cost-sharing rate for the establishment of enduring and treatment practices is 65 percent of the average cost of installing the enduring practices in the selected plan for the evaluation unit. The estimated total financial assistance cost for enduring practices is $1,526,800.

2. The SCS will assist the sponsors in providing technical and adminstrative assistance to landowners or operators to plan and install land treatment practices shown in the plan. Percentages of technical and administrative assistance costs to be borne by the sponsors and SCS are as follows:

Works of improvement	Sponsors (%)	SCS (%)	Est. Tech. Assistance ($)	Est. Admin. Assistance ($)
Land treatment practices	0	100	$859,700	$76,200

3. The sponsors will obtain applications from owners of not less than 60 percent of the land in the problem area, indicating that they will carry out the planned land treatment measures. These applications will be obtained before the first long-term land treatment contract is executed.

4. The sponsors will obtain agreements with landowners or operators to operate and maintain the land treatment practices for the protection and improvement of the watershed.

5. The sponsors will acquire, or will ensure that land users or operators have acquired, with other than Public Law 83-566 funds, such real property as will be needed in connection with the works of improvement. (Estimated Cost $0.)

6. The sponsors will acquire, or ensure that the landowners or water users have acquired, such water rights pursuant to State law as may be needed for the installation and operation of the works of improvement.

7. The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto, will be the average costs incurred in the installation of works of improvement or an approved variation.

8. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by SCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

9. A separate agreement will be entered into between SCS and sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

10. This plan may be amended or revised only by mutual agreement of the parties hereto, except that SCS may deauthorize or terminate funding at any time it determines that the sponsor has failed to comply with conditions of this agreement. In this case, SCS shall promptly notify the sponsor in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsor or recoveries by SCS shall be in accord with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between SCS and the sponsor(s) having specific responsibilities for the measure involved.

11. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

12. The program conducted will be in compliance with the nondiscrimination provision as contained in Titles VI and VII of the Civil Rights Act of 1964, as amended, the Civil Rights Restoration Act of 1987 (Public Law 100-259) and other nondiscrimination statutes, namely, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and in accordance with regulations of the Secretary of Agriculture (7 C.F.R. 15, Subparts A & B), which provide that no person in the United States shall, on the grounds of race, color, national origin, age, sex, religion, marital status, or handicap be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving

Federal financial assistance from the Department of Agriculture or any agency thereof.

13. Certification Regarding Drug-Free Workplace Requirements (7CFR 3017.Subpart F).

By signing this watershed agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the SCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 812) and as further defined by regulation (21 CFR 1308.11 through 1308.15);

Conviction means a finding of (including a plea of nolo contendere) or imposition of sentence, or both by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant including: (i) all directed charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant, and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The sponsors certify that they will or will continue to provide a drug-free workplace by:

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(2) Establishing an ongoing drug-free awareness program to inform employees about --

(a) The danger of drug abuse in the workplace;

(b) The grantee's policy of maintaining a drug-free workplace;

(c) Any available drug counseling, rehabilitation and employee assistance programs; and

(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1);

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will --

(a) Abide by the terms of the statement; and

(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(5) Notifying the SCS in writing, within ten calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4)(b), with respect to any employee who is so convicted --

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6)

B. The sponsors may provide a list of the site(s) for the performance of work done in connection with a specific project or other agreement.

C. Agencies shall keep the original of all disclosure reports in the official files of the agency.

15. **Certification Regarding Lobbying (7 CFR 3018) (applicable if this agreement exceeds $100,000).**

(1) The sponsors certify to the best of their knowledge and belief, that:

(a) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Members of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress in connection with this Federal contract, grant loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with instructions.

(c) The sponsors shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

(2) This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

16 Certification Regarding Debarment. Suspension. and Other Responsibility Matters - Primary Covered Transaction (7 CFR 3017).

(1) The sponsors certify to the best of their knowledge and belief, that they and their principals:

(a) Are not presently debarred, suspended, proposed for debarment declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicated for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

(2) When the primary sponsors are unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

Wasco County Soil and Water Conservation District

By Linda S. Visser
Linda S. Visser
Chair Wasco County Soil and Water Conservation District

Date Nov. 10, 1994

Address: 2325 River Road, Suite 3
The Dalles, Oregon 97058

The signing of this plan was authorized by a resolution of the governing body of the Wasco County Soil and Water Conservation District adopted at a meeting held on

March 2, 1994.

Sherman County Soil and Water Conservation District

By Paul Sather
Paul Sather
Chair Sherman County Soil and Water Conservation District

Date 11/8/94

Address: P.O. Box 405
Moro, Oregon 97309

The signing of this plan was authorized by a resolution of the governing body of the Sherman County Soil and Water Conservation District adopted at a meeting held on

March 15, 1994.

Soil Conservation Service
United States Department of Agriculture

Approved by: _____
Bob Graham
State Conservationist

Date 11/17/94

CONTENTS

BUCK HOLLOW
WATERSHED PLAN and ENVIRONMENTAL ASSESSMENT

LIST OF TABLES

GLOSSARY

ACP	Agricultural Conservation Program
ASCS	Agricultural Stabilization and Conservation Service
CRP	Conservation Reserve Program
EQ	Environmental Quality
FSA	Food Security Act
GWEB	Governor's Watershed Enhancement Board
NED	National Economic Development
NEPA	National Environmental Policy Act
NMFS	National Marine and Fishery Service
ODF&W	Oregon Department of Fish and Wildlife
ODWR	Oregon Department of Water Resources
OM&R	Operation, Maintenance and Replacement
OSE	Other Social Effects
OSU-ES	Oregon State University - Extension Service
PL-566	Public Law 83-566
Plan-EA	Watershed Plan and Environmental Assessment
RED	Regional Economic Development
SCS	Soil Conservation Service
SHPO	State Historical Preservation Officer
USFW	US Fish and Wildlife Service
WASCOB	Water and Sediment Control Basin
WNTC	West National Technical Center, USDA-SCS

SUMMARY

Watershed Plan-Environmental Assessment Summary
for
Buck Hollow Watershed
Wasco and Sherman Counties, Oregon

Project Name: Buck Hollow Watershed
Wasco and Sherman Counties, Oregon

Sponsors: Sherman County Soil and Water Conservation District
Wasco County Soil and Water Conservation District

Recommended Plan: A watershed land treatment project will be implemented to rectify water quality problems, specifically related to salmonid fisheries. Project measures will be installed for the purpose of reducing water quality impairments such as sediment and nutrient loading, high temperatures and low flows. These measures will greatly improve the habitat for the spawning and rearing of salmonid and other cold water species.

This plan was formulated considering the criteria of the Soil Conservation Service National Watershed Manual and has been accepted by local Sponsors for implementation.

Resource Information:

Watershed Area	126,800 Acres
Ownership	
Private	120,300 Acres
Federal (BLM)	6,500 Acres

Land Use /1	Area (%)	(acres)
Range	60	76,600
Cropland	36	46,200
Roads & Urban	4	4,000
Total	100	126,800

/1 27,500 acres of Cropland are currently enrolled in the Conservation Reserve Program (CRP) and 2,000 acres of Rangeland is reseeded former cropland. Urban includes farmsteads.

Wetlands: less than 150 acres (0.1 % of the watershed)

Endangered Species: Bald Eagle, Peregrine Falcon

Cultural Resources: The Buck Hollow watershed is entirely located on lands ceded to the United States Government by the Warm Springs Tribe. The Treaty mandates sufficient water quality and quantity to maintain the fishery resource. Additionally, the Treaty reserved the right to fish at all locations where members of the Warm Springs Tribe fished at treaty time, both within the ceded area and beyond, as well as the right to hunt, gather roots, berries and alderwood and pasture livestock on lands owned by the public.

The procedures of the SCS General Manual (420 GM 401) will be followed during project installation. If cultural resources are discovered during project installation, work will be halted and the Oregon SCS Cultural Resource Coordinator will be immediately contacted.

Floodplains: 1,000 acres adjacent to the main stem of Buck Hollow. No businesses or residences are located in this floodplain. Some minor structures, farm roadways, and fences are located in this floodplain.

Problem Identification:

Negatively Impacted Beneficial Uses

- Livestock Watering (low flows limit access)
- Cold Water Fish
- Other Aquatic Life
- Wildlife
- Water Contact Recreation
- Aesthetic Quality

Critical Water Quality Problem

The cold water fishery is the most sensitive of the identified negatively impacted beneficial uses, in the Buck Hollow Watershed. Conservation measures installed to remove cold water fish from the list of negatively impacted beneficial uses will improve watershed conditions to the point that the other listed negatively impacted beneficial uses will also be removed from the list.

Formulation Goal to address Critical Water Quality Problem

1. Shade: The goal is to establish 80% shading of the watercourse.

2. Water Temperature: The goal is to limit the maximum water temperatures to 58 degrees F.

3. Flow: The goal is to augment low flows to a minimum of 5 CFS at the mouth of Buck Hollow.

4. Pool/Riffle Ratio: The goal is to achieve a pool/riffle ratio of 40/60.

5. Channel Width/Depth Ratio: The goal is achieve a channel width/depth ratio of less then ten.

6. Streambank Stability: The goal is to have 80% of streambanks stable.

7. Woody Debris: The goal is to have 20 units (pieces) per 100 meters of stream corridor.

8. Substrate: The goal is to limit the percentage of fines in the channel substrate to less than 12 percent.

Alternative Plans Considered

No-Project Action
Accelerated Land Treatment

Project Purpose: Water Quality

Principal Project Measures:

1) Grazing Systems (includes Riparian and Upland)
2) Fish Stream Improvement Systems
3) Cropland Systems
4) Other Conservation Practices (includes Water and Sediment Control Basins, Proper Access Roads, and Upland Wildlife Management)

Project Costs:

Installed Cost Item	PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost			
Fish Stream Improvement	$178,800	$96,300	$275,100
Cropland	$420,900	$226,600	$647,500
Rangeland			
Uplands	$375,200	$202,000	$577,200
Riparian Zone	$105,000	$56,500	$161,500
Other	$446,900	$240,600	$687,500
Total Construction Cost	$1,526,800	$822,000	$2,348,800
Total Management Cost	$0	$1,295,300	$1,295,300
Technical Assistance	$859,700	$0	$859,700
Aministrative Assist.	$ 76,200	$0	$76,200
Total Land Treat. Costs:	$2,462,700	$2,117,300	$4,580,000

Price Base: 1994.
Technical Assistance include Project Administration Costs
Average Annual Costs including Operation, Management, and Replacement are: $509,400

Project Benefits:

NED: Average Annual Damage Reduction: $456,100

EQ: Increase from 200 to 1,200 adult steelhead annually returning. Reduction of erosion, sedimentation and nutrient runoff.

RED: Minor short term employment of 14.2 person-years during implementation and minor OM&R employment.

OSE: Resource recovery and protection by locally accepted change in management of land resources.

Effects: The currently listed negatively impacted beneficial uses, in Buck Hollow, will no longer be listed, as a result of this alternative. Water quality will be improved in Buck Hollow by lowering water temperatures and improving base flows. Sediment and nutrient delivery to Buck Hollow from 76,600 acres of rangeland and 46,200 acres of cropland will be reduced. Sediment delivery will be reduced by 21,900 tons annually. Erosion from crop and rangeland (including riparian area) will be reduced by 45,000 tons annually. Sediment removal from roadside ditches will be reduced by 2,000 cubic yards annually. Annual forage production of rangeland (including riparian area) will be

increased by 2,500 animal unit months (AUM). Annually returning steelhead will be increased by 1,000 adult fish. An estimated 80% of nutrients contained in runoff will be trapped. Average annual benefits are $456,100

Contracting: Long-term contracts (LTC's), between SCS and participants, will be developed for cost-shared land treatment. Each LTC will be based on a plan/schedule of operations developed by the participant and approved by SCS. LTC's will range in duration from four to seven years. An estimated 40 LTC's will be developed based on an 80% participation rate. 20 LTC's are estimated to be written in each of the first two years. No LTC's will be signed until the initial participation requirements are met and all LTC's will be signed within five years of the date on which the plan is approved.

Plans may require conservation treatment that will not be cost shared. The sponsors have determined that landowners installing Water and Sediment Control Basins (WASCOBs) be also required to install grazing systems to meet the project purpose.

LTC's will not be entered into if the land involved is within a unit that is under contract for conservation land treatment under another program.

Financing: The participants in the project will incur individual costs as outlined in the Long Term Contracts (LTC's). Participants may receive credit for such contributions toward their required cost sharing under conditions to be agreed upon in advance of their performance. The Sponsors may continue to solicit, non-federal, grant funds to assist project participants in meeting their financial obligations. Each LTC's will have a $100,000 limitation of PL83-566 cost share.

Operation, maintenance, and replacement: The landowners/operators are responsible for operation, maintenance and replacement. The Sponsors will encourage landowners and operators to operate and maintain the land treatment measures on their farms and ranches for the protection and improvement of the watershed. Appendix C includes an evaluation of the life span of practices and operation, maintenance, and replacement costs associated with them. The Long-term Contracts (LTC's) developed between the SCS and participants will clearly indicate the operation, maintenance, and replacement required for individual practices. Operation, maintenance, and replacement requirements and agreements will comply with the SCS National Operation and Maintenance Manual.

INTRODUCTION

The watershed plan and environmental assessment for this project have been combined into a single document referred to as the Plan-EA. The Plan-EA describes project formulation, identifies the expected environmental, social, and economic impacts, and provides the basis for authorizing federal technical assistance for implementation of the planned measures.

