WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Irrigation Water Use Efficiency Demonstration Project

Phase III
Demonstration Water Conservation Plan

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IRRIGATION WATER USE EFFICIENCY DEMONSTRATION PROJECT

PHASE III

DEMONSTRATION WATER CONSERVATION PLAN

Prepared by

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Water Resources Program

in cooperation with

Walla Walla Conservation Plan Formulation Committee

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EXECUTIVE SUMMARY

Background

Increased demands and competition for water have focused attention on the improvement of water use efficiency and effective water management in recent years. In 1989, the legislature passed Substitute House Bill No. 1397 in which authorization was given to develop a demonstration conservation plan in an irrigation area. This bill outlined a three phase process, which is described below.

Plan Development

Phase 1 Establish a task force, evaluate state-wide irrigated areas and select an area for a voluntary demonstration project.

Completed in 1989, with selection of the Walla Walla basin.

Phase 2 Complete an assessment of conservation in the selected area.

The phase 2 Conservation Assessment, completed in July, 1991, developed baseline information on the Walla Walla basin (Washington side), utilizing analytical models to predict hydrologic and economic consequences from illustrative theoretical scenarios of water use efficiency.

The theoretical scenarios considered effects from: 1) improving irrigation efficiency, 2) eliminating surface water diversions, and 3) providing upstream storage. The model results were: 1) irrigation water was decreased by 13 percent depending on the time and how saved water was used, *(There were very small increases in instream flows as a result during the low flow period.)*, 2) ground water pumpage increased and average instream flow increased slightly during the low flow period, and 3) providing upstream storage (Washington side) for water during the low flow period had negligible effect on ground water and modest benefits to fish habitats.

The overall conservation assessment results revealed there is a pressing need to collect data and monitor water use data. Accurate data becomes a necessity, if planning and implementation for water use efficiency improvements and water conservation are to be successful.

Phase 3 The results of the conservation assessment were used to develop a

demonstration conservation plan, which was accomplished jointly by the local Conservation Plan Formulation Committee and the Department of Ecology.

The Phase 3 Demonstration Conservation plan for the Walla Walla basin sets forth a model for planning water conservation measures, focusing on irrigated agriculture. It lays out a logical framework by stating objectives, clarifying the objectives through policies and purposes, and sets a path to attain the objectives by required actions for implementation.

A goal of "Sustainable water use for the Walla Walla Basin" was adopted to ensure future water supply. A sub-goal to increase irrigation efficiency has the potential for conserving water, which may be used for other beneficial uses.

Seven major objectives were established as the bases of the plan. Also the entire hydrologic basin, Washington and Oregon, must be taken into account for effective water conservation planning. Accurate data and analysis are needed, and they are given high priority. Policies were developed to provide direction to move towards implementation of the water conservation measures under the objectives. A summary of the objectives and policies are as follows:

A. Public Information and Education

Establish an information and education program targeting water users to bring a higher level of awareness.

B. Improve Agricultural Off-Farm and On-Farm Water Use Efficiency

Encourage water use measurements and recordings to account for the water and improve management. Improve physical diversions on streams to increase efficiency and management. Pursue water use efficiency measures with priority given to cost-effectiveness and environmental acceptability.

C. Determine Water Availability (surface and ground in Walla Walla Basin)

Collect and monitor technical data for analysis to determine quantity and quality of water supply available. Basin wide (Washington and Oregon) ground and surface water studies are needed to effectively analyze the aquifers. Develop, implement, and enforce a ground water management plan subsequent to the study.

D. Cooperation With State of Oregon, Federal Government and Tribes

The Walla Walla hydrologic basin cannot be separated therefor an interstate water management plan is necessary to lesson adverse impacts on each state. Cooperation and coordination is to be initiated with Oregon and affected Indian tribes.

E. Equitable Sharing of Costs

Water use efficiency measures require funds to implement objectives. Government cost sharing programs that share costs with local agencies and citizens will be assessed for effective participation, incentives and pursued.

F. Examine Transfer of Water

The potential water conservation through transfers and marketing sales are recognized. Examination of existing laws are recommended to ease such transfers.

G. Consider Storage For Basin

Upstream storage investigations will be will be pursued to determine feasibility. There is insufficient stream flows for all uses in the basin, and storage could provide these needs. Improvement of watershed management is encouraged to help water conservation.

A course of recommended actions to implement and achieve the objectives of the conservation plan are set forth by priority as follows:

A. Public Information and Education

1. Establish and advance public information and education.

B. Improve Agricultural Off-Farm and On-Farm Water Use Efficiency.

Off-Farm:

1. Install flow measurement devices.
2. Improve management.
3. Improve maintenance.
4. Improve conveyance systems, canals, ditches, and regulation structures.
5. Install in-system equalization reservoirs.
6. Consolidate ditch companies.
7. Construct permanent diversion structures.
8. Conversion to ground water.

On-Farm:

1. Install flow measurement devices.
2. Improve soil tilth as related to moisture retention.
3. Improve irrigation water management.
4. Improve water control structures.
5. Install ditch lining, piping.
6. Initiate and undertake irrigation scheduling.

C. Determine Water Availability (surface and ground).

1. Identify local cost-sharing sources of revenue to finance needs in conjunction with possible state and federal funds for a water availability study.
2. Provide for collection, recording and management of technical data (surface and ground), flow data, spatial distribution of aquifer thickness and hydraulic continuity to be pursued through appropriate government agencies.
3. (a) Provide water use data, measurement records of diversions, farm turnouts, well locations, lifts, and discharges.
   (b) Investigate ground water recharge (gravel and basalt aquifers).
4. Develop and provide a water balance for the area under investigation.(Water balance is a summation of inflows and outflows to a hydrologic system.)
5. Examine the correlation between the water rights and water use, surface and ground.
6. Establish acceptable rates of ground water withdrawal.
7. Develop a ground water management plan acceptable and approved by local citizens and government and the State of Washington.
8. Develop a conjunctive water use (surface and ground water) management plan.
9. Develop a water quality protection plan for both surface and ground water.

D. Cooperation with State of Oregon, Federal Government and Tribes.

1. Invite Oregon side, Walla Walla Basin, State of Oregon Water Resources Department, and representatives from federal water agencies and Tribes to participate in discussions and evaluations.
2. Consider Washington - Oregon interstate water conservation plan that benefits both citizens and Tribes.
3. Follow through with efforts to authorize plan and make effective and implementable.

E. Equitable Sharing of Costs.

1. (1) Identify needs, (2) Determine preliminary range of costs for water use efficiency improvements, and (3) Determine cost sharing avenues and sources.
2. Identify government programs and criteria and extent of cost sharing.
3. Determine all water users willingness to pay for conservation.

F. Examine Transfer of Water.

1. Identify potential uses and transfers, including market transfers.
2. Identify potential users who may be interested in transfers.
3. Develop model scenario to show incentives for transfers.
4. Develop recommendations to enact legislation.

G. Consider Storage For Basin.

1. Investigate watershed management.
2. Pursue Phase II assessment of Mill Creek Lake with Corps of Engineers.
3. Determine Mill Creek Lake improvement costs.
4. Identify benefits of Mill Creek Lake improvement.
5. Identify environmental impacts associated with the improvement of Mill Creek Lake.
6. Develop workable agreement with Corps of Engineers for use of stored water in Mill Creek Lake.
7. Identify local/state cost-sharing avenues.
8. Identify off-farm and on-farm storage for equalization reservoirs for irrigation water supply.
9. Cooperate with Oregon, federal agencies, and Tribes seeking viable upstream storage an the Walla Walla River and tributaries.
10. Investigate spring freshet retention basins.

