

FINAL REPORT
of the
WASHINGTON STATE
WATER USE EFFICIENCY STUDY COMMITTEE

December 31, 1988

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SUNNYSIDE VALLEY IRRIGATION DISTRICT

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P. O. BOX 239

Sunnyside, Washington

December 29, 1988

Members of the Legislature:

For the past eight months I have been honored to serve as Chair of the Water Use Efficiency Study Committee. The Committee was appointed by the Governor and the Legislature in April of 1988 as required by Substitute House Bill 1594. This bill directs the Committee to investigate and evaluate opportunities and means for achieving improvements in water use efficiency and to issue a report to the Legislature by December 31, 1988. On behalf of the Committee, it is my pleasure to submit this report of our findings and recommendations to you, the members of the Washington State Legislature, for your consideration.

This report to the Legislature contains an executive summary, the findings and recommendations of the three subcommittees of the Water Use Efficiency Study Committee, and a summary of public comment on our draft findings and recommendations. The executive summary provides background information, describes problems and issues related to water use efficiency, outlines efficiency objectives, summarizes the Committee's recommendations, and identifies appendices to the executive summary. Those appendices which are not included in this report will be submitted to the Legislature in early January, 1989.

The findings and recommendations contained in this report result from an intensive process of discussion, review, and revision by Committee members. In submitting them for your consideration, the Committee emphasizes the preliminary nature of these findings and recommendations. They constitute an initial step toward increased water use efficiency in Washington. Several major water use efficiency issues identified in the course of our work could not be resolved in the limited time available to the Committee. We have identified these unresolved issues and urge the Legislature to continue the process of discussion and resolution which we have begun.

Finally, the Water Use Efficiency Study Committee has maintained contact throughout our study with the work of the Legislature's Joint Select Committee on Water Resource Policy. It is our hope that these initial findings and recommendations will contribute to the broad consideration of water policy issues being undertaken by that Committee.

Sincerely,



James Trull, Chair
Water Use Efficiency Study Committee

EXECUTIVE SUMMARY
WATER USE EFFICIENCY STUDY

I. INTRODUCTION

Substitute House Bill (SHB) 1594, passed in early 1988, established the Water Use Efficiency Study Committee to carry out a study of water use efficiency in the state of Washington. The Committee's study and report to the Legislature represent the first efforts to systematically examine water use efficiency and conservation in the state. This report is composed of an Executive Summary, a list of Committee members, findings and recommendations of the Committee's three subcommittees, a summary of public comment, a comparison between two subcommittee reports, and a list of issues recommended to the Legislature for its further consideration. The Executive Summary provides background information, describes problems and issues related to water use efficiency, outlines efficiency objectives, summarizes the Committee's proposed recommendations, and identifies all appendices to the Executive Summary.

II. BACKGROUND

The Water Use Efficiency Study Committee consists of four members of the state House of Representatives and four members of the state Senate, twelve members representing various water interests and seven members representing state agencies and the Governor's office. Appendix B, the list of Committee members, is attached to this report. Since its establishment in May 1988, the Committee has met eight times at various locations around the state. The meetings of the Committee are documented by meeting notes. (See Appendix D).

The Committee has addressed water use efficiency principally for municipal, industrial, agricultural and instream water uses. These findings and recommendations were initially developed by two subcommittees, one on municipal, industrial and instream uses and one on agriculture and instream uses. In addition, a separate task force of the Committee developed findings and recommendations for a public education program.

The recommendations in this final report are primarily conceptual in nature and describe broad concepts identified by the Committee that could enhance water use efficiency. Specific legislation, administrative rules, and programs will be necessary to implement these concepts. By no means has this brief study considered all possible conceptual options, nor has it systematically explored technical alternatives for achieving efficiency. The Committee emphasizes the need for continued work to expand upon this initial effort.

The Committee assumes that its findings and recommendations will be utilized by the Legislature's Joint Select Committee on Water Resource Policy established by Second Substitute Senate Bill 6724 (1988). The Joint Select Committee is carrying out a broader review of fundamental state water resource policies including water conservation and efficiency.

III. PREPARATION OF REPORT AND APPENDICES

In conformance with provisions of SHB 1594 the Department of Ecology has provided staff support to the Committee. This Committee report, however, does not necessarily represent the positions or policies of the Department of Ecology.

In the preparation of materials for the Committee, the Department of Ecology has consulted extensively with the Water Research Center at Washington State University. In support of the study, the University has absorbed all overhead costs associated with the study. The Committee acknowledges the importance of this support to the Committee's work and wishes to thank the University and the Water Research Center and its Director, Dr. William Funk.