The purpose of the project, as identified by the sponsors, is to rectify water quality problems, specifically related to salmonid fisheries, as identified in the 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution. Project measures will be installed for the purpose of reducing water quality impairments such as sediment and nutrient loading, high temperatures and low flows. These measures will greatly improve the habitat for the spawning and rearing of salmonid and other cold water species.

This report was prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, an amended (16 USC 1001-1008) and in accordance with Section 102(2)(c) of the National Environmental Policy Act of 1969 Public Law 91-190, an amended (42 USC 4321 et seq.). Responsibility for compliance with the National Environmental Policy Act rests with the Soil Conservation Service.

Local sponsoring organizations (Sponsors) are the Wasco County and Sherman County Soil and Water Conservation Districts. Sponsors requested assistance from SCS and participated directly in the development of the Plan-EA. Other federal, state, tribal, local agencies and groups, and individual citizens participated in, all or some portions of, the planning process by identifying problems and concerns, providing data, developing project concepts, and reviewing project alternatives.

PROJECT SETTING

Location and Size

(see map Appendix A for present condition)

Buck Hollow Watershed encompasses 126,800 acres in Wasco and Sherman Counties, Oregon. Buck Hollow originates near the town of Shaniko in Wasco County and flows into the Deschutes River below Sherars Bridge about eight miles downstream from Maupin, Oregon and 43 miles upstream from the Columbia River.

Physical Characteristics

Topography and Drainage - Buck Hollow is classified as natural and well defined. Stream flow is intermittent in the upper reaches and perennial on the main stem. Most of the main tributaries to the Buck Hollow main stem are currently intermittent. The elevation at the upper end of the main stem is 2,900 ft and 680 feet above sea level at the mouth. The average stream slope is 80 ft/mile. The highest elevation in the watershed is 3,325 ft.

The valleys of the main stem and major tributaries are relatively narrow and confined by steep and high canyon walls with slopes typically greater than 60%. The uplands are rolling Columbia River Plateau, sharply dissected with deeply entrenched drainage systems.

Geology and Soils

The major soils are wind deposited loess with admixtures of volcanic ash. Major soils are the Condon complex, Bakeoven complex, Lickskillet and Wrentham. The cropland is primarily characterized by Condon soils.

Land Use

The land use of the watershed is presented in Table A:

Table A

Land Use /1	Area (%)	(acres)
Range	60	76,600
Cropland	36	46,200
Roads & Urban	4	4,000
Total	100	126,800

/1 27,500 acres of Cropland are currently enrolled in the Conservation Reserve Program (CRP) and 2,000 acres of Rangeland is reseeded former cropland. Urban includes farmsteads.

Precipitation and Runoff

Annual precipitation ranges from 9 to 11 inches with the majority (90%) falling during the winter. Occasional late spring and summer thunderstorms also occur. Peak flows from rainfall, snowmelt, and/or combined events are estimated as five times greater than historical peak flow events, of the same recurrence interval. Several significant high runoff events, for example 1964, and 1978 caused significant scouring and riparian damage to the main stem. High runoff contributes large loads of sediment and nutrients to the main stem which in turn flows into the Deschutes and Columbia rivers.

Social and Economic Condition

The economy of the watershed and surrounding area is dependent on farming and ranching. The watershed is 95% privately owned and comprised of 52 different farm/ranch operations with sizes ranging from 200 acres to 25,000 acres. Most operations have been continuous family operations for 80-100 years.

Land values are estimated to be $300 per acre for cropland and $100 per acre for rangeland. Cash crop production is almost exclusively wheat-fallow rotations with average yields of 30 bushels per acre. A majority of operations integrate livestock, almost exclusively cattle, with farming operations. CRP was a major alternative to wheat/fallow rotations this past decade. Most of the CRP contracts are due to expire in the next two years. An estimated $14,000,000 has been spent via the CRP program during the past decade in the Buck Hollow Watershed. Based on interviews with local farmers, if the CRP program is eliminated, the majority of CRP land will be returned to wheat/fallow rotations.

There are no population centers located in the watershed. State Highways and county roads provide transportation routes for the watershed populace.

The Buck Hollow watershed is entirely located on lands ceded to the United States Government by the Warm Springs Tribe. The Treaty mandates sufficient water quality and quantity to maintain the fishery resource. Additionally, the Treaty reserved the right to fish at all locations where members of the Warm Springs Tribe fished at treaty time, both within the ceded area and beyond, as well as the right to hunt, gather roots, berries and alderwood and pasture livestock on lands owned by the public.

The closest urban areas are The Dalles, Oregon and Madras, Oregon. Less than 5% of the watershed's population are members of a minority group.

Forecasted Conditions

Current land treatment includes FSA compliance, terrace and Water and Sediment Control Basin (WASCOB) installation, riparian restoration, and grazing system implementation. Technical assistance is provided by SCS, Extension and Oregon Department of Fish and Wildlife (ODF&W). Financial assistance is provided through the Agricultural Conservation Program (ACP), the Bonneville Power Administration, the Governor's Watershed Enhancement Board (GWEB) cost share and private funds. Two major impacts on the current rate of treatment are:

#1) the conversion of CRP land to wheat/fallow rotations. This will increase the amount of conservation required to meet the sponsor's objectives;

and

#2) funding through the GWEB program will be at a level substantially below that required to meet the sponsor's objectives.

The major landuse change is expected to be the return of 24,750 acres (90%) of CRP to wheat/fallow rotations. Without the project the deteriorated riparian zone and salmonid fish populations will continue their downward trend, based on the current and forecasted level of treatment.

PROBLEMS AND OPPORTUNITIES

PROBLEMS

The 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution identifies the following as negatively impacted beneficial uses in Buck Hollow:

Negatively Impacted Beneficial Uses

- Livestock Watering (low flows limit access)
- Cold Water Fish
- Other Aquatic Life
- Wildlife
- Water Contact Recreation
- Aesthetic Quality

The 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution identifies the following as severe pollution types in Buck Hollow:

Pollution Types Rated Severe

- Turbidity
- Low dissolved oxygen
- Nutrients
- Sediment
- Streambank erosion
- Decreased stream flows
- Insufficient stream structure

Subsequent to the 1988 report and based on recent appraisal by the Soil Conservation Service and the Oregon Department of Fish and Wildlife it is apparent that another key pollution type rated severe in Buck Hollow is:

Additional Pollution Type Rated Severe

- Temperature

The 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution identifies the following as likely probable causes for existing negative impacts in Buck Hollow:

Probable Causes

- Surface Erosion (Sheet, Rill, Gully, and Wind)
- Decreased Ground Surface Permeability
- Elimination of Thermal Cover to Stream
- Vegetation Removal

Subsequent to the 1988 report and based on recent appraisal by the Soil Conservation Service and the Oregon Department of Fish and Wildlife it is apparent that other likely probable causes for existing disturbance in Buck Hollow are:

Additional Probable Causes

- Changes in flow Pattern & Timing (Ground and Surface)
- Decline in Alluvial Water Table
- Drought

Critical Water Quality Problem

The cold water fishery is the most sensitive of the identified negatively impacted beneficial uses, in the Buck Hollow Watershed. Conservation measures installed to remove cold water fish from the list of negatively impacted beneficial uses will improve watershed conditions to the point that the other listed negatively impacted beneficial uses will also be removed from the list.

The most critical impairments to cold water fish are high temperatures, low flows, and sediment delivery. Additionally nutrient loading and stream structure, particularly as it relates to salmonid and other cold water fish habitat, are key impairments. These water quality impairments directly and negatively impact the spawning and rearing of salmonid and other cold water species. Key water quality parameters, present, forecasted and desired, are presented in Table B.

Table B. WATER QUALITY PARAMETERS PRESENT, FORECASTED AND DESIRED

	Shade (%)	Max. Water Temperature (degrees F)	Minimum Flow @ Mouth (CFS)	Pool/Riffle Ratio (ft/ft)	Channel Width/Depth Ratio (ft/ft)	Stream Channel Stability (%)	Riparian Woody Debris (unit/100m)	Substrate Fines (% fines)
Present	36	80	1	10/90	30	25	< 5	20
Forecasted	40	80	1	10/90	40	30	< 5	30
Desired	80	58	5	40/60	< 10	80	> 20	< 12

Impact on the Cold Water fishery --

	Number of Adult Steelhead (Oncorhynchus mykiss)
Present	200
Forecasted	200
Desired	1200

OPPORTUNITIES

The Sponsors have identified the following opportunities in the Buck Hollow watershed.

1. Improved natural resource conservation education. Through coordination with local school districts and the sponsors, volunteer landowners will allow access to their property by junior high and high school students for educational activities related to natural resource conservation. Additionally the sponsors will conduct annual tours for interested groups which will educate a diverse community about resource conservation practices.

2. Demonstrate the co-existence of productive agriculture, a healthy watershed, high water quality and salmonid habitat. Buck Hollow may serve as a model for other watersheds dealing with the combined issues of sustainable agriculture, watershed health, water quality, and salmonid and other cold water fisheries habitat.

SCOPE OF THE ENVIRONMENTAL ASSESSMENT

Scoping was conducted to identify concerns significant to the decision making process, such as environmental, legal, political, and technical limitations and their possible effects. The scoping process involved the public, agencies of government and interested technical people. A well attended consensus planning session was held April 18th through April 20th 1994, at The Dalles, Oregon. During this session significant concerns were identified that relate to watershed problems or stem from their proposed solutions. Concerns of less critical importance to the overall health of the watershed were eliminated.

Scoping of concerns caused the planning efforts to be directed toward rectifying water quality problems specifically related to salmonid fisheries. The primary objectives of the Sponsors is to reduce water quality impairments by reducing sediment and nutrient loading, lowering instream temperatures, and increasing low flows. These objectives will also improve the nabitat for the spawning and rearing of salmonid and other cold water species. Table C displays the results of scoping.

Table C
Identified Concerns

	Economic, social and environmental concerns	Degree of concern	Degree of significance	Remarks
1.	Water Quality	High	High	Poor Water Quality resulted in several negatively impacted beneficial uses
2.	Sediment-ation	Medium	Medium	Current levels of sedimentation are excessive
3.	Streambank erosion	Medium	Medium	75 % of stream banks are unstable
4.	Seasonal Peak Water Flows	High	High	High peak flows preclude riparian restoration and improvements to fish habitat
5.	Low Summer Base Flows	High	High	Low summer base flow is directly linked to water quality impairments
6.	High Water Temperature	High	High	High water temperatures are lethal to salmonids
7.	CRP Contracts Expire	High	High	Erosion rates will increase, farm income variability will increase, runoff will increase, fish and wildlife values may decrease
8.	Lack of Streamside Vegetation	High	High	Shading is very important in controlling temperature, vegetation contributes to biodiversity

Table C - continued
Identified Concerns

	Economic, social and environmental concerns concerns	Degree of concern	Degree of significance	Remarks
9.	Lack of Fish	High	High	Currently populations are at lowest recorded levels
10.	Upland Water Sources	Medium	Medium	Lack of upland water limits grazing alternatives
11.	Threatened or Endangered Species	High	High	Steelhead are currently petitioned to be listed as T&E, Eagles and Peregrine Falcon are T&E listed
12.	Instream Cover & Structure	High	High	Lack of instream cover and poor structure yields poor fish habitat
13.	Water Rights	High	High	Pending instream water rights, landowners are concerned about options to develop water sources
14.	Stream Width/Depth Ratio	High	High	High width depth ratio precludes shading and makes fish passage more difficult
15.	Economics	Medium	Medium	A healthy farm economy is essential for continued implementation of conservation practices
16.	Upland Range Condition	Medium	Medium	Improved range condition would reduce peak runoff and be economically beneficial

Table C - continued
Identified Concerns

Economic, social and environmental concerns	Degree of concern	Degree of significance	Remarks
17. Landowner Resistance to Corridor Fencing	Medium	Medium	Complete and permanent livestock exclusion not socially acceptable, however may be accepted by some landowners
18. Undesire-able plants	Medium	Medium	Juniper, sagebrush and and other invading plants are a concern
19. Conser-vation costs	High	High	Many operations will require implementation assistance
20. Nutrient Loading	Medium	Medium	Nutrient loading impacts not well known
21. Cropland Erosion	Medium	Medium	Most wheat-fallow systems erode at rates greater than sustainable
22. Cultural Resources	Medium	Medium	Tribal trust and ceded land in watershed
23. Flood Plain	Low	Low	Limited amount of roads, buildings etc. in flood plain
24. Private Property Rights	High	High	Landowners fear loss of property rights
25. Wildlife Habitat	Medium	Medium	Improved watershed health will better distribute game and non-game species
26. Wetlands	Low	Low	Limited amount in watershed
27. Human Health and Safety	Low	Low	Resource problems do not significantly impact human health and safety

Table C - continued
Identified Concerns

Economic, social and environmental concerns	Degree of concern	Degree of significance	Remarks
28. Important Agricultural Lands	Low	Low	State zoning laws protects agricultural lands
29. Highly Erodible Lands	Low	Low	Highly erodible lands in compliance with FSA requirements

FORMULATION AND COMPARISON OF ALTERNATIVES

Formulation Process

Project formulation followed the inventory, forecasting, and analysis of the water and land resource conditions that were relevant to the sponsor objectives to reduce water quality impairments by reducing sediment and nutrient loading, lowering instream temperatures, and increasing low flow.

Formulation Goal

A formulation goal was established during the consensus planning session held April 18-20, 1994. The formulation goal is in keeping with the sponsor's objectives. The water quality parameters included in the formulation goal are:

1. Shade: The goal is to establish 80% shading of the watercourse. Shading is critical to the control of water temperature and a healthy riparian plant community. Providing 80% shade will also substantially increase woody debris in the riparian zone. The existing condition is 36% shade. Riparian degradation and loss of streamside vegetation is caused by a combination of livestock grazing and high flow events which have scoured the channel.