A process for implementing the actions is also set forth in the plan. Guides for estimating costs of certain actions are listed in the appendix. Specific action examples are given to assist in outlining conservation planning. The specific actions and estimated costs are briefly presented as follows:

1. Publicize the need for water conservation.

   Estimated cost: $22,000 annually.

2. Off-farm - Install measuring devices and collect water use data.

Estimated cost: $225,000 installation
$10,000 annually, collect and record

On-farm - Initiate irrigation scheduling.

Estimated cost: $12,000 per farm

3. Determine water availability.

Estimated cost: $40,000 to inventory, collect existing data and to make decision on initiating water availability study.

4. Initiate interstate planning.

Estimated cost: Cost closely tied to preparation work for water availability study. Same tasks can accomplish most of both actions' needs. Add $20,000 to complete this action.

5. Determine costs and cost sharing needs. Focus on a selected pilot area to demonstrate selected conservation measures, and determine costs for baseline cost sharing needs.

Estimated cost: Planning - $20,000
Implementation - $350,000 to $2,500,000, depending on size of pilot area.

6. Examine transfers of water. Investigate, assess and report on pilot transfers and theoretical test of moving water rights.

Estimated cost: $36,000

7. Consider storage for basin. Pursue further investigation and planning of rehabilitation of the Corps of Engineers' Mill Creek Lake.

Estimated cost: $5,000 to Go or No Go decision.
$18,478,000 rehabilitation, Corps of Engineers' estimate.

A summary matrix lists each objective and its associated actions. It outlines who will be involved in implementation, the type of assistance offered and test factors to determine if the actions are meeting the objectives.

The key government agencies involved in implementation of irrigation water use efficiency improvements are:

Tribes:	Affected tribe(s)
State:	Department of Ecology WSU Cooperative Extension Service
County:	County Extension Service Appropriate County Agencies
Other Local:	Irrigation Districts Local Irrigated Agriculture Organizations Water Users
Federal:	Bureau of Reclamation Soil Conservation Service Agriculture Stabilization & Conservation Service Corps of Engineers

Type of assistance offered by agencies listed above:

State:	Planning, technical, information and education, funding.
County:	Information and education, technical and planning.
Other Local:	Information and education, technical, and some planning.
Federal:	Planning, technical, funding, information and education.

Type of assistance required:

County:	Cost sharing,technical,information and education
Other Local:	Cost sharing, technical, information and education.

Appendices:

A. Guides estimating water use efficiency costs.
B. Federal and state funding sources.

I. GOAL

The increased demands and competition for water has focused attention on the improvement of water use efficiency and effective management in recent years. As a result of the Phase II Conservation Assessment, the Walla Walla Conservation Plan Formulation Committee (Committee) became increasingly aware of the water resources and the need to take action to improve management and conservation.

The Committee adopted as a goal "sustainable water use for the Walla Walla Basin" to ensure a future water supply.

The general policy of the State of Washington is to have all water users use water more efficiently through water conservation measures and practices.

The Committee adopted objectives as part of the demonstration conservation plan which state the purposes and intended results of the plan to reach the goal.

Other considerations for effective management include supply side and demand side control and conservation. Water conservation will require reasonable efforts by suppliers and users to meet acceptable economical, technical, and environmental constraints.

Increased irrigation efficiency has potential for conserving water which may be used for other beneficial uses.

II. BACKGROUND / PHASE II CONSERVATION ASSESSMENT

In 1988, the Washington State Legislature established the Water Use Efficiency Committee to carry out a study of water use efficiency in the State of Washington. The committee identified alternative approaches to improving water use efficiency. In 1989, the Legislature passed Substitute House Bill 1397 in which authorization was given to develop an irrigation area demonstration conservation plan. The authorization is now codified in Chapter 90.54 RCW, specifically RCW 90.54.190.

The authorization essentially set out a three phase process to follow:

1) Establish a task force and evaluate state-wide irrigated areas and select an area for a voluntary demonstration project,
2) Complete a conservation assessment of the selected area, and
3) Use the results of the conservation assessment to develop a demonstration conservation plan.

Phase I was completed in December, 1989, with the selection of the Walla Walla basin. Phase II was completed in July, 1991. The Phase II Conservation Assessment developed baseline information utilizing analytical models to predict hydrologic and economic consequences from some illustrative scenarios of water use efficiency. The Phase II report is attached to this plan for reference.

A summary of the Phase II Conservation Assessment results follows:

> 1989, a near average year (in terms of both water supply and irrigation requirements), was the only year considered for baseline data due to time and budget constraints of the assessment. Theoretical scenarios were selected and used in computer modeling to assess the water use efficiency in the Washington portion of the Walla Walla Basin. Under these theoretical scenarios, nine measures were assessed for impacts and results.
>
> The theoretical scenarios selected for model evaluation during, the 1989 low flow months considered effects from: 1) improving irrigation efficiency, 2) eliminating surface diversions and 3) providing additional upstream storage. More specifically the model results were:
>
> 1) The greatest impacts of improved irrigation efficiency were on irrigation water use and ground water pumpage. Irrigation water use was decreased by about 13 percent and ground water pumpage reduced by 13 percent depending on the scenario, time, and how saved water was used. Increasing on-farm application and off-farm delivery system efficiencies have relatively small effects on-farm economic returns over variable costs, instream flows and fish habitat.

2) In the model scenario that eliminated surface water diversions for irrigation, ground water pumpage was increased. Average flows during the low flow period increased by 26 cfs in Mill Creek at gaging station (assuming no water diverted to Yellowhawk Creek) and by 19 cfs in the Walla Walla River near Touchet. The projected benefit to fish habitat in Mill Creek ranged from fair to good depending on the operational scheme for Mill Creek and Yellowhawk Creek.

   What is not apparent in the modeling process, and came out by those familiar with Mill Creek flows, is the streambed loss to the aquifer below the Mill Creek gaging station. Keeping this in mind, the more realistic increase in Mill Creek flows from this scenario and model run would be less than the 26 cfs.

3) Providing upstream storage (the modeling analysis for the upstream storage scenario in the Walla Walla Basin Washington side) during low flow months had negligible effect on ground water in farming region 13. The benefit to fish habitat was modest due to large seepage losses in the creeks and water used for agriculture.

From the Phase II assessment results there appears to be little gain in instream water from efficiency improvements and water conservation. The question remains on how much water could be saved if data collection (actual water use and land use) were improved.

The major challenge during Phase II conservation assessment was obtaining data for water use, land use and fishery analysis. The impact of the Oregon side of the Walla Walla Basin on water availability and water supply is too great to disregard. Consequently, it is obvious that data collection and analysis should have high priority and needs to include the Oregon side.

The demonstration conservation plan is formulated around the following:

- Measure, record, and collect actual water use data.
- Determine basin water availability.
- Collect actual land use and fishery data.
- Include Oregon side of Walla Walla Basin.
- Detail conservation assessment sufficiently to attain credible costs.
- Sort out existing water rights.
- Determine long-term conservation and water-use plan.

III. POLICIES and PURPOSES of the DEMONSTRATION CONSERVATION PLAN

The committee and the Department of Ecology established the objectives, and intended results, of the Walla Walla Demonstration Conservation Plan following the Phase II Conservation Assessment. To achieve the objectives set forth, it was recognized that effective conservation cannot be separated from comprehensive water resource planning. Consideration must be given to the entire basin and basin wide hydrology and water use and quality. There is a definite relation between surface and ground water and irrigation water use efficiency improvement. To fully understand this relationship, additional data and analysis will be needed. However, the incomplete data should not delay the planning process and a certain degree of direction is to be provided in order to move forward.

Policy statements are key to providing direction and support for general water use efficiency improvements. To implement water use efficiency improvements will require public support, commitment of resources, and funds. An analysis or examination of policy direction will show both positive and negative impacts. The policies are intended to set the stage for implementation of water conservation measures sometime in the future. Increased costs in conservation can be impediments to holding back conservation, and there are potential trade offs and incentives which need to be understood and put into practice.

The policies set forth for the Walla Walla Demonstration Conservation Plan are as follows:

A. Objective: Public Information and Education

1. <u>Policy</u>
   Public information and education are essential to the successful implementation of any water use efficiency improvement. Awareness of the issues, dissemination of water conservation benefits and demonstrations can be very instrumental in translating into decisions to implement water efficiency and conservation. Education can have long term effects. It is recommended that the committee endorse and pursue public information and education and that the state of Washington establish a high priority program that will target the users and schools and address the special informational needs on water efficiency and conservation.

   <u>Purpose</u>
   The purpose of the information and education program is to change peoples' attitudes towards water efficiency improvements and conservation. With projected increases in population and development, conflicts over a limited water supply will increase and voluntary water conservation is one way to minimize such conflicts.

B. Objective: Improve agricultural off-farm and on-farm water use efficiency.

1. Policy

A high priority for the short term is to encourage water use measurements and recordings of all surface and ground water use in the basin through installation of weirs and meters for both off-farm and on-farm diversions, withdrawals, turnouts, spills. Priority should be given to metering basalt aquifer wells.

Purpose

Water measuring and metering are key data collection items for quantification of water to assist in determining future water availability. The improvement of water management records and bookkeeping are necessary to track water use and determine water use efficiency.

2. Policy

It is recommended that irrigation districts and ditch companies make every effort to examine their organizations and determine options for combining organizations, if economics justify, with existing irrigation districts or establish new irrigation districts to consolidate and improve diversions from the Walla Walla River.

Purpose

Improving physical diversions and water management increase water use efficiency which may result in less water being diverted. With consolidation, physical maintenance, record keeping, lower equipment costs and generally lower maintenance costs could be gained.

3. Policy

The committee and the State of Washington will pursue implementation of actions listed under this objective to the extent they are economically reasonable and acceptable. Those actions with least cost and environmental impacts and a shorter time period to implement are given higher priority. Specific education and information will be required to help make all users aware of need and opportunities that will lead to water use efficiency measures is endorsed by the committee.

Purpose

Water use efficiency measures, when cost effective and environmentally acceptable, are viable ways to reduce the use of water in off-farm deliveries and on-farm distribution and applications.

C. Objective: Determine water availability (surface and ground).

1. Policy

Basic to long-term water conservation measures, there is a definite need to collect technical data concerning: (1) the basin surface water runoff and (2) the availability, quantity and quality of ground water in the gravel and basalt aquifers.

Purpose

To update the surface water records and to determine ground water quality, flow data, hydraulic continuity and spatial distribution of aquifer thickness. Presently much of this data is lacking which hinders development and implementation of water conservation plans. Because of domestic use of ground water, water quality problems must be identified and steps taken to preserve or improve the quality.

2. Policy

The local committee recognizes the need for local cost sharing to pursue needed water resource studies. Clearly, local cost sharing must be identified and plans executed to finance local costs for the studies.

Purpose

The water resource studies, because of their magnitude and study area required, should be accomplished by appropriate government agencies. Almost all agencies require cost-sharing to some degree from local groups and governments.

3. Policy

When ground water studies are completed, an effective local ground water management plan shall be implemented. The management plan must be enforceable by the local and state authorities to control sustainable withdrawals and prevent quality contamination.

Purpose

Without local and state control, there would be questions regarding sustainable ground water quantities for future generations.

D. Objective: Cooperation with State of Oregon, Federal Government, and Tribes.

1. Policy

The committee and the State of Washington recognize that water conservation measures, technical data collection and monitoring and management of the Walla Walla Basin's water supply must involve both sides of the basin (the States of Oregon and Washington) in order to ensure future water for instream and offstream uses. A concerted effort will be made to coordinate and cooperate with the State of Oregon and its Walla Walla Basin citizens and Tribes to develop an interstate water conservation and management plan benefiting all interests in the Walla Walla Basin. The committee will initiate action.

Purpose

The geographic and physical make up of the Walla Walla Basin does not recognize political boundaries. Much of the surface and ground water originates in Oregon, and any water quantity and quality plans in Oregon impact the water supply in Washington. Washington conservation efforts and measures impact Oregon, economically and environmentally. A coordinated interstate water plan is needed to lessen any adverse impacts on the citizens of both states and the Tribes.

2. Policy

The physical, geographical, and geological interstate water relationship makes it necessary to coordinate water conservation and management efforts with those federal agencies involved with water conservation and water planning.

The committee and the State of Washington will initiate contacts and maintain cooperative programs with the appropriate federal agencies and Tribes to assist in interstate water assessments and implementation of planned water conservation activities.

Purpose

Federal agencies involved in water conservation have authority to plan with both states. Potential federal funding may be available to help cost share an integral long range successful water management and conservation plan. It becomes an imperative case for cooperation with the federal government.

E. Objective: Equitable sharing of costs.

1. Policy

The committee endorses state and federal cost-sharing programs as incentives and recommends identification of agencies that can provide financing to assist

in cost sharing with local farmers and public entities. Other effective incentives will be identified.

An information and education program is recommended to be led in part by the committee and the State of Washington to encourage the willingness to implement water use efficiency improvements.

Because of the lack of detailed water conservation measures, good estimated costs are not available. The first priority will be to collect additional data, improve the useability of data and attempt to locate, estimate, and document cost of conservation measures.

Purpose
To coordinate an effective water conservation program with appropriate economics and financial incentives that would encourage improvements in water use efficiency.

F. Objective: Examine transfer of water.

Policy
The Committee and the State of Washington recognize the potential for water use efficiency improvements from various types of transfers, including water market sales. The state and local governments are advised to review water right laws and institutional changes to facilitate transfer of water rights in light of encouraging water conservation. Not only should interests of the potential buyer and seller be considered, but also other parties with interests in water, especially those with water rights, should be part of the process.

Purpose
Transferring water rights from one use to another, changing a point or method of diversion, changing the place of use, and permitting greater conjunctive use to ground and surface water could all serve to encourage more efficient use of the existing water supply. Such transfers or changes may be made under current water laws without injury or detriment to existing rights, but they are not frequently made because of limitations and difficulty in defining existing rights. Water savings from conservation efforts and measures should be allowed to be transferred to other uses, or marketed. The conditions and complexities of water transfer need to be clarified and changed to ease transfers between potential buyers and sellers, and discuss the conditions governing impairments to water right holding third parties.

G. Objective: Consider storage for basin.

1. Policy

The committee and the State of Washington will initiate action with those federal agencies, the State of Oregon, and Tribes to investigate upstream storage of surface water runoff for potential beneficial uses.

Purpose

Because insufficient instream flows for beneficial uses cannot be generated through conservation practices and other potential benefits would occur from upper storage releases, the upstream storage should be investigated.

2. Policy

Enhancing and implementing watershed management and protection in those areas contributing to the water supply are encouraged. Investigation and monitoring are to be initiated.

Purpose

Land and water management are directly related. Investigations and data collection can be used to plan and implement watershed protection.

Note:

Presently no storage reservoirs exist in the Walla Walla River Basin other than the Corps of Engineers' Mill Creek Lake. There are some small pump ponds on-farm, utilized for offstream irrigation storage. There are virtually no instream flows in the Walla Walla River and its tributaries in August and September due to low runoff and to water right diversions. There is very little opportunity for instream use enhancement or for irrigation of crops that would require late irrigation. The only storage for irrigation and other offstream uses is the ground water gravel aquifer. This aquifer would also benefit from surface storage and proper water management.