2. Water Temperature: The goal is to limit the maximum water temperatures to 58 degrees F. This is the optimum temperature for salmonid populations. The existing conditions are maximum water temperatures of 80 degrees F which are lethal to salmonid populations. High water temperature is caused by a lack of shading, low flows, and extremely wide degraded channels.

3. Flow: The goal is to augment low flows to a minimum of 5 CFS at the mouth of Buck Hollow. Improved base flows will positively impact water temperature and fish passage. The existing condition is low flows of 1 CFS at the mouth of Buck Hollow. Low flows are caused by a riparian zone in very poor condition. The existing riparian zone is highly scoured and lacks the water holding capacity to provide storage during high flows and later release water during the summer base flow months.

4. Pool/Riffle Ratio: The goal is to achieve a pool/riffle ratio of 40/60. This pool/riffle ratio has been established as optimum for salmonid spawning and rearing. The existing condition is a pool/riffle ratio of 10/90. The stream channel has been severely degraded by livestock gazing and high water events.

5. Channel Width/Depth Ratio: The goal is achieve a channel width/depth ratio of less than ten. This width/depth ratio will improve fish passage, allow for more shading, and have the hydraulic characteristics necessary to pass sediment and bedload through the system. The existing condition is a width/depth ratio of 30. The stream channel has been severely degraded by livestock grazing and high water events.

6. Streambank Stability: The goal is to have 80% of streambanks stable. This will reduce the amount of sediment directly entering the stream system. The existing condition is 25% bank stability. The stream channel has been severely degraded by livestock grazing and high water events.

7. Woody Debris: The goal is to have 20 units per 100 meters of stream corridor. This amount of woody debris will provide the proper amount of stream structure and cover for salmonid spawning and rearing. The existing condition is less than 5 units per 100 meters of stream corridor. This is caused by a lack of woody vegetation related to livestock degradation and high flow event scouring.

8. Substrate: The goal is to limit the percentage of fines in the channel substrate to less than 12 percent. The existing condition is 20% fines in the channel substrate. This is caused by the high amounts of sediment delivered to the stream from upland and streambank erosion.

Solution Methods Considered but Not Found Feasible

The following solution methods were considered but not found feasible:

1. Construction of a large dam in the main stem of Buck Hollow. An earlier Bureau of Reclamation "Lower Deschutes River Basin" appraisal report identified a 4500 ac-ft reservoir on Buck Hollow near Maken canyon. This reservoir site was identified as an option for increasing late season flows in Buck Hollow. At the consensus planning session this method was eliminated from consideration due to the unacceptability of large dams which significantly reduce fish passage.

2. Complete and permanent stream corridor fencing to exclude livestock from the riparian zone as the sole project measure. At the consensus planning session this method was eliminated from consideration due to it being unacceptable to a large number of landowners in the watershed and due to the fact that it does not address upland concerns. However it is recognized that fencing within the riparian area will be a tool acceptable to some landowners and as such will be included as a component of Grazing Management Systems (see page 21).

3. The exclusive use of grade stabilization structures to raise the hydraulic gradient of the riparian zone and increase the riparian zones capability to store water. This method was rejected due to it providing only an incomplete solution.

4. Widespread reliance on alternate crops and changes to established cropping systems. This method was rejected due to the lack of alternative systems being economically feasible and acceptable.

5. Continue and expand the use of the Conservation Reserve Program or some similar other program on cropland. This method was rejected due to high cost.

Methods to Achieve the Formulation Goal

During the consensus planning session held April 18th through April 20th, 1994 the following methods of achieving the formulation goal were identified, based on the defined formulation goal. Each method was defined as a system of related conservation practices and each system evaluated as to its capability of achieving the formulation goal individually. The evaluation of each system's impact on the formulation goal was based on 80% of landowners participating. This participation rate was arrived at during the consensus planning session.

Grazing Systems - These are defined as combinations of practices which target the improvement of the ecological condition of the plant community in those areas of the watershed where livestock graze. The area within the watershed where livestock graze can be subdivided into upland grazing and riparian zone grazing. In the Buck Hollow watershed, these subdivisions are closely connected as many landowners and operators have livestock which graze in both areas.

The primary focus of grazing systems within the riparian area will be to manage livestock to the extent that vegetative recovery will occur. This will have a direct and relatively rapid impact on riparian condition. Increased vegetation within the riparian area will facilitate stream shading and improve the water holding capability of the stream system, which in turn will augment low flows. Improved grazing management within the riparian zone will also have a beneficial impact on streambank erosion.

The primary focus of grazing systems in the uplands will be to improve the hydrologic condition of the grazed lands. Vegetative recovery in the uplands will have a significant and positive impact on reducing the high peak flows which have often scoured the main channels. Improved grazing management in the uplands of the watershed will also allow for systems which rest or defer grazing in the riparian zone, when upland grazing systems are integrated with riparian grazing systems.

Both riparian and upland grazing systems will promote an increase in AUM production and have a positive impact on the incomes of the ranching community.

The Soil Conservation Service practices identified to be included under Grazing Systems are:

Code	Practice Name	Code	Practice Name
556	Planned Grazing System	528	Proper Grazing Use
574	Spring Development	378	Pond
642	Well	382	Fencing
338	Prescribed Burning	550	Range Seeding
472	Livestock Exclusion	314	Brush Management
575	Stock Trail	516	Pipeline
614	Trough & Tank	352	Deferred Grazing
636	Water Harvesting Catchment		

The impact on the formulation goals from Grazing System are:

Shade : Increase shading from 36% to 66%. Goal is 80%.

Water Temp. : Reduce temperatures from current 80 degrees F to 65 degrees F. Goal is 58 degrees F.

Flow : Increase low flows from 1 CFS to 2 CFS. Goal is 5 CFS.

Pool/Riffle : Increase pool/riffle ratio from 10/90 to 30/70. Goal is 40/60.

Width/Depth : Reduce width/depth ratio from 30 to 20. Goal is less than 10.

Steambank : Increase streambank stability from 25% to 55%. Goal is 80%.

Wood Debris : Increase units per 100 meters of channel from less than 5 to 15. Goal is greater than 20.

Substrate : Reduce percent fines in substrate from 20 to 10. Goal is 10.

Fish Stream Improvements - These are defined as those combination of practices which directly target physical instream or streambank improvements. The primary focus of instream improvements will be streambank stabilization, the acceleration of riparian vegetation by plantings, and the use of low impact soil bio-engineering principles to promote instream structure, pool/riffle ratio, and width/depth ratio.

The Soil Conservation Service practices identified to be included under Fish Stream Improvements are:

Code	Practice Name	Code	Practice Name
395	Fish Stream Improvement	580	Stream Channel Stab.
584	Streambank and Shoreline Protection		

The impact on the formulation goals from Fish Stream Improvements are:

Shade : Increase shading from 36% to 41%. Goal is 80%.

Water Temp. : Reduce temperatures from current 80 degrees F to 75 degrees F. Goal is 58 degrees F.

Flow : No impact on low flows of 1 CFS. Goal is 5 CFS.

Pool/Riffle : Increase pool/riffle ratio from 10/90 to 20/80. Goal is 40/60.

Width/Depth : Reduce width/depth ratio from 30 to 25. Goal is less than 10.

Steambank : Increase streambank stability from 25% to 35%. Goal is 80%.

Wood Debris : Increase units per 100 meters of channel from less than 5 to 7. Goal is greater than 20.

Substrate : Reduce percent fines in substrate from 20 to 15. Goal is 10.

Cropland Systems - These are defined as combinations of practices which target the reduction of water, sediment, and nutrient runoff from cropland.

The primary focus of cropland management in the uplands will be to improve the hydrologic condition of croplands. Increased residue, terraces, filter strips, etc. will have a significant and positive impact on reducing the high peak flows which have often scoured the main channels. Improved hydrologic condition will also result in reduced erosion, sediment and nutrient runoff.

The Soil Conservation Service practices identified to be included under Cropland Systems are:

Code	Practice Name	Code	Practice Name
329	Conservation Tillage	350	Sediment Basin
327	Conservation Cover	600	Terraces
344	Crop Residue Use	393	Filter Strips
412	Grassed Waterway	342	Critical Area Plant.
328	Conservation Cropping Seq.	550	Range Seeding

Note: Code 550 Range Seeding will be applied to those lands which have contracts expiring from the Conservation Reserve Program and where the landowner decides to change the landuse from cropland to rangeland. Code 590 Nutrient Management and Code 595 Pesticide Management were considered for inclusion but omitted. It is recognized that Nutrient and Pesticide Management have important benefits to water quality. However these practices are, for the most part, normally practiced by landowners/operators in the Buck Hollow Watershed.

The impact on the formulation goals from Cropland Management System are:

Shade : Increase shading from 36% to 41%. Goal is 80%.

Water Temp. : No impact on current 80 degrees F water temperature. Goal is 58 degrees F.

Flow : No impact on low flows of 1 CFS. Goal is 5 CFS.

Pool/Riffle : No impact on pool/riffle ratio of 10/90. Goal is 40/60.

Width/Depth : Reduce width/depth ratio from 30 to 29. Goal is less than 10.

Steambank : Increase streambank stability from 25% to 27%. Goal is 80%.

Wood Debris : No impact on units per 100 meters of channel of less than 5. Goal is greater than 20.

Substrate : Reduce percent fines in substrate from 20 to 10. Goal is 10.

Other Conservation Practices - These are defined as those other practices, not yet listed, which would directly improve the watershed's health. These practices target the reduction of runoff and the trapping of sediment and nutrients, from range and cropland, the proper design and maintenance of farm roads in the watershed, and the improvement of wildlife upland habitat.

Runoff will be reduced and sediment and nutrients will be trapped by providing additional storage in the uplands. Peak runoff reduction will address the watershed's poor hydrologic condition and directly target a major negative impact on the riparian zone. The severe scouring resulting from past peak runoff events will be attenuated.

The proper construction of farm roads will reduce erosion and sediment delivery. Farm roads are often an integral practice in the planning of grazing and cropland systems. Wildlife upland habitat improvement will improve watershed health and reduce the impact of big game concentrations in the riparian zone.

The Soil Conservation Service practices identified to be included under Other Conservation Practices are:

Code	Practice Name	Code	Practice Name
560	Access Road	645	Wildlife Upland Hab.
638	Water & Sediment Control Basin		

Note: to comply with State of Oregon Dam Safety requirements and to more completely address the purpose of the project Code 638 Water & Sediment Control Basin will meet the higher SCS construction standards required of Code 378 Pond.

The impact on the formulation goals from Other Conservation Practices are:

Shade : Increase shading from 36% to 41%. Goal is 80%.

Water Temp. : No impact on current 80 degrees F water temperature. Goal is 58 degrees F.

Flow : Increase low flows from 1 CFS to 1.5 CFS. Goal is 5 CFS.

Pool/Riffle : No impact on pool/riffle ratio of 10/90. Goal is 40/60.

Width/Depth : Reduce width/depth ratio from 30 to 28. Goal is less than 10.

Steambank : Increase streambank stability from 25% to 30%. Goal is 80%.

Wood Debris : No impact on units per 100 meters of channel of less than 5. Goal is greater than 20.

Substrate : Reduce percent fines in substrate from 20 to 10. Goal is 10.

Formulation of the Accelerated Land Treatment Alternative

Four methods were evaluated individually as to their capability to achieve the formulation goal. None of the four above systems were shown to individually achieve the formulation goal. The four systems were then considered to be applied together. There was consensus that the formulation goal was met when the four systems were applied in combination. This is due to the synergistic effect of the systems.

The formulation of the Accelerated Land Treatment Alternative was developed using an incremental process arrived upon at the consensus planning session. The incremental order used in the development of the Accelerated Land Treatment Alternatives focused first on direct impacts on the riparian area, secondly on management systems in the uplands which improve the hydrologic response of the watershed and last on storage techniques to improve the hydrologic response. The order of implementation of conservation systems in the Buck Hollow Watershed was determined to be:

1) (a) Application of Grazing Systems in the riparian zone treatment unit. Grazing Systems in the riparian zone will have the most direct and fastest positive impact on the formulation goals.

1 (b) Application of Grazing Systems on the upland range treatment unit. It is recognized that many landowners/operators have grazed land in both the riparian zone and the uplands. It will be necessary to coordinate Grazing Systems in both riparian and upland areas when working with these landowners. Grazing Systems in the uplands will also have a positive impact relative to the hydrologic response of the watershed. An improved hydrologic response from upland Grazing Systems will beneficially impact water quality, specifically related to the salmonid fishery.

2) Application of Fish Stream Improvements. Reduction of streambank erosion, stream vegetation, and fish habitat will have a direct and fast positive impact on the formulation goals.

3) Application of Cropland Systems on the cropland treatment unit. Upland conservation treatment of Cropland Systems will add an additional level of hydrologic improvement and reduction in sediment and nutrient runoff. An improved hydrologic response from upland Cropland Systems will beneficially impact water quality, specifically related to the salmonid fishery.

5) Application of Other Conservation Practices. Upland conservation treatment of practices, primarily Water and Sediment Control Basins, which increase the storage available for runoff will add an additional level of hydrologic improvement and reduction in sediment and nutrient runoff. The amount of storage developed using Water and Sediment Control Basins will be the final incremental amount required to retard peak runoff rates to a level which will assure the formulation goals are met, and after all management practices are installed.

Description of Alternative Plans

Two alternatives, Alternative 1 - No Project Action, and Alternative 2 - Accelerated Land Treatment were evaluated. General viability of both alternative plans was determined by considering four aspects:

Completeness: The extent to which an alternative plan accounts for all investments and actions necessary to realize planned results.