IV. RECOMMENDED ACTIONS TO ACHIEVE OBJECTIVES

The policies formulate the course of actions for the Walla Walla Demonstration Conservation Plan. In the course of recommended actions, answers to questions, resolution of issues and additional data will be attained, and the actions, as set forth by priority herein, will lead to water conservation.

Action plans will require some changes and changes bring opposition because the basic issues are not understood. To be successful, public awareness of water resource problems and conservation to reduce water demand are key criteria in establishing basic water conservation ideals. Therefore, public information and education are given a high priority.

A. Objective: Public Information and Education

Action Plan(s)

1. Establish and advance public information and education.

B. Objective: Improve Agricultural Off-Farm and On-Farm Water Use Efficiency.

Action Plan(s)

Off-Farm:
1. Install flow measurement devices.
2. Improve management.
3. Improve maintenance.
4. Improve conveyance systems, canals, ditches, and regulation structures.
5. Install in-system equalization reservoirs.
6. Consolidate ditch companies.
7. Construct permanent diversion structures.
8. Conversion to ground water.

On-Farm:
1. Install flow measurement devices.
2. Improve soil tilth as related to moisture retention.
3. Improve irrigation water management.
4. Improve water control structures.
5. Install ditch lining, piping.
6. Initiate and undertake irrigation scheduling.

C. Objective: Determine Water Availability (surface and ground).

Action Plan(s)

1. Identify local cost-sharing sources of revenue to finance needs in conjunction with possible state and federal funds for a water availability study.
2. Provide for collection, recording and management of technical data (surface and ground), flow data, spatial distribution of aquifer thickness and hydraulic continuity to be pursued through appropriate government agencies.
3. (a) Provide water use data, measurement records of diversions, farm turnouts, well locations, lifts, and discharges.
   (b) Investigate ground water recharge (gravel and basalt aquifers).
4. Develop and provide a water balance for the area under investigation.(Water balance is a summation of inflows and outflows to a hydrologic system.)
5. Examine the correlation between the water rights and water use, surface and ground.
6. Establish acceptable rates of ground water withdrawal.
7. Develop a ground water management plan acceptable and approved by local citizens and government and the State of Washington.
8. Develop a conjunctive water use (surface and ground water) management plan.
9. Develop a water quality protection plan for both surface and ground water.

D. Objective: Cooperation with State of Oregon, Federal Government and Tribes.

Action Plan(s)

1. Invite Oregon side, Walla Walla Basin, State of Oregon Water Resources Department, and representatives from federal water agencies and Tribes to participate in discussions and evaluations.
2. Consider Washington - Oregon interstate water conservation plan that benefits both citizens and Tribes.
3. Follow through with efforts to authorize plan and make effective and implementable.

E. Objective: Equitable Sharing of Costs.

Action Plan(s)

1. (1) Identify needs, (2) Determine preliminary range of costs for water use efficiency improvements, and (3) Determine cost sharing avenues and sources.
2. Identify government programs and criteria and extent of cost sharing.
3. Determine all water users willingness to pay for conservation.

F. Objective: Examine Transfer of Water.

Action Plan(s)

1. Identify potential uses and transfers, including market transfers.
2. Identify potential users who may be interested in transfers.
3. Develop model scenario to show incentives for transfers.
4. Develop recommendations to enact legislation.

G. Objective: Consider Storage For Basin.

Action Plan(s)

1. Investigate watershed management.
2. Pursue Phase II assessment of Mill Creek Lake with Corps of Engineers.
3. Determine Mill Creek Lake improvement costs.
4. Identify benefits of Mill Creek Lake improvement.
5. Identify environmental impacts associated with the improvement of Mill Creek Lake.
6. Develop workable agreement with Corps of Engineers for use of stored water in Mill Creek Lake.
7. Identify local/state cost-sharing avenues.
8. Identify off-farm and on-farm storage for equalization reservoirs for irrigation water supply.
9. Cooperate with Oregon, federal agencies, and Tribes seeking viable upstream storage an the Walla Walla River and tributaries.
10. Investigate spring freshet retention basins.

V. PLAN EVALUATION/LEVELS OF IMPLEMENTATION

As determined in the Phase II Conservation Assessment, data collection and analysis are key ingredients for a successful conservation plan. A major part of this demonstration plan is devoted to this process particularly where ground water plays an important role. Usually, ground water information is lacking because it is the biggest unknown and difficult to find.

To implement the demonstration conservation plan in a systematic way requires public education and information first to expose the issues and how to resolve them. Financing, or outside cost sharing of the conservation activities, will be necessary for implementation of most activities to take place. Finding the options available is another part of the demonstration conservation plan. Several potential opportunities are open for innovative entities or groups to pursue. The plan creates a roadway for assistance.

A successful demonstration conservation plan has a strong linkage with implementation, an indication of who would implement the actions and the manner and process defined for implementation. A test of the conservation plan and implemented success can be applied by using certain test factors.

1. There is coordination with policies.
2. Confronts objective.
3. Considers incentives for implementation.
4. Takes into account water rights/water appropriation.
5. There is cooperation and coordination among all parties.

The following is a process for implementing the actions and a summary matrix that pulls together the demonstration conservation plan strategic considerations for implementing and achieving the most effective conservation measures and/or targeted activities that will lead to efficiency and a sustainable water resource.

A. Objective: Public Information and Education

<u>Process for implementing Actions</u>

- Establish public information and education program with specific roles for county, Washington State University Cooperative Extension Service and Washington Department of Ecology.
- Focus on outreach, speakers, media, shows and fairs.
- Establish higher profile for government technical assistance and demonstrations of water use efficiency measures.

Specific Action Example (Steps and estimated costs):

Publicize the need for water conservation.

- Focus on the plan objectives, selecting one item per irrigation season, for each objective.
- Select audience to reach
- Reasons to pursue water conservation
- advantages, cost saving from water conservation

Estimated cost: $22,000 annual

B. Objective: Improve agricultural off-farm and on-farm water use efficiency.

Process for implementing Actions

- Utilize public information and education program.
- Utilize the state Referendum 38 program
- Utilize the determination of costs and cost sharing needs program to find funding sources.
- Focus on technical team, Washington State University Cooperative Extension, Federal Agencies, Soil Conservation Service, State Department of Ecology, to establish technical demonstrations and provide technical assistance.
- Move on early implementation to install measuring devices and collect water use data. Establish local and state technical team to correlate and start activities.

1. Off-farm

Specific Action Example (Steps and estimated costs):

Install measuring devices and collect water use data.

- Focus on Pilot irrigation district
- Agreement negotiated, cost-sharing identified and funds procured
- Establish overview technical team
- Install measuring devices - record, compile - 2 years

Estimated Cost: $255,000 installation
$10,000 annual, read and record measurements

2. On-farm

Specific Action Example (Steps and estimated costs):

Initiate irrigation scheduling

- Focus on pilot farm, four in basin, varying cropping patterns
- Agreement negotiated with WSU, SCS, ASCS; cost sharing identified and funds procured
- Establish and carry out two irrigation seasons

Estimated Cost: $12,000 per farm - WSU-CE

C. Objective: Determine water availability (surface and ground).

Process for implementing Actions

- Utilize public information and education program established herein.
- Utilize the determination of costs and cost sharing needs program established herein.
- Move on early implementation to collect surface and ground water data, including water use data; establish local and state technical team to correlate and start activities.
- Initiate ground water study through county, farm organizations and cities as soon as funding and willingness to proceed can be established.
- Establish study team, local citizens, tribes, county, cities and state to coordinate and make decisions on water availability study and develop ground water management plan.
- Department of Ecology will undertake water right report when funding is available, with local assistance.