Effectiveness: The extent to which an alternative plan alleviates the problem and achieves the opportunities identified.

Efficiency: The extent to which an alternative plan is most cost effective.

Acceptability: The extent to which an alternative plan is accepted by the public and compatible with existing laws, regulations, and policies.

ALTERNATIVE 1 - No Project Action (Future Without Project)

Components - Continued implementation of FSA compliance plans on 41,000 acres, annual installation of 4,000 feet of terrace and 3 WASCOBs, 1 mile of riparian restoration, and grazing management system implementation on 1,000 acres. Use of ACP program to assist in financing.

Costs - No additional costs result from Alternative 1.

ALTERNATIVE 2 - Accelerated Land Treatment

Components- Implementation of 25 miles of Fish Stream Improvements, 10,500 acres of Cropland Systems, 60,000 acres of Rangeland Systems (2,000 acres in the riparian zone), and 94,900 acres impacted from Other Conservation Practices (includes 1000 acre-feet of upland storage using Water and Sediment Control Basins). For a complete listing of the type and number of conservation practices installed see Appendix C.

Costs- This alternative has an estimated installation cost of $4,580,0100. The estimated PL83-566 cost is $2,462,700. Refer to table #1 for a complete cost breakdown.

Effects of Alternative Plans

ALTERNATIVE 1 - No Project Action (Future Without Project)

Effects - This alternative will result in a continued decline of already depressed salmonid fish populations, continued degradation of the riparian zone, and would fail to meet the objectives of the project sponsors. This alternative does not address the continuation of damaging high peak flow, continued low base flow and existing water quality problems. The salmonid fishery will continue to decline. The effects on the relevant water quality parameters are shown on page 12.

ALTERNATIVE 2 - Accelerated Land Treatment

Effects- The currently listed negatively impacted beneficial uses, in Buck Hollow, will no longer be listed, as a result of this alternative. Water quality will be improved in Buck Hollow by lowering water temperatures, improving fish passage, and improving base flows. Sediment and nutrient delivery to Buck Hollow from 76,600 acres of rangeland and 46,200 acres of cropland will be reduced. Sediment delivery will be reduced by 21,900 tons annually. Erosion from crop and rangeland (including riparian area) will be reduced by 45,000 tons annually. Sediment removal from roadside ditches will be reduced by 2,000 cubic yards annually. Annual forage production of rangeland (including riparian area) will increased by 2,500 animal unit months (AUM). Annually returning steelhead will be increased by 1,000 adult fish. An estimated 80% of nutrients contained in runoff will be trapped. Average annual benefits are $456,100 (see table 5a).

Note: No specific quantification of nutrients delivered to the Buck Hollow main stem was made. However the 80% value is based on the estimated trap efficiency of WASCOBs.

Comparison of Alternative Plans

A summary and comparison of Alternative Plans is shown as Table D

Table D - SUMMARY AND COMPARISON OF ALTERNATIVE PLANS-

Effects	Alternative 1 (no project action)	Alternative 2 (recommended)
Note: Alternative 2 is Accelerated Land Treatment		
Measures	-------	Land Treatment on: 60,000 ac. rangeland, 10,500 ac. cropland, 25 mi. stream habitat improvement.
Project invest.	$0	$4,580,000
National Econ. Devel. Acct.		
Beneficial annual	---	$456,100
Adverse, annual	---	$483,200
Net Beneficial	---	($27,100)
Environmental Quality Acct.		
Cold Water Fishery - critical impairments to salmonid species spawning/rearing: high water temp., low flows & sediment delivery.		Impairment corrected within project life
Other impairments: nutrient loading, stream structure		within project life
Stream side vegetation Woody canopy inadequate at 40 %		adequate canopy at 80 %
Lack of Fish, reduced population of salmonids at 200 and degraded channel/habitat		Increased adult population, salmonids at 1,200 Improved channel/ habitat- 25 mi.

TABLE D- SUMMARY AND COMPARISON OF ALTERNATIVE PLANS
-Continued

Effects	Alternative 1 (no project action)	Alternative 2 (recommended)
Environmental Quality Acct. (Cont.)		
Water Quality - State standards		
Increased violations from identified pollutant types:		Reduced violations to meet standards:
Low stream flow (1 cfs)		(5 cfs)
Temperature (Max. 80 deg. F)		(< 58 deg. F)
Turbidity		infrequent violations
Nutrients		infrequent violations
Sediment		infrequent violations
Low DO		infrequent violations
Insufficient stream structure and cover		Adequate stream structure and cover
Water Quantity - excessive		
Seasonal peak flow increasing to:		Reduced peak flow decreased to:
2-yr. event at 2,000 cfs		300 cfs
5-yr. event at 5,900 cfs		2,100 cfs
Upland water source of benefit to:		Increase to:
domestic stock at	5 ac-ft.	25 ac-ft.
wildlife at	250 ac ft.	1,250 ac ft.
Total	255 ac-ft.	1,275 ac-ft.
Wildlife Concentrations		
Decreasing upland & riparian habitat values & potential populations. (increased regulations)		Increased upland & riparian habitat value & populations. (increased management & property trespass)
Erosion - excessive and increasing to:		Reduced erosion decreased to:
avg. sheet & rill on		
/1 rangeland at	0.10 T/A/Y	0.04 T/A/Y
/2 cropland at	4.5 T/A/Y	2.2 T/A/Y
/3 avg. streambank @	900 T/Mi/Y	250 T/Mi/Y
avg. gully at	0.2 T/A/Y	0.1 T/A/Y

/1 rangeland at 76,600 acres - 60,000 acres treated
/2 cropland at 46,200 acres - 10,500 acres treated
/3 streambank at 28 miles - 25 miles treated

TABLE D- SUMMARY AND COMPARISON OF ALTERNATIVE PLANS -Continued

Effects	Alternative 1 (no project action)	Alternative 2 (recommended)
Environmental Quality Acct. (Cont.)		
Sediment yields - excessive and increasing to:		Reduced sediment decreased to:
sheet & rill at	26,000 T/Y	4,000 T/Y
Streambank & gully	26,000 T/Y	7,000 T/Y
Total	52,000 T/Y	11,000 T/Y
Conservation Reserve Program expiration, Watershed health and hydrologic condition. Degradation- reduced rainfall infiltration, reduced support of soil, water, plant, animal, air resources.		Improved watershed health and hydrologic Improved condition- increased rainfall infiltration, increased support of soil, water, plant, animal, air resources.
Rangeland/Grazing Continued production: at 12,000 AUMs. Management of Juniper, sagebrush & other undesirable plants. Reduced control		Increased production: at 14,500 AUMs. Improved control
Rare, threatened, and endangered species habitat. Fish - Salmonids (petitioned/potential listing)		(reduced likelihood of listing)
Flood damages - to wildlife habitat increased: Loss of healthy riparian corridor and downstream sediment damages in the Deschutes and Columbia Rivers.		Habitat recovery Gain of healthy riparian corridor and sediment delivery to the Deschutes and Columbia Rivers.

TABLE D- SUMMARY AND COMPARISON OF ALTERNATIVE PLANS -Continue

Effects	Alternative 1 (no project action)	Alternative 2 (recommended)
Other Social Effects Acct.		
Scenic/aesthetic		
Degradation of natural landscape		Restoration of natural landscape in riparian areas
Private Property rights - potential reduction in viability of economic farm and ranch units		Reduced potential fo loss of viability of farm and ranch units
Cultural Resources		
Continued degradation of land and water resource, including salmonid fishery and upland hunting with cultural and religious significance.		Resource recovery and protection by locally accepted change in management of land resources.
Protected		Protected
Range Management/Grazing		
Management risks		Management risks
short term - decreased		increased
long term - increasing		decreased
Risk to Life and limb		
No change		Slight reduction in flood hazard
Regional Economic Development Acct.		
Beneficial annual		
Region	---	$456,100
Rest of Nation	---	0
Adverse, annual		
Region	---	$217,300
Rest of Nation	---	$265,900

Risk and Uncertainty

The degree of risk and uncertainty involved in each alternative and in each project element was considered throughout the planning process. The consensus planning method was used rather than detailed technical analysis.

The uncertainty of fish population projections, and the impacts of riparian and upland management were evaluated in depth. Projected fish populations were obtained from the local Oregon Department of Fish and Wildlife District Fish Biologist. An alternative fish population analysis was completed and published in the "Columbia Basin System Planning - Deschutes River Sub-basin Salmon and Steelhead Production Plan". This alternative fish population analysis suggests projected steelhead population from 60 to 850. This alternative analysis yields an increase of 790 rather then 1000 as stated in Table B.

Project action will focus on water quality parameters within Buck Hollow which directly impact salmonid fish habitat. Additional habitat problems face the salmonids when migrating. These problems include dam passage and ocean conditions, both of which are beyond the scope of the project.

Buck Hollow lacks historic measured streamflow data. Hydrologic analysis was used to model the existing runoff conditions in the watershed and make comparisons to the historical (pre 1850) watershed condition. Hydrologic analysis was checked, to the extent possible, by a review of a ten year runoff period, of Rock Creek in adjacent Gilliam County. Rock Creek was the only gauged stream of a similar nature to Buck Hollow found in Oregon.

The construction of Water and Sediment Control Basins have currently been determined to not require an Oregon Water Right permit if they are constructed under an agreed upon specification developed with Oregon Water Resources Department (see Appendix B). If at some future time the Water and Sediment Control Basin are used for other purposes, water rights may be required. That process could result in substantial delays.

Rationale for Plan Selection

Sponsors and the general public selected the Accelerated Land Treatment Alternative as the recommended plan. This alternative was selected because the sponsors and general public determined it to be complete, effective, efficient, and acceptable.

CONSULTATION AND PUBLIC PARTICIPATION

Agency consultation and public participation were an integral part in all phases of planning and environmental evaluation conducted by the Sponsors and SCS. On April 18th through 20th, 1994 a consensus planning session was held by the Sponsors to assist in the development and review of the preauthorization study results. This well attended session included participants from other federal and state agencies, landowners and operators within the watershed, concerned environmental organizations, and the general public. The resource problems, opportunities and related environmental considerations were initially evaluated and the feasibility of proposed alternatives discussed. The sponsors accepted the pre-authorization report in May 1994 and advised SCS to proceed in planning the project.

Agency Consultation

Formal agency consultation began with a review by the State Designated Agency, The Oregon Water Resource Department (OWRD), review of the Sponsor's Application for Technical Assistance, submitted March 15, 1994. On May 5, 1994 the Director of OWRD notified the Soil Conservation Service that the State of Oregon placed a high priority on the Buck Hollow Watershed.

Based on the results of these meetings and preauthorization studies, SCS requested planning authorization from the SCS chief in Washington D.C. This authorization was granted and agencies and public were notified. The interdisciplinary planning staff assigned to the project consulted with agencies and group representatives on specific items as necessary, and periodically on an informational basis.

The environmental evaluation required by NEPA was conducted in conjunction with planning. Similar consultation continued throughout the environmental evaluation. USFW, NMFS, and ODF&W were consulted in accordance with Section 7 of the Endangered Species Act, as amended, concerning threatened and endangered species that may be present in Buck Hollow Watershed.

The State Historic Preservation Officer (SHPO), was consulted concerning historical and archaeological sites within Buck Hollow watershed.

A technical review copy of the Plan-EA was distributed to the Sponsors for informal review. Discussions and informal comments from the technical review were incorporated into the Draft Plan-EA.

The Draft Plan-EA was distributed for review and comment to individuals who had expressed interest in receiving a copy and to the following agencies and groups.

U.S GOVERNMENT

Department of Agriculture
- Agricultural Stabilization and Conservation Service
  - State Office and Wasco and Sherman County Offices
- Farmers Home Administration State Office
- Forest Service Regional Office

Department of Defense
- Corps of Engineers, District Office

Department of Interior
- Bureau of Land Management
- Geological Survey
- Bureau of Reclamation, Regional Office
- Fish and Wildlife Service, Nation and Regional Offices
- National Marine Fishery Service

Environmental Protection Agency, Regional Office,
- Office of Federal Activities

STATE OF OREGON

- Columbia Basin Fish and Wildlife Authority
- Department of Agriculture
- Department of Environmental Quality
- Department of Fish and Wildlife, District, Regional, and State Headquarters
- Department of Forestry
- Department of Transportation
- Department of Water Resources
- Department of Parks and Recreation
- Division of State Lands
- Oregon State University, Extension Service
- State Historic Preservation Officer

WASCO AND SHERMAN COUNTIES
- Wasco County Board of Commissioners
- Sherman County Board of Commissioners

SPONSORS
- Wasco County Soil and Water Conservation District
- Sherman County Soil and Water Conservation District

CONFEDERATED TRIBES of the WARM SPRINGS RESERVATION

INDIVIDUALS

Senator Mark O. Hatfield
Senator Bob Packwood
Representative Robert F. Smith
Governor Barbara Roberts

Public Participation

In addition to the consensus planning session held April 18th through April 20th , 1994 a public meeting was held May 20th, 1994. Public meeting notices were published and mailed to agencies, landowners, and other who expressed interest prior to the meeting. Information sheets were available at the public meeting. Local participants were encouraged to give the sheets to acquaintances interested in making their concerns a part of this project. Problems, concerns, alternatives, and the recommended plan and its effects were discussed.

RECOMMENDED PLAN

Purpose and Summary

Alternative 2 - Accelerated Land Treatment is the Recommended Plan. The primary purpose of the Plan-EA is to rectify water quality problems, specifically related to salmonid fisheries, as identified in the 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution. Project measures will be installed for the purpose of reducing water quality impairments such as sediment and nutrient loading, high temperatures and low flows. These measures will greatly improve the habitat for the spawning and rearing of salmonid species.