Specific Action Example (Steps and estimated costs):

Early Reconnaissance into the needs for, collection of surface and ground water data, including water use data.

- Establish local, state (agencies, citizens) coordinating team
- Extend and establish interstate coordinating team
- Collect sufficient existing data, compile for decision making, estimate cost
- Decision on needs - go or no go

If Go:

- Contact federal water agencies (USGS, USBR, SCS, COE) and tribes to present needs

- Decision on study needs and extent of study, estimated cost, cost-sharing
- Confirm local, state (Washington, Oregon) cost-sharing
- Decision - Go or No Go on basin water availability study

If Go:

- Negotiate study

Estimated Cost: $40,000 one year time to point of decision - Go
Note: See Appendix A for ground water study costs.

D. Objective: Cooperation with State of Oregon, Federal Government, and Tribes.

Process for implementing Actions

- The Walla Walla Conservation Plan formulation Committee And the Department of Ecology to extend invitations to the concerned parties to initiate the interstate water planning efforts.
- Establish the interstate team or committee.
- Utilize the public information and the costs and cost sharing needs programs to inform and build public confidence and find fund sources to assist with cost sharing.

Specific Action Example (Steps and estimated costs):
Initiate interstate water availability and planning.

See specific action example under objective C.

Estimated Cost: Add $20,000 to complete this action.

E. Objective: Equitable sharing of costs.

Process for implementing Actions

- Establish public information and education program, and the roles of county, local farmer organizations and districts and tribes to carry out procedures to determine costs and cost sharing needs.
- Bring state and federal water resources agencies into process by invitation to relate and coordinate local activities with state and federal procedures.
- Agreement among interested parties to start process with identified roles and follow through on investigations and complete reports.

Specific Action Example (Steps and estimated costs):

Procedures to determine costs and cost sharing needs.

- Focus on pilot project area. Could utilize pilot area project suggested under Objective B irrigation district and include on-farm or individual farms and possible ditch companies.
- Meeting, WSU Cooperative Extension Service, Ecology, Referendum 38 program, and CCWF program, Agricultural Stabilization and Conservation Service, Soil Conservation Service, Bureau of Reclamation, and proposed pilot project area representatives, reach consensus on pilot water conservation project
- Negotiate agreement, selected water conservation management practices and measures (off-farm and on-farm). Establish roles of each agency to participate (see appendix on cost sharing programs) in determining costs and proposed cost-sharing.
- Consensus reached on pilot practices and measures.
- Initiate pilot project implementation and complete (Two-Four Years).

Planning
Estimated Cost: $20,000 to initiate and take to implementation stage.

Implementation
Estimated Cost: $350,000 to $2,500,000 depending on pilot project area and number and kind of practices and measures.

F. Objective: Examine transfer of water.

Process for implementing Actions

- Utilize the public information and education program.
- Utilize the determination of costs and cost sharing needs to find the funds to initiate the process.
- Establish roles and initiate reviews with local interest groups, tribes and the State of Washington, Department of Ecology.
- Investigation reports completed by the local water resources committee and the State of Washington, Department of Ecology.
- Complete model runs by the State of Washington, Department of Ecology.
- If feasible, legislation would be pursued to ease transfers.

Specific Action Example (Steps and estimated costs):

Investigation, assessment, and report completed by local water resources committee and Department of Ecology. Transfer of points of diversion for water conservation purposes.

- Assemble local committee and with Ecology, assess diversion point changes and conditions in basin which could benefit water conservation.
- Contact water right holders in affected stream reach agree to theoretical test of moving diversion points
- Review paper water rights
- Physically measure water diversions if no records exist.
- Complete hydrologic investigation
- Complete economic assessment
- Compile detrimental and/or positive hydrologic and economic effects on water right holders
- Complete report, advantages, disadvantages and make recommendations in report on water law changes if needed.

Estimated Cost: $36,000

G. Objective: Consider storage for basin.

Process for implementing Actions

- Utilize the findings of reports from determination of cost needs and funding sources to pursue funding of study and investigation teams and possible later implementation.
- Cooperation of Corps of Engineers, Walla Walla County, tribes, farmer organizations, cities, and the State of Washington required to pursue the planning and rehabilitation of Mill Creek Lake.
- Cooperative interstate water conservation team as established herein, will initiate upstream investigations, watershed investigations and make decisions with further public involvement.
- Irrigation districts, ditch companies and the State of Washington Department of Ecology, will initiate off-farm and on-farm equalization reservoir investigation to determine feasibility and ways to implement.
- Utilize consolidation of districts and ditch companies and potential state Referendum 38 cost sharing to fund construction of feasible off-farm equalization reservoirs.

Specific Action Example (Steps and estimated costs):

Cooperate with Corps of Engineers, Walla Walla County, Tribes, farmer organizations, cities and state of Washington to pursue planning rehabilitation of Mill Creek Lake.

- Initiate further Mill Creek Lake rehabilitation investigations
- State, local agencies and interested organizations meetings with Corps of Engineers
- Determine Whether further assessment of water supply storage benefits is practical.
- Determine local interest in pursuing further study for water supply storage.
- Determine local cost sharing needs for further study.
- Decision: Go or No Go
- If Go, find local cost sharing and negotiate agreement for further study

Estimated Cost: $5,000 to Go or No Go

Estimated Cost: $18,478,000 Mill Creek Rehabilitation capital cost, Corps of Engineers reconnaissance study (see Appendix A).

VI. SUMMARY

The Phase III Demonstration Water Conservation Plan for the Walla Walla basin utilizes and builds from the results of the Walla Walla Phase II Conservation Assessment. The plan sets forth a model for planning water conservation, focusing on agricultural water use. It lays out a logical framework by stating the objectives, clarifying the objectives through policies and purposes, and sets a path to attain the objectives by required actions for implementation and evaluation.

Seven objectives and policies are required to improve water use efficiency in the Walla Walla basin. For each objective there are several required actions to facilitate water conservation implementation to obtain the objectives. Each action will involve a process for implementation with an expected result. A summary matrix is given below which lists each objective and its associated actions. The matrix outlines who will be involved in implementation, the type of assistance offered, the assistance required, and test factors to determine if the actions are meeting the objectives.

VI. Summary Matrix

Actions to Produce Outputs	Implementation: Lead (L), Assist (A), Implement (I) — Gov't Agencies**							Type of Assistance Offered: Planning (P), Technical (T), Information & Education (E), Cost Sharing (C)* — Gov't Agencies**							Assistance Required: Funding, Cost Sharing (FC), Technical (T), Information & Education (E)					Test Factors				
	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Local \County	Local\ Irr. Dist. \Other Public Bodies	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Coordination with Policies	Confronts Objective	Consider Incentives for Implementation	Takes into Account Water Rights	Coordination & Cooperation Required
A. Objective: Public Information and Education																								
1. Establish and advance public information and education	L	L,I	A,I	A	A	I		E	E		E				FC					X	X	X	X	X
B. Objective: Improve Agriculture Off-farm and On-farm water use efficiency																								
Off-farm:																								
1. Install flow measurement devices	L,A	A	I	L,A	A	I		P,T,E,C	E		P,T,E,C	E			E	FC,T,E	E	FC,T		X	X	X	X	X
2. Improve Management	A	A	L,I	A	A			P,T,E,C	E		P,T,E	E			FC,T,E	FC,T,E	FC,T,E	FC,T,E		X	X	X		X
3. Improve Maintenance		A	L,I		A	I		P,T	E		P,T	E				FC,T,E	E	FC,T,E		X				X
4. Improve Conveyance Systems, Canals, Ditches and Regulation Structures	L,A	A	I	L,A	A	I		P,T,E,C	E		P,T,E,C	E			E	FC,T,E	E	FC,T,E		X	X	X	X	X
5. Consolidate Ditch Companies	L,A		A		A,I	A		P,T,E	P,E			E			E	T,E	FC,T,E	FC,T,E		X	X		X	X
6. Construct Permanent Diversion Structures	L,A	A	L,A	A	A,I	A		P,T,E,C	P		P,T,C				FC,E	FC,T,E	T,E	FC,E		X	X	X	X	X
7. Conversion to ground water	L,A	A	I	A	A	I		P,T,E,C	P,E		P,T	E			FC,E	FC,T,E	E	FC,E			X		X	X
On-farm:																								
1. Irrigation Water Management	A	L	A	L	A	I		E	P,T,E	E	P,T,E,C	E			FC	E	E	FC,T,E		X	X	X	X	X
2. Improve Soil Tilth for Moisture Retention	A	L	A	L	A	I		E	P,T,E	E	P,T,E,C	E			FC	E	E	FC,T,E		X	X	X		X
3. Flow Measurement Devices	A	L	A	L	A	I		E	P,T,E	E	P,T,E,C	E			FC	E	E	FC,T,E		X	X	X		X
4. Water Control Structures	A	L	A	L	A	I		E	P,T,E	E	P,T,E,C	E			FC	E	E	FC,T,E		X	X			X
5. Ditch Lining/ Piping	A	L	A	L	A	I		E	P,T,E	E	P,T,E,C	E			FC	E	E	FC,T,E		X	X	X		X
6. Irrigation Scheduling	L	L	A	A	A	I		P,T,E,C	P,T,E	E	P,T,E,C	E			FC	E	E	FC,T,E		X	X	X	X	X

*Cost sharing may depend on appropriate legislation.
**State of Washington includes: WDOE,WSU-CE; Federal includes: USBR, SCS, ASCS,COE

VI. Summary Matrix

Actions to Produce Outputs	Implementation: Lead (L) Assist (A) Implement (I) — Gov't Agencies**							Type of Assistance Offered: Planning (P) Technical (T) Information & Education (E) Cost Sharing (C)* — Gov't Agencies**							Assistance Required: Funding, Cost Sharing (FC) Technical (T) Information & Education (E)					Test Factors				
	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Local \County	Local\ Irr. Dist. \Other Public Bodies	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Coordination with Policies	Confronts Objective	Consider Incentives for Implementation	Takes into Account Water Rights	Coordination & Cooperation Required
C. Objective: Determine Water Availability (surface and ground)																								
1. Identify local cost sharing needs and sources of revenue to finance those needs	L,I	L,I	A		A,I	A		P,E,C	P,E,C	E	E	P,E	E		FC					X	X			X
2. Provide for collection, recording and management of technical data (surface and ground), flow data, spatial distribution of aquifer thickness and hydrualic continuity to be pursued through appropriate government agencies	L,I	A	A	L,I	A	A		P,T,E,C	E	E	P,T,E,C	E	E		FC,T,E	FC,T,E	E	E		X	X		X	X
3. (a) Provide wateruse data, measurement records of diversions, farm turnouts, wells locations, lifts and discharges.	L,I	A	L,I	A	A	I		P,T,E,C	E	P,C	P,T,E,C	E			E	FC,T,E	E	FC,T,E		X	X	X	X	X
3. (b) Investigate ground water recharge (gravel and ground)	L,I	A	A	A	A	A		P,T,E,C			P,T,E,C				FC,T,E	FC,T,E	E	FC,T,E		X	X		X	X
4. Develop and provide a water balance for the area under investigation	L,I	A	A	A	A	A		P,T,E,C	E,T	P	P,T,E,C	E	E		FC,T,E	FC,T,E	T,E	FC,T,E		X	X	X	X	X
5. Examine the correlation between the water rights and water use, surface and ground	L,I	A	A	A	A	A		P,T,E,C		E	E		E		FC,T,E	T,E	E	T,E		X	X		X	X
6. Establish acceptable rates of ground water withdrawal	A	L,I	L,I	A	A	I		P,T,E	P,T,E	P,T,E	T,E	E	E		T,E	T,E	E	T,E		X	X		X	X
7. Develop a ground water management plan																								
8. Develop a conjunctive water use (surface and ground water used conjunctively)	A	L,I	L,I	A	A	I		P,T,E,C	P,T,E,C	P,T,E	T,E	E	E		FC,T,E	FC,T,E	E	T,E		X	X	X	X	X
9. Develop water quality protection plan for both surface and ground water	L,I	L,I	A	A	A	I		P,T,E,C	P,T,E,C		P,T,E,C	E			FC,T,E	T,E	E	T,E		X	X			X

*Cost sharing may depend on appropriate legislation.
**State of Washington includes: WDOE,WSU-CE; Federal includes: USBR, SCS, ASCS,COE

VI. Summary Matrix

Actions to Produce Outputs	Implementation: Lead (L) Assist (A) Implement (I) — Gov't Agencies**							Type of Assistance Offered: Planning (P) Technical (T) Information & Education (E) Cost Sharing (C)* — Gov't Agencies**							Assistance Required: Funding, Cost Sharing (FC) Technical (T) Information & Education (E)					Test Factors				
	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Local \County	Local\ Irr. Dist. \Other Public Bodies	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Coordination with Policies	Confronts Objective	Consider Incentives for Implementation	Takes into Account Water Rights	Coordination & Cooperation Required
D. Objective: Cooperation with State of Oregon, Federal Government, and Indian Nations																								
1. Invite Oregon Side, Walla Walla Basin, State of Oregon water resources department, and representatives from federal water agencies and tribes to participate in discussions and evaluations	A	L,I	A	A	L,I	A		P,T,C,E	P,E		P,T,C,E	P,E			T,E	T,E	T,E	T,E		X	X			X
2. Consider Washington-Oregon water conservation plan that benefits both citizens, tribes	L,I	L,I	A	A	A	A		P,T,C,E	P,E		P,T,C,E	P,E			T,E	T,E	T,E	T,E		X	X			X
3. Follow through with efforts to authorize and make plan effective and implementable	L,I	L,I	A	A	A	A		P,T,C,E	P,E		P,T,C,E	P,E			FC,T,E	FC,T,E	T,E	FC,T,E		X	X	X	X	X
E. Objective: Equitable Sharing of Costs.																								
1. Determine (1) identify need, (2) preliminary ranges of costs for water use efficiency improvements and (3) cost sharing awareness and sources	L,I	I	L,I	A	A	A		P,T,C,E	P,T,E	P,E	P,T,C,E	P,E			FC,T,E	FC,T,E	T,E	T,E						
2. Identify government programs and criteria and extent of cost sharing	L,I	L,I	I	A	A	A		P,T,C,E	P,T,E	P,E	P,T,C,E	P			FC,T,E	FC,T,E	T,E	T,E		X	X			X
3. Determine all water users willingness to pay for conservation	A	L,I	L,I	A	A	A		E	P,T,E	P,T,E	E	P,E			FC,T,E	FC,T,E	T,E	T,E		X	X	X	X	X

*Cost sharing may depend on appropriate legislation.
**State of Washington includes: WDOE,WSU-CE; Federal includes: USBR, SCS, ASCS,COE