Plan Elements

(Refer to Appendix C for a complete list of planned land treatment practices).

Grazing Systems: All owners will be encouraged to apply grazing systems in both the riparian zone and the uplands. SCS will provide technical assistance to develop grazing systems which are compatible with the purpose of the project. Each grazing system will be:

- tailored to help meet the project purpose

- designed to fit the size and number of grazing units, climate, kind and condition of grazing land, and kinds and classes of grazing animals, including big game, and number or herds

- practical and flexible to meet the needs of key plants in relation to climatic fluctuations

- designed with emphasis on the nutritional needs of the grazing and browsing animals

- provide for movement of livestock from one grazing unit to another, depending on the condition and needs of key forage plants and grazing animals

- consider fences, water facilities, and brush management alternatives in terms of adequacy, economics, and environmental impacts, both onsite and offsite

- include special provisions for prolonged drought or other unusual circumstances

- include proper grazing use and pasture management as essential elements

- developed with consideration to the maintenance of needed crop residue for erosion protection and soil maintenance when temporary forage crops and crop residues are included as part of the grazing system

- developed with consideration to establishing and maintaining proper vegetation in the riparian zone

Fish Stream Improvements: All owners will be encouraged to apply those instream measures identified to meet the project purpose. SCS will provide technical assistance for the identification, design and installation of planned fish stream improvements. Fish Stream Improvements will be targeted to:

- provide instream and stream bank shelter

- improve instream spawning conditions for fish

- eliminate or modify instream barriers for fish passage

- reduce sediment loads causing downstream damages and pollution

- protect banks and channels against scour and erosion

- control aggradation or degradation in stream channels

Cropland Systems: All owners will be encouraged to apply cropland systems in the uplands. SCS will provide technical assistance to develop cropland systems which are compatible with the purpose of the project. Cropland Systems will be targeted to:

- improve or maintain good physical, chemical, and biological conditions of the soil
- reduce soil erosion
- improve water use efficiency and water quality
- reduce damage from sediment and runoff to downstream areas
- improve associated wildlife habitat
- maintain enduring cover on cropland where Conservation Reserve Program contracts expire

Other Conservation Practices: All owners will be encouraged to apply Water and Sediment Control Basins (WASCOBs) where feasible and when they are needed to satisfy the purpose of the project (Note: an estimated 1,000 acre-feet of upland storage will be provided by the installation of WASCOBs). Additionally all owners will be encouraged to properly construct and/or maintain farm roadways and to actively improve the management of uplands for the purpose of wildlife. SCS will provide the technical assistance necessary to install these other conservation practices. Other Conservation Practices will be targeted to:

- reduce water course and gully erosion
- reduce and manage onsite and downstream runoff
- trap sediment and nutrients
- improve water quality
- provide a fixed route for travel for moving livestock, as a component of Grazing Systems, while controlling runoff to prevent erosion
- provide year-long food, cover, and water for resident wildlife species or for an appropriate period for migratory species at acceptable population levels

Mitigation Features

No significant losses of fish or wildlife habitat will occur as a result of implementing this plan. Primary consideration will be given to the timing of activities in channel areas in order to limit it to periods having the least detrimental impact on fish or wildlife.

Permits and Compliance

Installation of the proposed measures will be performed in full compliance with all federal, state, and local laws and policies pertaining to (1) Dredge, fill, and removal of materials in waterways, (2) Requirement for water right permits and certificates, (3) Compliance with Oregon Water Resource Department's dam safety standards, and (4) Compliance with the Oregon Water Resource Department's specification for the construction of sediment retention ponds in the Buck Hollow Watershed.

Costs

Technical assistance costs include planning, design, inspection and compliance reviews. Project administration includes the cost of administering contracts and operation overhead. SCS will be responsible for all technical assistance and project administration costs.

The recommend alternative has an estimated installation cost of $4,580,000. The estimated PL83-566 cost is $2,462,700. Refer to table #1 for a complete cost breakdown.

Installation and Financing

Implementation of the recommended plan will take five years. The schedule of implementation and obligation is shown in Table E.

Table E. Estimated Implementation and Obligation Schedule
Buck Hollow Watershed, Oregon

Year .. 1

Installed Cost Item	Estimated Cost (Dollars) Nonfederal Land		
	PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost	$457,900	$246,600	$704,500
Management Cost	$0	$185,100	$185,100
Technical Assistance	$133,800	$0	$133,800
Total Year .. 1	$591,700	$431,700	$1,023,400

Year .. 2

Installed Cost Item	Estimated Cost (Dollars) Nonfederal Land		
	PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost	$457,900	$246,600	$704,500
Management Cost	$0	$185,100	$185,100
Technical Assistance	$133,800	$0	$133,800
Total Year .. 2	$591,700	$431,700	$1,023,400

Year .. 3

Installed Cost Item	Estimated Cost (Dollars) Nonfederal Land		
	PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost	$305,300	$164,400	$469,700
Management Cost	$0	$185,100	$185,100
Technical Assistance	$133,800	$0	$133,800
Total Year .. 3	$439,100	$349,500	$788,600

Table E. Estimated Implementation and Obligation Schedule
con't Buck Hollow Watershed, Oregon

Year .. 4

Installed Cost Item	Estimated Cost (Dollars) Nonfederal Land PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost	$152,700	$82,300	$235,000
Management Cost	$0	$185,100	$185,100
Technical Assistance	$133,800	$0	$133,800
Total Year .. 4	$286,500	$267,400	$553,900

Year .. 5

Installed Cost Item	Estimated Cost (Dollars) Nonfederal Land PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost	$152,700	$82,300	$235,000
Management Cost	$0	$185,100	$185,100
Technical Assistance	$133,800	$0	$133,800
Total Year .. 5	$286,500	$267,400	$553,900

Year .. 6

Installed Cost Item	Estimated Cost (Dollars) Nonfederal Land PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost	$0	$0	$0
Management Cost	$0	$185,100	$185,100
Technical Assistance	$133,800	$0	$133,800
Total Year .. 6	$133,800	$185,100	$318,900

Table E. Estimated Implementation and Obligation Schedule
con't Buck Hollow Watershed, Oregon

Year .. 7

Installed Cost Item	Estimated Cost (Dollars) Nonfederal Land		
	PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost	$0	$0	$0
Management Cost	$0	$184,500	$184,500
Technical Assistance	$133,400	$0	$133,400
Total Year .. 7	$133,400	$184,500	$317,900

Project Totals

Estimated Cost (Dollars) Nonfederal Land		
PL-566 SCS	Other Funds	Total
$2,462,700	$2,117,300	$4,580,000

Responsibilities: Leadership for the development, installation, operation, and maintenance of land treatment practices will be the responsibility of the Wasco and Sherman County Soil and Water Conservation Districts.

In accordance with priorities set by the Wasco and Sherman County Soil and Water Conservation Districts and the requirements of this Plan-EA, SCS is responsible for providing technical assistance. Technical assistance includes conservation planning, engineering design, and contract preparation for long-term contracts. SCS will also participate in O&M inspections and follow-up actions for a two year period.

Contracting: Long-term contracts (LTC's) between SCS and participants will be developed for cost-shared land treatment. Each LTC will be based on a plan/schedule of operations developed by the participant and approved by SCS.
LTC's will range in duration from four to seven years.
An estimated 40 LTC's will be developed based on an 80% participation rate. 20 LTC's are estimated to be written in each of the first two years. No LTC's will be signed until the initial participation requirements are met and all LTC's will be signed within five years of the date on which the plan is approved. Each LTC's will have a $100,000 limitation of PL83-566 cost share.

Plans may require conservation treatment that will not be cost shared. The sponsors have determined that landowners installing Water and Sediment Control Basins (WASCOBs) be also required to install grazing management systems to meet the project purpose.

LTC's will not be entered into if the land involved is within a unit that is under contract for conservation land treatment under another program.

Other Agencies: Cost share funds, available under the annual Agricultural Stabilization and Conservation Service cost-share program (ACP), may be available for land treatment in the watershed during the project's implementation. The PL-566 project was formulated in addition to the existing, ongoing ACP program. Additionally other agencies may provide funding sources which may enhance the Buck Hollow watershed. In particular GWEB, ODFW, and BPA have previously been funding sources.

Cultural Resources: The Buck Hollow watershed is entirely located on lands ceded to the United States Government by the Warm Springs Tribe. The Treaty mandates sufficient water quality and quantity to maintain the fishery resource. Additionally, the Treaty reserved the right to fish at all locations where members of the Warm Springs Tribe fished at treaty time, both within the ceded area and beyond, as well as the right to hunt, gather roots, berries and alderwood and pasture livestock on lands owned by the public.

The procedures of the SCS General Manual (420 GM 401) will be followed during project installation. If cultural resources are discovered during project installation work will be halted and the Oregon SCS Cultural Resource Coordinator will be immediately contacted.

Financing: The participants in the project will incur individual costs as outlined in the Long Term Contracts (LTC's). Participants may receive credit for such contributions toward their required cost sharing under conditions to be agree upon in advance of their performance. The Sponsors may continue to solicit non-federal, grant funds to assist project participants in meeting their financial obligations.

Operation, maintenance, and replacement: The landowners/operators are responsible for operation, maintenance and replacement. The Sponsors will encourage landowners and operators to operate and maintain the land treatment measures on their farms and ranches for the protection and improvement of the watershed. Appendix A includes an evaluation of the life span of practices and operation, maintenance, and replacement costs associated with them. The Long-term Contracts (LTC's) developed between the SCS and participants will clearly indicate the operation, maintenance, and replacement required for individual practices. Operation, maintenance, and replacement requirements and agreements will comply with the SCS National Operation and Maintenance Manual.

Tables: The following tables, pages 45-48, include those National Watershed and Planning Manual tables applicable for the Buck Hollow Watershed recommended alternative.

Table 1. Estimated Installation Cost
Buck Hollow Watershed, Oregon

Installed Cost Item	Number Nonfederal Land Unit	Number	Estimated Cost (Dollars) 1/ Nonfederal Land PL-566 SCS	Other Funds	Total
Evaluation Unit Construction Cost					
Fish Stream Improvement	Miles	25	$178,800	$96,300	$275,100
Cropland	Acres	10,500	$420,900	$226,600	$647,500
Rangeland					
Uplands	Acres	60,000	$375,200	$202,000	$577,200
Riparian Zone	Acres	2,000	$105,000	$56,500	$161,500
Other	Each	170	$446,900	$240,600	$687,500
Total Construction Cost			$1,526,800	$822,000	$2,398,800
Total Management Cost	Acres	72,600	$0	$1,295,300	$1,295,300
Technical Assistance	Work-Years	16.1	$859,700	$0	$859,700
Administrative Assist.	Work-Years	1.4	$76,200	$0	$76,200
Total Land Treatment Costs:			$2,462,700	$2,117,300	$4,580,000

1/ Price Base: 1994.

November 1994

Table 4. Estimated Average Annual NED Costs
Buck Hollow Watershed, Oregon

Evaluation Unit	Project Outlays /1		Other Project Costs	
	Amortized Installation Cost	Operation Maintenance Replacement Cost	Other Direct Costs	Total
Land Treatment-Accelerated Evaluation Unit Construction Cost				
Fish Stream Improvement	$25,800	$5,500	$0	$31,300
Cropland	$60,700	$10,700	$0	$71,400
Rangeland				
Uplands	$54,100	$12,800	$0	$66,900
Riparian Zone	$15,100	$6,200	$0	$21,300
Other	$64,400	$19,000	$0	$83,400
Total Construction Cost	$220,100	$54,200	$0	$274,300
Total Management Cost	$121,300	$0	$0	$121,300
Technical Assistance	$80,500	$0	$0	$80,500
Administrative Assist.	$7,100	$0	$0	$7,100
Grand Total	$429,000	$54,200	$0	$483,200

/1 Price Base 1994, amortized over 25 years at a discount rate of 8.00 percent

November 1994

Table 5a. Estimated Average Annual Watershed Protection Damage Reduction Benefit
Buck Hollow Watershed, Oregon

Item	--- Damage Reduction Benefit Average Annual --- Agricultural-related	Nonagricultural-related
Onsite		
Erosion Reduction	$8,100	$0
Ditch Maintenance	$7,000	$0
Forage Increase	$18,200	$0
Weaning Weight Increase	$47,500	$0
Calf Crop Increase	$38,000	$0
Subtotal	$118,800	$0
Offsite/Public		
Steelhead Fishery	$0	$132,500
Sediment Reduction	$0	$204,800
Subtotal	$0	$337,300
Totals	$118,800	$337,300
Grand total:	$456,100	

1/ Price base 1994.

November 1994

Table 6. Comparison of NED Benefits and Costs
Buck Hollow Watershed, Oregon

Evaluation Unit	Agricultural-related		Nonagricultural		Average Annual Benefits /2	Average Annual Costs /3	Benefit Cost Ratio /1
	Damage Reduction	Intensi-fication	Water Ways	Wildlife Recreation			
Land Treatment-Accelerated							
Fish Stream Improvement	$0	$0	$95,400	$132,500	$227,900	$31,300	
Cropland	$15,100	$0	$24,200	$0	$39,300	$71,400	
Rangeland							
Uplands	$0	$63,300	$3,400	$0	$66,700	$66,900	
Riparian Zone	$0	$40,400	$0	$0	$40,400	$21,300	
Other	$0	$0	$81,800	$0	$81,800	$83,400	
Subtotal	$15,100	$103,700	$204,800	$132,500	$456,100	$274,300	
Total Management Cost /4	$0	$0	$0	$0	$0	$121,300	
Technical Assistance	$0	$0	$0	$0	$0	$80,500	
Administrative Assist.	$0	$0	$0	$0	$0	$7,100	
Total /5					$456,100	$483,200	0.94:1.00

/1 Price Base 1994.
/2 From Table 5a.
/3 From Table 4.
/4 These practices are necessary to achieve the overall benefits shown on Table 5a.
/5 Refer to Rational for Plan Selection

November 1994

REFERENCES

1) "Eastern Oregon Anadromous Fish Habitat Restoration Project", United States Fish and Wildlife Service & National Marine Fishery Service, May 1981

2) "Columbian Basin System Planning - Deschutes River Sub-basin Salmon and Steelhead Production Plan", Oregon Department of Fish and Wildlife, Confederated Tribes of Warm Springs, and Northwest Power Planning Council.

3) "Salmon Facts", Stephen Caruana - Salmon Recovery Coordinator SCS, March 1994

4) "Managing Riparian Ecosystems (zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington", Riparian Habitat Subcommittee of the Oregon/Washington Interagency Wildlife Committee, March 1994

5) "1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution", Planning & Monitoring Section, Water Quality Division Oregon Department of Enivronmental Quality, August 1988

6) "Existence and Sport Values for Doubling the Size of Columbia River Basin Salmon and Steelhead Runs", P.Olsen, J.Richards and R.Scott, Rivers Vol.2 No. 1 pgs 44-56

LIST OF PREPARERS

Name/Title	Education/Experience(Yrs)	License/Other
SOIL CONSERVATION SERVICE		
Russ Collett Area Conservationist	BS - Soil Science Soil Scientist - 8 District Conservationist - 4 RC&D Coordinator - 3 Water Quality Specialist - 3 Area Conservationist - 4	
Paul Cleary Civil Engineer	BS - General Engineering Civil Engineer - 16 Hydraulic Engineer - 8 River Basin Staff Ldr. - 4	PE Civil WI
David Franzen State Range Conservationist	BS - Range Management Soil Conservationist - 4 District Conservationist - 6 Range Conservationist - 18	
Hal Gordon State Economist	BS - Range Science MS - Economics Agricultural Economist - 6	
Paul Pedone State Geologist	BS - Geology Editor - 2 Geologist - 18	Reg.Geo. AZ
Mark Tilton Resource Inventory Specialist	MS - Range & Wildlife Mgmt. Range Conservationist - 4 District Conservationist - 4 Computer Systems Analyst - 5 RIS - 4	
Roy Carlson State Resource Conservationist	BS - Range Science Range Conservationist - 16 District Conservationist - 8 State Resource Conservationist - 4	
Dusty Eddy District Conservationist	BS - Biology Soil Conservationist - 12 District Conservationist - 9	
Jim Wright District Conservationist	BS - Range Science Soil Conservationist - 3 District Conservationist - 2	
Eileen Larkin Range Conservationist	BS - Range Range Conservationist - 4	

LIST OF PREPARERS - continued

Name/Title	Education/Experience(Yrs)	License/Other
Stephen Caruana Salmon Recovery Coordinator	BS - Agriculture Soil Conservationist - 4 District Conservationist - 5 SRC - 2	
Ken Hyde Resource Conservationist	BS - Range Conservationist Soil Conservationist - 7 District Conservationist - 7 Resource Conservationist - 2	
Robert Schattin Area Engineer	BS - Agricultural Engineering BS - Biology MBA Agricultural Engineering - 4 Civil Engineer - 2 Hydraulic Engineer - 3 Area Engineer - 3	PE Civil, Environ-mental, OR
Craig Ziegler Area Forester	BS - Forestry Soil Conservationist - 4 District Conservationist - 6 Area Forester - 4	
WASCO SOIL AND WATER CONSERVATION DISTRICT		
Ron Graves District Manager	MS - Meterology & Oceanography U.S. Navy - 23 District Manager - 4	
Chris Morris District Technician	BS - Geography District Technician - 3	
OREGON DEPARTMENT OF FISH AND WILDLIFE		
Jim Newton District Biologist	BS - Wildlife Managment Fish Biologist - 12 District Biologist - 13	
Ray Hartlerode Fish Biologist	BS - Fishery Science Fish Biologist - 6	
John Zauner Biological Technician	BS - Wildlife Science MPA Biological Tech. - 2	

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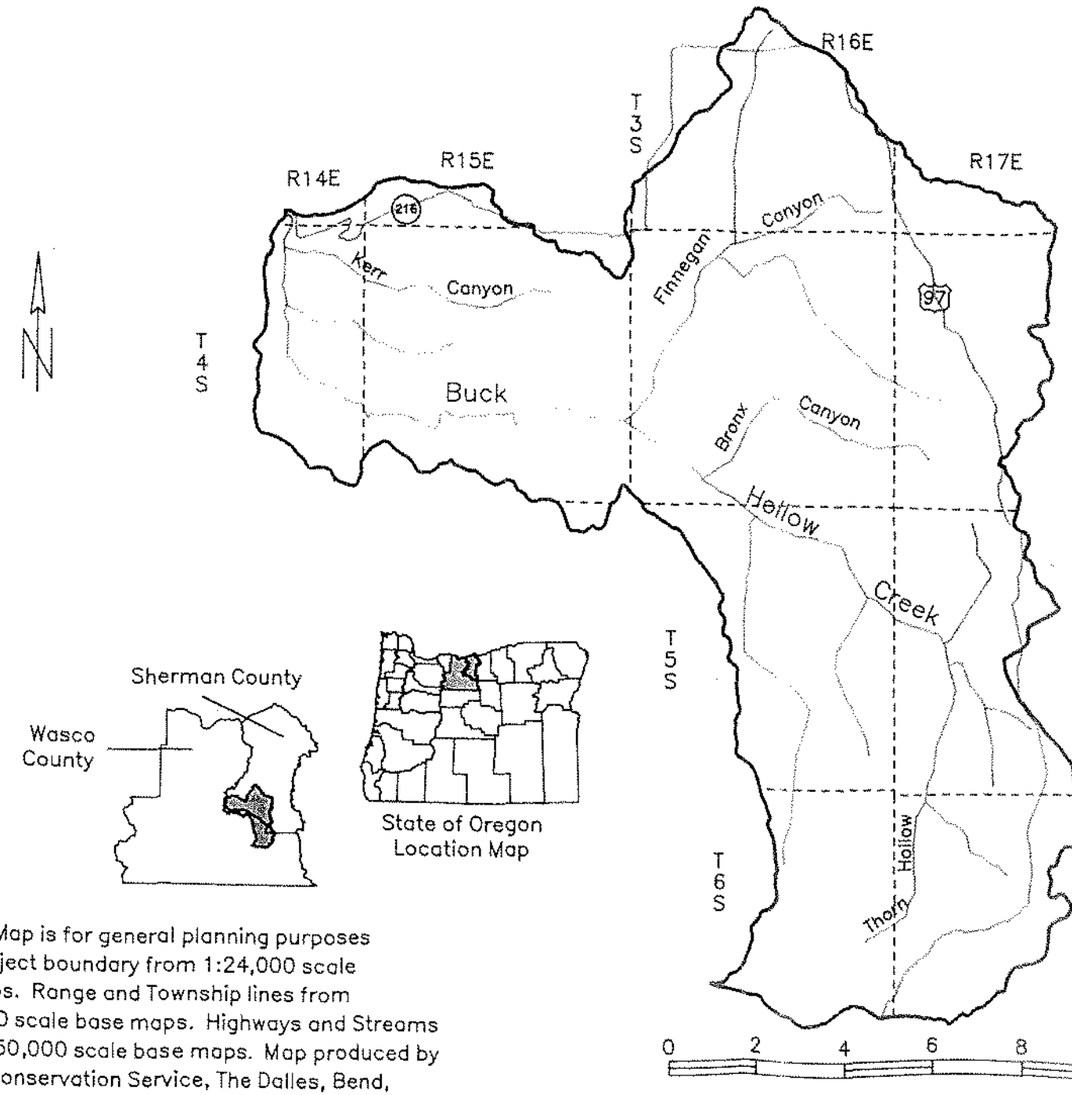
Appendix A1

Buck Hollow Watershed Project



Location

—Project Boundary/ Benefitted Area Est. Acres=126,800

-- Range and Township

—Highways

—Streams

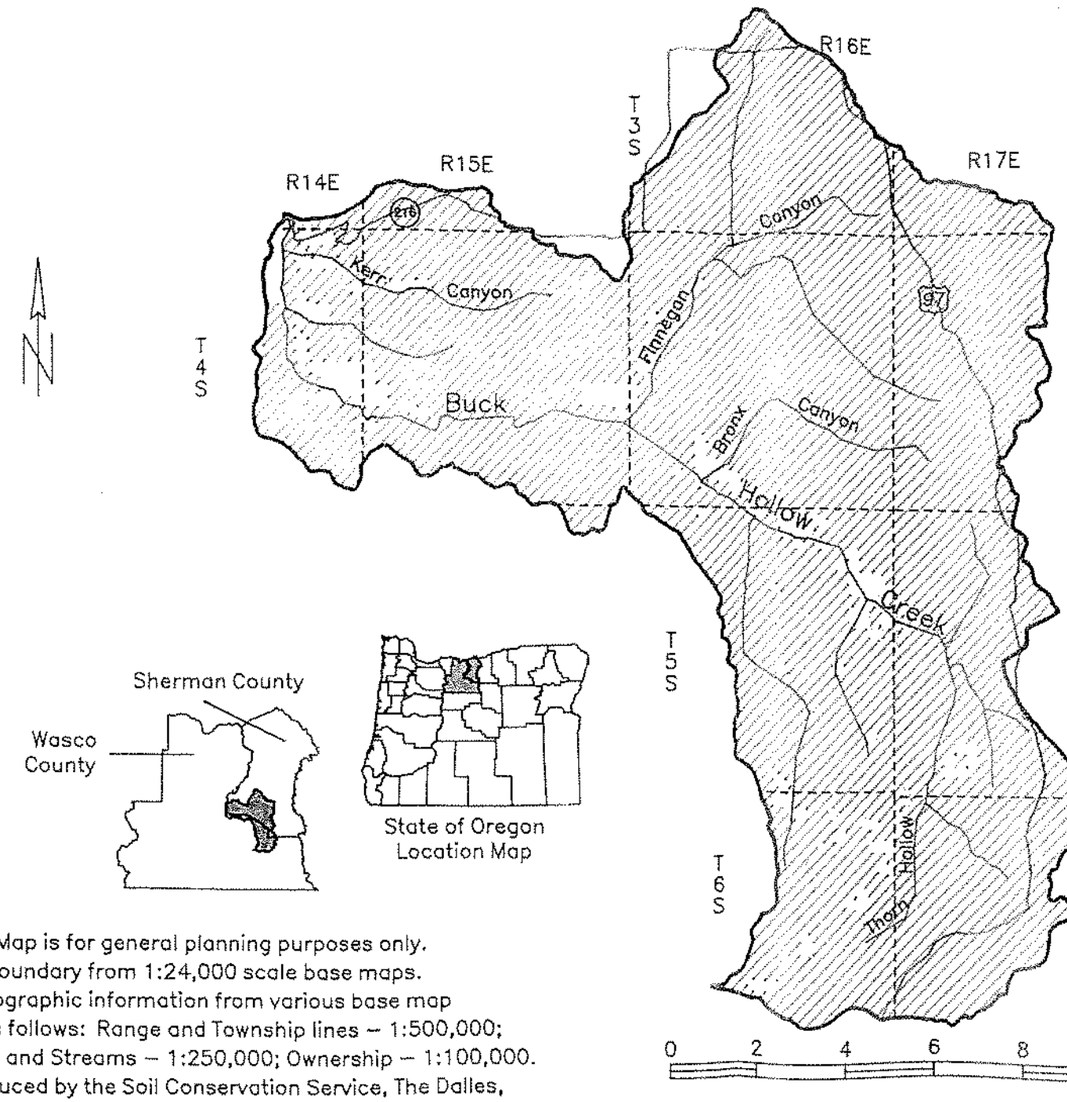
State of Oregon Location Map

Source: Map is for general planning purposes only. Project boundary from 1:24,000 scale base maps. Range and Township lines from 1:500,000 scale base maps. Highways and Streams from 1:250,000 scale base maps. Map produced by the Soil Conservation Service, The Dalles, Bend, and Portland, Oregon.