VI. Summary Matrix

Actions to Produce Outputs	Implementation: Lead (L) Assist (A) Implement (I) — Gov't Agencies**							Type of Assistance Offered: Planning (P) Technical (T) Information & Education (E) Cost Sharing (C)* — Gov't Agencies**							Assistance Required: Funding, Cost Sharing (FC) Technical (T) Information & Education (E)					Test Factors				
	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Washington State	Local \County	Local\ Irr. Dist. \Other Public Bodies	Federal	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Local \County	Local\ Irr. Dist. \Other Public Bodies	Local Organizations\Groups	Water Users\Individuals	Indian Nations	Coordination with Policies	Confronts Objective	Consider Incentives for Implementation	Takes into Account Water Rights	Coordination & Cooperation Required
F. Objective: Examine transfer of water.																								
1. Identify potential uses for transfer or market	L,I	A	A	A	A	L,I		P,T,E		P		P	P,E		E	T,E	E	T,E		X	X	X	X	X
2. Identify users who may be interested	L,I	A	A	A	A	L,I		P,T,E		P		P	P,E		E	T,E	E	T,E		X	X			X
3. Develop model scenario to show incentives for transfer or market	L,I	A	A	A	A	L,I		P,T,E		P		P	P,E		E	T,E	E	T,E		X	X	X		X
4. Recommendation to enact legislation	A	L,I	A	A	A	L,I		P,T,E	P,E	P		P	P,E		FC,E	T,E	E	FC,T,E		X	X		X	X
G. Objective: Consider Storage for Basin																								
1. Investigate watershed management	A	L,I	A	L,I	A	A		P,T,E	P,C,E	P,E	P,T,C,E	P	P		FC,T,E	T,E	T,E	T,E		X	X			X
2. Pursue Phase II assessment of Mill Creek Lake with Corps of Engineers	A	A	L,I	L,I	A	L,I		P,T,C,E		P	P,T,C,E	P	P		E	FC,T,E	FC,T,E	T,E		X	X		X	X
3. Determine Mill Creek Lake improvement costs	A	A	L,I	L,I	A	L,I		P,T,C,E		P	P,T,C,E	P	P		E	FC,T,E	FC,T,E	T,E		X	X			X
4. Identify further benefits of Mill Creek Lake improvements	A	A	L,I	L,I	A	L,I		P,T,C,E		P	P,T,C,E	P	P		E	FC,T,E	FC,T,E	T,E		X	X			X
5. Identify environmental impacts associated with improvement of Mill Creek Lake	A	A	L,I	L,I	A	L,I		P,T,C,E	P,E	P	P,T,C,E	P	P		FC,E	FC,T,E	FC,T,E	T,E		X	X			X
6. Develop workable agreement with Corps of Engineers for use of stored water in Mill Creek Lake	A	A	L,I	L,I	A	L,I		P,T,C,E	P,E	P	P,T,C,E	P	P		T,E	FC,T,E	T,E	FC,T,E		X	X		X	X
7. Identify feasible off-farm and on-farm off-stream storage for storage and/or equalization of irrigation water supply	L,I	A	L,I	A	A	L,I		P,T,C,E	P,E	P,T	P,T,C,E	P	P		T,E	FC,T,E	T,E	T,E		X	X		X	X
8. Identify local/state cost sharing avenues	L,I	L,I	L,I	A	A	A		P,T,E	P,E	P	P,T,E	P	P		FC,T,E	FC,T,E	T,E	T,E		X	X	X		X
9. Cooperate with Oregon, federal agencies, and Indian Nations seeking viable upstream storage on the Walla Walla River and tributaries	L,I	A	A	L,I	A	A		P,T,C,E	P,C,E	P,E	P,T,C,E	P	P		FC,T,E	T,E	T,E	T,E		X	X	X		X
10. Investigate spring freshet retention basins	A	L,I	A	L,I	A	A		P,T,E	P,E	P,E	P,T,C,E	P	P		FC,T,E	T,E	T,E	T,E		X				X

*Cost sharing may depend on appropriate legislation.
**State of Washington includes: WDOE,WSU-CE; Federal includes: USBR, SCS, ASCS,COE

APPENDIX A
Guides for Estimating Water Use Efficiency Costs

PART I Off-Farm, Estimated Cost for Guidelines to Planning Water Use Efficiency Physical or Structural Improvements.

A. U.S. Bureau of Reclamation, Preliminary Assessment Report, Walla Walla, 1990.[1]

Flow Measurements:	
Mainline canals - Weirs	$1,500 to $3,000each
Lateral or Farm Turnouts	$900 to $4,000each
River Diversion Structures	
New Concrete Diversion Dams (w/o fish passage facilities) (with fish passage facilities multiply by 1.5)	$800,000-$1,400,000
Upgrade exiting concrete diversion dam	$500,000
Realign and restore canals, ditches to operational efficiencies	$600-$1,400 per mile
Seepage Control	
Reline canals, ditches	$64,000-$105,000 per mile
Pipe replacement	$575,000 per mile

[1] U.S. Bureau of Reclamation Walla Walla River Basin Irrigation System Water Conservation Assessment, Preliminary Assessment Report, July, 1990.

B. Irrigation Districts in State of Washington.

Reregulation Reservoir, Earthfill Dam, PVC Lined Reservoir, 75HP Pumping Station[2]	$863,000
Canal Turnout (concrete)[3]	$9.73 per ft width
Canal Turnout (concrete)[4]	$1,500
Weir Blade Structure(concrete)[5]	$1,000 per yd^3
Weir Box (concrete)[6]	$5,200
Pipe (laterals) 2" to 18" dia[7]	$13.00 per linear ft
Pipe(laterals,PVC) 6" to 24" dia[8]	$6.00 to $24.00 per linear ft
Flowmeter (3" to 10")[9]	$585 to $870
Flowmeter(4",with 10'steel pipe)[10]	$1,280
Pipe(21" dia. PVC)[11]	$21.46 per linear ft
Canal shaping and lining (2" shotcrete)[12]	$7.60 per sq.yd.
Canal Flume (concrete & steel)[13]	$44.60 to $551.47 per linear ft.

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[2] Roza Irrigation District 1989.

[3] Roza Irrigation District 1991.

[4] Sunnyside Irrigation District 1991.

[5] Roza Irrigation District 1990.

[6] Sunnyside Irrigation District 1991.

[7] Roza Irrigation district 1990.

[8] Sunnyside Irrigation District 1990.

[9] Roza Irrigation District 1991.

[10] Roza Irrigation District 1991.

[11] Wolf Creek Reclamation District 1990.

[12] East Columbia Irrigation District 1991.

[13] Wenatchee Reclamation District 1989.

PART II On-Farm, Estimated Costs for Guidelines to Planning Water Use Efficiency Measures, Improvements.

A.	1. Sprinkler Wheel line[14], Row, Rill, Pasture	$463/acre
	2. Solid Set[15], Vineyard	$927/acre
	3. Trickle[16], Vineyard	$1070/acre
B.	1. Center Pivot, Lincoln-Adams County[17], 1986	$292/acre
	2. Side Roll, Columbia Basin[18], 1985	$300/acre
	3. Side Roll, Yakima Basin[19], 1986	$285/acre
	4. Hand Lines, Walla Walla[20], 1989	$200/acre

[14] U.S. Soil Conservation Service, North Whitstan Watershed, 1991.

[15] U.S. Soil Conservation Service, North Whitstan Watershed, 1991.

[16] U.S. Soil Conservation Service, North Whitstan Watershed, 1991.

[17] Cooperative Extension Service, WSU, Farm Mgt. Report, 1989.

[18] Cooperative Extension Service, WSU, Farm Mgt. Report, 1985.

[19] Cooperative Extension Service, WSU, Farm Mgt. Report, 1986.

[20] Cooperative Extension Service, WSU, Farm Mgt. Report, 1989.

PART III Ground and Surface Water Investigation and Studies, Estimated Costs for Guidelines to Planning Water Availability, Water Use Efficiency Measures, Improvements.