June 1994

Appendix A2

Buck Hollow Watershed Project



Ownership

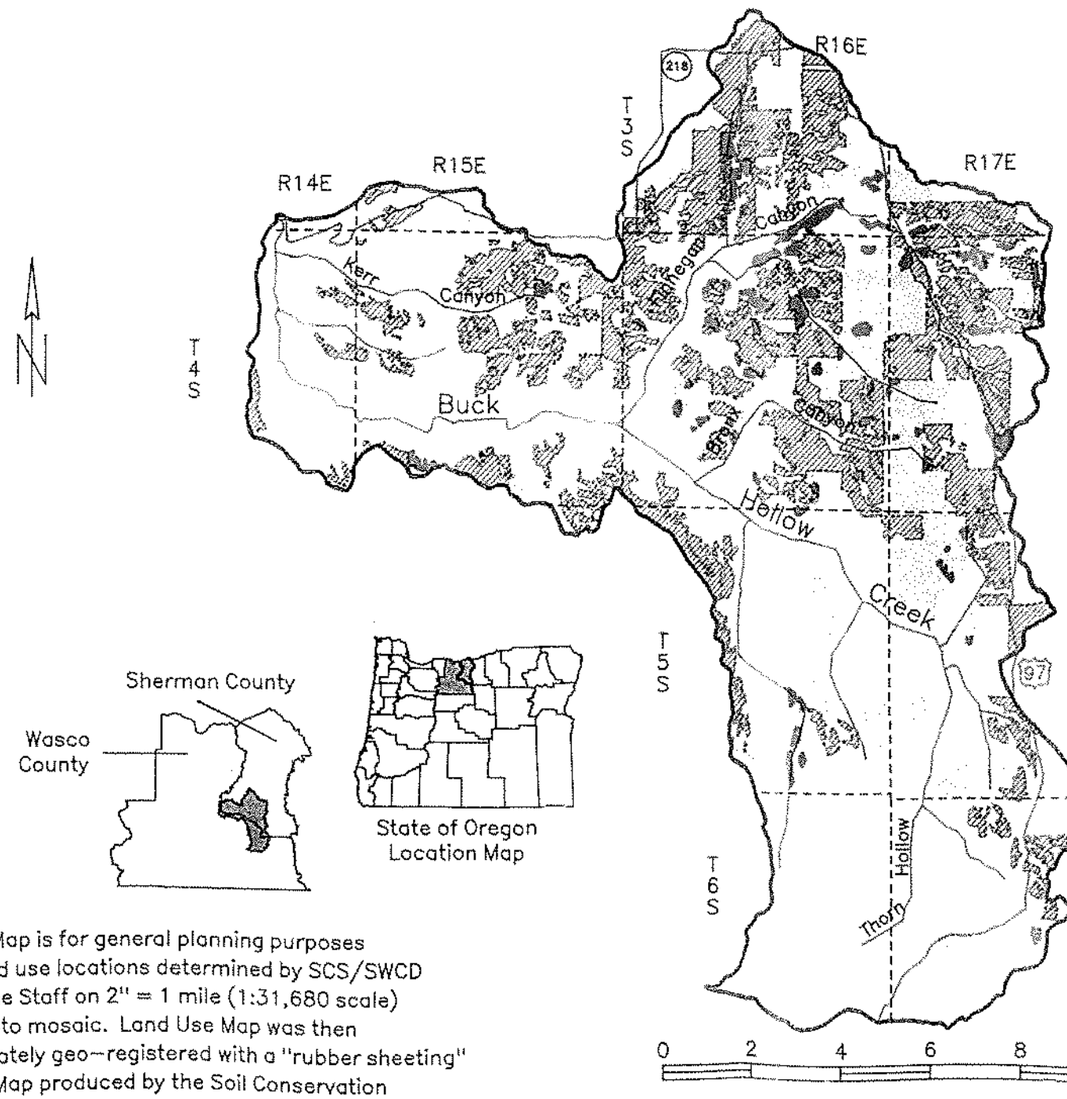
- Private Lands Est. acres=120,300
- Bureau of Land Mgmt. Est. acres =6,500
- —Project Boundary/ Benefitted Area
- -- Range and Township
- —Highways
- —Streams

Source: Map is for general planning purposes only. Project boundary from 1:24,000 scale base maps. Other geographic information from various base map scales as follows: Range and Township lines – 1:500,000; Highways and Streams – 1:250,000; Ownership – 1:100,000. Map produced by the Soil Conservation Service, The Dalles, Bend, and Portland, Oregon.

June 1994

Appendix A3

Buck Hollow Watershed Project



State of Oregon
Location Map

Land Use

- Cropland – 13.2%
  Est. acres = 16,700
- Conservation Reserve Program(CRP) – 21.7%
  Est. acres = 27,500
- Seeded Pasture – 1.6%
  Est. acres = 2,000
- Rangeland – 60.4%
  Est. acres = 76,600
- Urban/Roads – 3.1%
  Est. acres = 4,000
- Project Boundary/ Benefitted Area
- Range and Township
- Highways
- Streams

Source: Map is for general planning purposes only. Land use locations determined by SCS/SWCD Field Office Staff on 2" = 1 mile (1:31,680 scale) aerial photo mosaic. Land Use Map was then approximately geo-registered with a "rubber sheeting" method. Map produced by the Soil Conservation Service, The Dalles, Bend, and Portland, Oregon.

June 1994

Oregon

WATER
RESOURCES
DEPARTMENT

May 17, 1994

Ron Graves, District Manager
Wasco Co. Soil & Water Conservation District
1505 W. First Street, Suite #3
The Dalles, OR 97058

RE: Buck Hollow Sediment Retention Ponds

Dear Ron:

Enclosed is a copy of the final design specifications for the Buck Hollow sediment retention ponds. As per our agreement, the proposed structures would be compared to the specifications, if a structure falls within the parameters of the specifications, it would be exempt from the water right requirement.

These structures are designed to trap rainfall and runoff from snow-melt, to help reduce erosion of small channels in the area and to slow the runoff long enough to trap suspended soil material. Structures developed in accordance with the specifications will not be required to secure a water right permit or certificate and a conduit will not be required for draining or distribution. However, if beneficial use of water entrapped in the sediment retention structure is realized, then a water right must be secured and the structure must include a minimum eight-inch diameter outlet pipe.

If you have further questions or comments, please give me a call.

Sincerely,

A. Reed Marbut, Administrator
Water Rights/Adjudication Division

ARM/dpc

Enclosure

cc: Martha O. Pagel
Barry Norris
Lorraine Stahr

Commerce Building
158 12th Street NE
Salem, OR 97310-0210
(503) 378-3739
FAX (503) 378-8130

OREGON WATER RESOURCES DEPARTMENT

BUCK HOLLOW SEDIMENT RETENTION PONDS

DESIGN SPECIFICATIONS

May 15, 1994

INTRODUCTION:

The Wasco and Sherman County Soil and Water Conservation Districts, in cooperation with area landowners, have developed plans for a multi-phase watershed enhancement project. As a par of this enhancement project a number of sediment retention structures are to be constructed. These structures are designed to trap rainfall and runoff from snow-melt, to help reduce erosion of small channels in the area and to slow the runoff lon enough to trap suspended soil material.

Structures developed in accordance with the specifications set out below will not be required to secure a water right permit or certificate and a conduit will not be required for draining or distribution. However, if beneficial use of water entrapped in the sediment retention structure is realized, then a water right must be secured and the structure must include a minimum eight inch diameter outlet pipe.

PROCEDURE FOR LOCATION AND SIZE:

1. Topography of the location of the structure must be evaluated with respect to size and slope of the channel, character of the soil and underlying geology of the site ar the site's proximity to property improvements, including other channel structures and roadways.

2. Volume of the average annual 24-hour event will be calculated based on 30 years of record.

3. Sediment accumulation for a 25-year period will be estimated, based on the average annual 24-hour event.

STRUCTURE DESIGN CRITERIA:

1. If the structure is expected to impound more than 9.2 acre feet of water at any time, or if the structure includes a dam greater than 10 feet in height, the plans and specifications must be approved by the Director.

2. Height, length, bottom width and top width will be designed to fit the location, topography, channel and geological characteristics of the site.

2. Structure material will be selected to insure a safe, durable structure with respect to the characteristics of the site.

3. Specifications for installation of the materials will be developed by the SCS so as to insure a safe, durable structure. (Installation will be supervised by the SCS.)

MAXIMUM STORAGE CAPACITY FORMULA:

1. The drainage area above the structure will be computed from USGS quadrangle maps.

2. The volume of runoff from the computed drainage area will be calculated for a 24-hour event derived from 30 years of record.

3. The structure will be designed so as to ensure that the computed 24-hour event volume will drain within 70 days of accumulation. However, the sediment retention structures need not be designed to drain all accumulated water. Residue water may be retained beyond the 70-day period in the bottom of the pond, so long as the depth of such residue water is no greater than one foot. If the drainage area above the structure is subject to two or more successive 24-hour events, or an event in excess of the computed 24-hour event occurs, excess water may be retained past the 70-day drainage period.

Appendix C
Buck Hollow Watershed Nov-94
Practice Cost Estimation

Project Life (Yr): 25
Discount Life: 8.00%

Conservation Practice	Unit	Cost Per Unit /1	Units	Total Cost	Years /2 Practice Installed	Cost Share Rate	Years Cost Share	PL-566 Cost (PV)	Local Cost (PV)	Technical Assistance (Hrs/Ut)	Total Hours TA	Average Annual O&MR Factor	Average Annual O&MR Cost ($/Ut)
FISH STREAM IMPROVEMENT													
584 Streambank and Shoreline Protection	Mi	$3,000	25	$75,000	1	65%	1	$48,750	$26,250	40	1,000	0.02	$60.00
580 Stream Channel Stabilization	Mi	$5,000	20	$100,000	1	65%	1	$65,000	$35,000	40	800	0.02	$100.00
395 Fish Stream Improvement	Mi	$4,000	25	$100,000	1	65%	1	$65,000	$35,000	40	1,000	0.02	$80.00
								$178,750	$96,250				
CROPLAND SYSTEM													
328 Conservation Cropping Sequence	Ac	$1	1,800	$1,800	25	0%	0	$0	$19,215	0.1	180	0.00	$0.00
327 Conservation Cover	Ac	$50	1,000	$50,000	1	65%	1	$32,500	$17,500	0.2	200	0.02	$1.00
570 Sediment Basin	Ut	$200	200	$40,000	1	65%	1	$26,000	$14,000	16	3,200	0.05	$10.00
600 Terraces	Ft	$1	100,000	$50,000	1	65%	1	$32,500	$17,500	0.001	100	0.03	$0.02
344 Crop Residue Use	Ac	$5	3,000	$15,000	25	65%	0	$0	$160,122	0.1	300	0.00	$0.00
393 Filter Strips	Ac	$50	2,000	$100,000	1	65%	1	$65,000	$35,000	0.4	800	0.02	$1.00
329 Conservation Tillage	Ac	$5	1,200	$6,000	25	65%	0	$0	$64,049	0.1	120	0.00	$0.00
550 Range Seeding	Ac	$50	8,000	$400,000	1	65%	1	$260,000	$140,000	0.1	800	0.01	$0.50
412 Grassed Waterways	Ac	$50	100	$5,000	1	65%	1	$3,250	$1,750	2	200	0.02	$1.00
342 Critical Area Planting	Ac	$50	50	$2,500	1	65%	1	$1,625	$875	2	100	0.03	$1.50
								$420,875	$470,010				
RANGELAND SYSTEM - UPLANDS													
556 Planned Grazing System	Ac	$0	60,000	$15,000	25	0%	0	$0	$160,122	0.1	6,000	0.00	$0.00
528 Proper Grazing Use	Ac	$1	40,000	$30,000	25	0%	0	$0	$320,243	0.1	4,000	0.00	$0.00
642 Well	Ut	$5,000	10	$50,000	1	65%	1	$32,500	$17,500	8	80	0.01	$50.00
574 Spring Development	Ut	$1,000	50	$50,000	1	65%	1	$32,500	$17,500	12	600	0.05	$50.00
614 Trough or Tank	Ut	$500	60	$30,000	1	65%	1	$19,500	$10,500	5	300	0.03	$15.00
516 Pipeline	Ft	$1	30,000	$30,000	1	65%	1	$19,500	$10,500	0.01	300	0.01	$0.01
387 Pond	Ut	$5,000	20	$100,000	1	65%	1	$65,000	$35,000	48	960	0.01	$50.00
382 Fencing	Mi	$3,827	45	$172,204	1	65%	1	$111,932	$60,271	2	90	0.03	$114.80
338 Prescribed Burning	Ac	$25	2,000	$50,000	1	65%	1	$32,500	$17,500	0.2	400	0.01	$0.25
314 Brush Management	Ac	$50	400	$20,000	1	65%	1	$13,000	$7,000	0.2	80	0.01	$0.50
550 Range Seeding	Ac	$50	1,000	$50,000	1	65%	1	$32,500	$17,500	0.1	100	0.01	$0.50
472 Livestock Exclusion	Ac	$250	200	$50,000	1	0%	0	$0	$50,000	0.2	40	0.00	$0.00
352 Deferred Grazing	Ac	$2	20,000	$40,000	25	0%	0	$0	$426,991	0.1	2,000	0.00	$0.00
575 Stock Trail	Mi	$2,000	5	$10,000	1	65%	1	$6,500	$3,500	8	40	0.05	$100.00
636 Water Harvesting Catchment	Ut	$3,000	5	$15,000	1	65%	1	$9,750	$5,250	16	80	0.05	$150.00
								$375,182	$1,159,377				

Appendix C continued

Buck Hollow Watershed Nov-94 Project Life (Yr): 25
Practice Cost Estimation Discount Life: 8.00%

Conservation Practice	Unit	Cost Per Unit	Units	Total Cost	Years Practice Installed	Cost Share Rate	Years Cost Share	PL-566 Cost (PV)	Local Cost (PV)	Technical Assistance (Hrs/Ut)	Total Hours TA	Average Annual O&MR Factor	Average Annual O&MR Cost ($/Ut)
RANGELAND SYSTEM - RIPARIAN ZONE													
556 Planned Grazing System	Ac	$1	2,000	$1,000	25	0%	0	$0	$10,675	0.1	200	0.00	$0.00
528 Proper Grazing Use	Ac	$1	2,000	$2,000	25	0%	0	$0	$21,350	0.1	200	0.00	$0.00
382 Fencing	Mi	$5,051	30	$151,539	1	65%	1	$98,501	$53,039	2	60	0.04	$202.05
472 Livestock Exclusion	Ac	$250	250	$62,500	1	0%	0	$0	$62,500	0.2	50	0.00	$0.00
314 Brush Management	Ac	$50	50	$2,500	1	65%	1	$1,625	$875	0.2	10	0.01	$0.50
516 Pipeline	Ft	$1	5,000	$5,000	1	65%	1	$3,250	$1,750	0.01	50	0.01	$0.01
614 Trough or Tank	Ut	$500	5	$2,500	1	65%	1	$1,625	$875	5	25	0.03	$15.00
								$105,001	$151,063				
OTHER CONSERVATION PRACTICES													
638 Water & Sediment Control Basin	Ut	$3,500	165	$577,500	1	65%	1	$375,375	$202,125	48	7,920	0.03	$105.00
560 Access Road	Mi	$20,000	3	$60,000	1	65%	1	$39,000	$21,000	16	48	0.02	$400
645 Wildlife Upland Habitat Management	Ac	$100	500	$50,000	1	65%	1	$32,500	$17,500	2	1,000	0.01	$1.00
								$446,875	$240,625		33,433		
Totals								$1,526,683	$2,117,325				

Total Construction & Management $3,644,008

Technical Assistance $859,700

Administrative Assistance $76,200

Total Project Cost ..... $4,579,908 /3

/1 Value rounded up.
/2 Practice installed each year for years listed.
/3 Difference with Table 1 due to rounding.

APPENDIX D. INVESTIGATION AND ANALYSIS REPORT

Biologist -

Project formulation goals were established by the Oregon Department of Fish and Wildlife District Biologist and concurred upon by consensus planning session attendees. ODF&W Fishery Biologists participated directly in:

1) The development of systems to achieve the formulation goals.

2) The consensus developed on the impacts of each system as well as the impacts of the combined systems.

3) The steelhead population potential in Buck Hollow.

4) The existing steelhead population in Buck Hollow.

5) A forecast of steelhead population under the future without condition.

Wildlife

Following the Preauthorization Study in May 1994, the US Fish and Wildlife Service, the National Marine Fishery Service, and the Oregon Department of Fish and Wildlife were contacted to identify any listed or proposed endangered or threatened species which might be present in the area of the proposed plan. The American Bald Eagle was identified.

Wetlands

A minimum amount of wetland exist in the project area, less than 0.1%. This was determined by consultation with field office personnel. With the exception of instream fishery improvements and spring developments, no other proposed conservation practice will impact wetlands. All required permits will be obtained, as well as technical assistance from Federal and State agencies, as available, when installing instream fishery improvements.

It was determined that no mitigation will be required.

Resource Conservationist -

Current and future land use was determined by a team of resource specialists. Erosion rates on cropland and rangeland were estimated based on current Food Security Act plans and recent rangeland plans. These erosion rates were checked using the Erosion Productivity Impact Calculator (EPIC) model.

A team of resource specialist developed, during a consensus planning session (April 18-20,1994), conservation systems which would be used to achieve the project formulation goal. This team concurred upon the impact to the formulation goals by each individual system as well as all the systems combined.

A team of resource specialist developed, during a detailed planning session (May 10-11,1994) the specific definition of each conservation system, including the applicable SCS practice standard and the expected number of each practice to be installed. The expected number of each practice to be installed was formulated to meet the formulation goal with consideration to the expected participation rate. Additionally the technical assistance required to implement a defined unit of conservation practice was developed.

Composite erosion rates, for the entire watershed, were subsequently calculated for the future without and the accelerated land treatment alternative.

Historical and Archaeological

The Oregon State Historical Preservation Officer was contacted in May 1994 to determine the presence of historical/archaeological sites located in the impacted area of the proposed project. The SHPO was unable to respond to this request due to limited staff and suggested we use the services of the SCS Archaeologist located at the West National Technical Center. It was concurred upon that Native American historical objects are probably located within the project area and that SCS will develop an archaeological plan to be followed during the installation of the ground disturbing practices.

Hydraulic Engineer -

Estimates of the runoff characteristics of the watershed were based on the historic, future without and accelerated land treatment alternatives using standard SCS hydrologic analysis (Runoff Curve Numbers, and TR-20). The future without condition results in peak runoff events approximately 10 times greater for the future without condition compared to the historic condition. The historic 100 year event was estimated to be roughly equivalent to a 5 year event under the future without condition. The composite historic runoff curve numbers was estimated to be 65. The future without composite runoff curve number was estimated to be 80.

A project formulation focus was on the restoration of upland watershed health to restore or approach restoration of historical runoff characteristics. Stream system hydraulics were considered in determining the degree of runoff attenuation required. The historic stream channel was estimated to be between a C4 and E4 channel, using the Rosgen stream classification system. The channel forming event was estimated to be between the 2yr and 5yr event (the 3.5yr event was used). For this planning level analysis the stream flow velocity desired was set a 7 ft/s. This was arrived at with input from the WNTC as acceptable for a planning level analysis and is the estimated velocity which is sufficient to transport sediment but low enough to avoid channel cutting. The estimated historic channel conditions (manning's n, slope, hydraulic radius) and the estimated historic 3.5 year event yielded approximately a 7 ft/s velocity using manning's equation.

Runoff attenuation was first checked using exclusively range and cropland management (proper grazing, crop residue, retention of CRP grassed acres, etc.). The estimated 3.5 year event for the future, with all management improvements in place, was estimated to be 2900 CFS (note: this did not yet consider existing storage in the watershed). The estimated 3.5 year historical event was estimated to be 350 CFS. Thirty combinations of storm events and landuse were considered and peak flows and volumes were calculated using the SCS hydrologic model TR-20 (Project Formulation).

A graph of runoff inches versus peak flows was developed and a predictive equation of runoff inches versus peak flow developed. A comparison between the calculated values and predicted values yielded an r squared value of 0.99. Using this predictive equation and noting a desired reduction of approximately 2,500 CFS for the 3.5 year event it was estimated that approximate 2,500 ac-feet (0.22 watershed inches) of runoff reduction would be required. Estimates were then made for existing storage capacity, minor depressional storage, main channel riparian storage (healthy condition) and tributary channel storage (healthy condition). The last increment of storage required will be developed by the installation of 1000 ac-ft of Water and Sediment Control Basins. This final value is somewhat less than required but checked against the available storage sites in the watershed.

The impacts of Water and Sediment Control Basin (WASCOB) installation was checked using a runoff model developed specifically for Buck Hollow. This model was based on the SCS runoff equation and 30 years of historic rainfall and snow depth records at the Extension weather station located at Moro, Oregon. This model estimated 1) the frequency, amount and timing of runoff events for a given sub-drainage, 2) the amount captured and stored for each individual event and 3) estimated the drawdown time to empty a WASCOB for each event.

This analysis yielded three important conclusions:

1) The majority of water captured is released by seepage rather than evaporation. WASCOBs to be constructed under the specification developed by Oregon Water Resources Department (see Appendix B) will, on average, release more than 90% of the captured water via seepage.

2) A histogram of events, by month, over the 30 year period was developed. This shows that over 90% of events, during which runoff is captured, occur during the winter and early spring, during which low flows are not critical to Buck Hollow. It will be rare for a WASCOB to capture water during a critical low flow period.

3) For WASCOBs constructed to comply with the specification developed by Oregon Water Resources Department (see Appendix B) over 75% of runoff volume will pass by the WASCOBs spillways.

Geologist -

Estimates for sediment delivery were made to the mouth of Buck Hollow watershed. Nearly all sediment delivered to the mouth of Buck Hollow is expected to reach the Columbia River. Estimates were based on sediment delivery from uplands and mass wasting of streambanks. Sediment delivery from representative sites was check using the Erosion Productivity Impact Calculator (EPIC).

Upland sediment delivery was estimated from soil erosion estimates made by the Resource Conservationist for the future without condition and the accelerated land treatment alternative. Sediment delivery ratios were estimated for each of the 23 subwatershed developed for the hydrologic analysis. These delivery ratios were based upon the relationship of drainage area and sediment size. The weighted composite sediment delivery ratio for the watershed was 12%. This delivery ratio corresponded well with collected and measured data for similar watersheds.

Rates of mass wasting of streambanks were estimated at one cubic foot per lineal foot (1 cf for both sides) of streambank. This value was developed from onsite field visits and by comparing 1964 to 1993 aerial photos. The sediment delivery ratio for streambank erosion was estimated at 95%.

Overall upland erosion sources accounted for 50% of sedimentation and mass wasting of streambanks accounted for 50% of sedimentation for the future without condition. This relative degree of upland versus streambank sedimentation also corresponded well with collected and measured data for similar watersheds.

Economist -

Time Data, Interest

The period of project evaluation is 25 years. The discount rate for the project, as directed by USDA-SCS, is 8.00 percent.

Cost Estimation

The cost of each of the conservation practices identified for installation by the Resource Conservationists was estimated. Cost estimates for each conservation practice included construction and management costs plus operation, maintenance and replacement costs (OM&R). Installation costs were discounted using the defined project period and discount rate.

The cost of technical assistance was estimated based on the technical assistance requirements, for each conservation practice to be installed, developed by the Resource Conservationist. Average GS salary rates, based upon experience of similar projects, were used.

The cost of project administration costs were estimated at 5% of the PL-566 installation cost.

Benefits

Benefits were quantified by the Resource Conservationist (reduction in soil erosion), the Range Conservationist (increased AUM production), the Geologist (reduction in sedimentation), and the Biologist (increase in steelhead).

Valuation for erosion reduction, livestock and AUM production, and sediment reduction was based on recent SCS project valuations, publications and interviews. These valuations were determined to be applicable for the Buck Hollow watershed in 1994.

Valuation of returning adult steelhead was based on the recently published "Existence and Sport Values for Doubling the Size of Columbia River Basin Salmon and Steelhead Runs".

Incremental Analysis

The formulation of alternatives began with the development of four conservation systems to achieve the formulation goal. It is noted that application of the four systems jointly are required to meet the formulation goals and that the benefits of the four systems combined are greater than the addition of the individual system benefits.

At the consensus planning session, it was agreed that the incremental application of the four systems would first focus on direct instream impacts, grazing management in the riparian zone and instream fish improvement, then management systems in the upland, rangeland grazing management systems and cropland management systems, and last include Water and Sediment Control Basins and Access roads.

The average annual National Economic Development Benefits and Costs was developed for each of the four systems.

Four accounts were established to facilitate the evaluation and alternative selection and to display the effects of the alternative plans. They are the NED, EQ, RED, and OSE accounts.

Range Conservationist -

Rangeland condition were estimated for the future without an accelerated land treatment alternative. For the future without alternative twenty five percent of rangeland was estimated to be in poor condition, sixty percent to be in fair condition, and thirty five percent in good condition. For the accelerated land treatment alternative it was estimated that eighty percent of the poor would be improved to fair and eighty percent of fair would be improved to good.

The feasibility of all grazing management systems considered was evaluated and input provided on the pace of change expected in both riparian and upland plant communities. The range conservationist provided review and comment related to the results of the hydrologic analysis, particularly related to change in runoff characteristics likely due to degraded range conditions.

Increased AUM production due to improved range conditions was estimated using standard SCS procedures and review of recently developed range management plans.

EFFECTS OF RECOMMENDED PLAN

The following table of "Effects of the Recommended Plan on Resources of National Recognition displays the effects of the plan on particular types of resources that are recognized by certain federal policies.

Effects of the Recommended Plan on Resources of National Recognition

Types of resources	Principal sources of National Recognition	Measurement of effects
Air Quality	Clean Air Act, as amended (42 U.S.C. 7401 et seq.)	Minor dust @ construction. No effect on classification.
Areas of particular concern within the coastal zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et sq.)	Not present in planning area.
Endangered & threatened species critical habitat	Endangered species Act of 1973, as amended (16 U.S.C. 1531 et seq.)	No effect
Fish & wildlife habitat	Fish & Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.)	Significant beneficial impact on 120 ac. salmonid fish habitat Improved wildlife habitat
Flood plains	Executive Order 11988, Flood Plain Management	No Effect
Historic & cultural properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. Sec. 470 et seq.)	No Effect
Prime & unique farmland	CEQ Memorandum of August 1, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act	Not present in planning area
Water quality	Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)	25 mi. severely polluted, changed to non-polluted
Wetlands	Executive Order 11990, Protection of Wetlands; Clean Water Act of 1977 (33 U.S.C. 1251, et seq.) Food Security Act of 1985	No effect

Effects of the Recommended Plan on Resources of National Recognition Continued

Wild & scenic rivers	Wild and Scenic Rivers act as amended (16 U.S.C. 1271 et seq.)	Not present in planning area

Appendix E. Comments Received

The following individuals submitted comments on the Draft Plan/Environmental Assessment. To the extent possible comments were incorporated into the final document.

In several instances comments were made addressing the importance of grazing management, particularly within the riparian zone, to achieve the project formulation goals.

To obtain copies of written comments contact:

Robert Graham, State Conservationist
USDA, Soil Conservation Service
101 SW MAIN, Suite 3000
Portland, Oregon 97204
Telephone (503) 414-3201 or Fax (503) 414-3277

Indiviual/Organization -- Date

Russell D. Peterson / United State Department of the Interior, Fish and Wildlife Service -- 8/9/94

David A. Moskowitz / Oregon Trout -- 8/11/94

James A. Newton / Oregon Department of Fish and Wildlife -- 8/10/94

Mark A. Fritsch / Confederated Tribes of Warm Springs -- 8/3/94

Alexander W. Macnab / Oregon State University Extension Service -- 6/28/94

Shannon K. Relaford / Oregon Division of State Lands -- 7/6/94

Bruce Andrews / Oregon Department of Agriculture -- 7/22/94

W. Wayne Killgore / Soil Conservation Service - West National Technical Center -- 6/28/94