A.	Ground Water Study, Modeling North Thurston County Health Dept[21].	$1,968,000
B.	Ground Water Study, Modeling Clark County Intergovernmental Resource Center[22].	$1,800,000
C.	Ground Water Study, Regional Water Association of South King County[23].	$1,300,000
D.	Ground Water Study, Kitsap County[24].	$1,409,000

Part IV Summary costs for Storage Projects in the Walla Walla Basin[25]

Project Description*	Direct Constr. Cost	Total Invest. Cost	Annual Amort. Cost ($,000)	Annual O&M & Repl.	Total Annual Cost
North Fork Walla Walla	$51,413	$58,235	$ 5,035	$ 66	$5,101
Mill Creek Watershed	23,267	30,389	2,628	136	2,764
Mill Creek Lake	18,478	19,247	1,644	0	1,644
South Fork Touchet	73,300	83,026	7,179	57	7,236

*Fishery Mitigation costs are not included.

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[21] Ground Water Management Area Program, Washington State Department of Ecology Grants, 1991.

[22] Ground Water Management Area Program, Washington State Department of Ecology, Grants, 1991.

[23] Ground Water Management Area Program, Washington State Department of Ecology, Grants, 1991.

[24] Ground Water Management Area Program, Washington State Department of Ecology, Grants, 1991.

[25] Corps of Engineers Reconnaissance study, 1991 price levels

APPENDIX B
Federal and State Funding Sources

A. Department of Ecology

1. Agricultural Water Supply Facilities, (Referendum 38)

Referendum 38 (Chapter 43.99E RCW and Chapter 173-170 WAC) authorizes available funding to public bodies (i.e. Irrigation Districts, Indian Tribes) operating agricultural water supply facilities to assist in improving their efficiency of water use beyond current levels. This program is administered by the Department of Ecology's Water Resources Program. Grants and loans are available for planning and implementation. Before implementation of a conservation project the public body must develop a Comprehensive Water Conservation Plan, which evaluates the current system for alternative managerial or structural water conservation improvements. Grants of 50% and Loans up to 40% are available for the plan development. Once a Comprehensive Water Conservation Plan has been approved by Ecology funding for construction is available as grants for 30% and loans up to 60%.

2. Centennial Clean Water Fund

The Centennial Clean Water Fund (Chapter 70.146 RCW and Chapter 173.95 WAC) helps local communities meet water quality, health and safety requirements. Money from the fund is available to public bodies through the Department of Ecology's Water Quality Financial Assistance Program. Grants of 75% are available for planning, research, monitoring and education involving nonpoint, ground water and freshwater projects. Loans are also available up to 100% of the eligible project costs.

3. Ground Water Management Area Program

Funding is available for designation of a Ground Water Management Area and for protection of quality and quantity of ground water. Grants of 50% are available with possibly additional 25% for hardship cases. Funding is available to public bodies and must be on Ecology's General Schedule and be a designated Ground Water Management Area.

B. US Bureau of Reclamation

1. Small Reclamation Projects Act of 1956

The Small Reclamation Projects Act provides financing to build new or rehabilitate the off-farm portions of existing irrigation systems. Loans are available for small reclamation projects and grants are available for those portions of the projects that are nonreimbursable as a matter of national policy. Grants are available for flood control, outdoor recreation, and fish and wildlife

enhancement purposes, where those purposes are of general public benefit. The Act is available to projects on Indian reservations and non-Federal projects or systems.

2. Technical Assistance to States

This program funds use of USBR staff to assist state agencies in water resource management evaluation s when that assistance is requested as part of a larger ongoing state study effort. Data, technical knowledge, and expertise will be provided to the state to aid in its evaluation and allocation of water resources. However, the entire project investigation will not be performed for the state nor can specific investigations be conducted for entities such as irrigation districts. Funds can be used only when USBR involvement is officially requested by the state water resources agency.

C. US Department of Agriculture

1. Conservation Operations Program

Under this program technical assistance is provided by the Soil Conservation Service to individual landowners, groups, and units of Government. Assistance in developing farm conservation plans, including irrigation water use and management plans, as well as assistance in the design, layout, installation, and management of onfarm irrigation systems and practices is provided. This assistance is provided through and in cooperation with soil and water conservation districts at the local level and is available to both federally and non-federally irrigated lands.

2. Resource Conservation and Development Program

Under this program the Soil Conservation Services provides and planning process to help people utilize and conserve the natural resources and improve local economies and facilities. Technical cost sharing and loan assistance is provided to organizations or groups on both federally and non-federally irrigated lands. Assistance is provided for water resource purposes of flood prevention, irrigation, drainage, water-based fish and wildlife and recreation developments, and water quality management.

3. Cooperative River Basin Studies Program

This program is carried out by the Soil Conservation Service and other participating USDA agencies to provide basin or areawide planning assistance to state agencies and local organizations in water and related land resource development to assure that adequate environmental considerations are given to

rural agriculture and forestry aspects. Current program emphasis is given to special problems of water quality, erosion control, protecting valuable farmlands, wetlands, water management, and conservation.

4. Watershed Protection and Flood Prevention Act

Commonly known as the small watershed program, this Soil Conservation Service program is directed toward furthering the conservation, development, utilization, and disposal of water and the conservation and use of land to preserve, protect, and improve the Nation's land and water resources. Federal assistance, cost sharing of structural measures, and loans to local organizations to help in financing their share of project costs. Principal structural measures related to irrigation are water storage reservoirs, distribution systems, and water control structures.

5. Agricultural Conservation Program

This program is administered by the Agricultural Stabilization and Conservation Service. The program provides cost sharing with landowners for performing conservation practices. Funding of $3,500 is available to each producer. If producers form a pulling group then each producer in the group is eligible to receive $10,000 for conservation work.

6. Water Bank Program

Administered by the Agricultural Stabilization and Conservation Service, this program provides for reimbursement of the cost of performing practices to conserve surface water, preserve and improve habitat for migratory waterfowl and other wildlife resources, and contributes to flood control.

D. Cooperative Extension Service

The Cooperative Extension Service, which is comprised of the Extension Service, state governments, and land-grant universities, assists farmers and others to apply the latest technology developed through research by land-grant universities, Department of Agriculture, and other sources. Area and county agents work directly with individuals and groups to help them apply the newest proven technology to operating problems. Information and other assistance are provided to landowners regarding irrigation practices related to the farm.

E. Army Corps of Engineers

1. General Investigation Program

Studies under the General Investigation Program are authorized by congress. They address flood control, navigation, water supply, recreation, and other needs and opportunities. When the Corps receives congressional authority to do a study a two phase planning process is followed. The first phase involves a reconnaissance study to determine if there is a good chance for a project to be justified. During this phase, a wide range of possible solutions are considered. Local citizens are consulted to assure that their concerns and needs are considered, and to inform them of their responsibilities. If the reconnaissance phase shows that a potential project meets the general criteria for development, the Corps will proceed with a more detailed second phase of study known as the feasibility phase. Local interest must agree to provide 50 percent of the feasibility study costs.

Note: *The recently completed Walla Walla River Basin Reconnaissance study (1992) under the General Investigation Program indicated that none of the investigated storage alternatives were economically feasible and recommended termination of further Corps studies of the basin.*

2. Planning Assistance to States

The Corps of Engineers is authorized under Section 22 of the Water Resources Development Act of 1974 to assist states in the preparation of planning studies for the development, utilization, and conservation of water and related land resources. The Corps will accommodate as many studies under this program to each state as possible under the funding limit of $300,000 annually per state. In fiscal year 1992 (October 1992 through September 1993) the non-federal cost share will be 30 percent. The non-federal cost share will increase to 50 percent beginning fiscal year 1993. The program includes involvement in studying many types for water supply, water quality, water conservation, hydropower development, flood control, erosion and navigation needs. The studies are at a reconnaissance level of detail and do not include design for project construction. The studies involve the analysis of existing data for planning purposes using standard engineering techniques.