Materials available to the Committee in the development of the findings and recommendations are contained within a voluminous set of appendices submitted to the Legislature together with this report. These appendices include a major report on the economics of water use efficiency prepared by the Washington State Water Research Center, under contract with the Department of Ecology, and a summary of legal and institutional considerations for water use efficiency. The appendices are listed at the end of this summary.

IV. PUBLIC INVOLVEMENT

The Committee made an effort to inform the public of its activities and to receive public comment on its draft findings and recommendations. A list of interested parties was developed through the course of the study. Individuals and organizations on the list received notices of Committee meetings and copies of key documents considered by the Committee. A draft report of Committee findings and recommendations was prepared for public review. Notices announcing the availability of the draft report and the public meetings on the draft report were mailed to over 1000 individuals and organizations. Similar announcements were sent to newspapers and radio and television stations throughout the state. In mid-November the Committee sent copies of the draft report to over 450 interested individuals and organizations. Copies of the draft report and the appendices were available at over 45 libraries in the state.

The Committee received oral comment on the draft report at public meetings in Spokane, Ellensburg, and Seattle on November 28, 29, and 30, respectively. Written comment submitted by December 7 was also accepted by the Committee. Both oral and written comment were considered by the Committee in preparation of the final report. A summary of comment received by the Committee on the draft report is included in this final report. (See Appendix F). Copies of all written comment received by the Committee constitute Appendix J.

V. PROBLEM DESCRIPTION

Washington has experienced an extended period of water resource development for municipal and industrial supply, energy production, and irrigated agriculture. Water resource development to expand the supply available for use has traditionally been the approach selected for meeting the long term growth in demand for water resources. Less attention has been given to improving management of existing supplies or to managing the growth in demand for water resources.

Rapid population growth in western Washington has increased the competition among instream and out-of-stream uses of water. Improved efficiency of urban water systems, reduced use by end users (households, commercial enterprises and industry), and improved knowledge of and consensus concerning desired instream flow protection standards could help alleviate conflicts among water interests and perhaps delay and diminish the need to develop new water sources.

In eastern Washington, agricultural and energy uses have been developed on many streams and aquifers. Efficiency improvements in agriculture in some areas could make water available to meet future instream and offstream water needs. However, efficiency measures must be carefully considered in light of possible negative consequences to resources and uses that depend upon return flows from irrigation.

In recent years, improving the efficiency of water use, managing demand growth, and voluntary reallocation of existing supplies have become recognized as potentially important tools for effectively managing increasingly scarce and valuable water resources. The following factors contribute to this change:

1. Shrinkage of federal participation in new project development.
2. The cost of developing new water projects.
3. Increased energy costs for pumping and foregone energy production.
4. Scarcity of economical and acceptable storage sites.
5. Environmental consequences of new source development.
6. Water quality degradation from return flows and sewage effluent.
7. Increased demand for protecting and restoring instream values.
8. Development of new water saving methods in all water use sectors.

Few incentives for improving water use efficiency currently exist. Impediments to maximizing benefits from limited supplies are apparent. A major policy challenge for the future is to increase the productivity of water resources while equitably distributing the costs and benefits of more efficient water use.

VI. WATER USE EFFICIENCY DIMENSIONS

Improved water use efficiency has technical, legal/institutional, socioeconomic and environmental dimensions. Following are some key

questions under each of these dimensions:

1. Technical

- A. What techniques and hardware are available in each water use sector for improving existing and future water uses?
- B. Is additional research needed to identify and test new water saving methods?
- C. How should knowledge about these techniques be transmitted to the water-using public?

2. Legal/Institutional

- A. What are the advantages and disadvantages of taking a state regulatory approach versus a market based approach for efficiency improvement?
- B. What features of existing statutory and case law are impediments to efforts to improve water use efficiency? How should they be changed?
- C. What existing state laws and programs can be used to facilitate efficiency improvements?
- D. Are new state laws, regulations or programs needed to further facilitate efficiency improvements?

C. Socioeconomic

- A. Is the pursuit of improved water use efficiency an economically sound public policy objective?
- B. How do the costs of efficiency improvements compare to the cost of developing new supplies?
- C. How can water pricing mechanisms be used to influence efficiency of use?
- D. What are the public and user costs and benefits from implementing water use efficiency? How should such costs and benefits be allocated?

D. Environmental

- A. What are the positive and negative environmental effects of alternative approaches for improving water use efficiency?
- B. How can negative effects be avoided or mitigated?
- C. What are the apparent environmental trade-offs involved in favoring either improved efficiency or new source development to meet future water needs?

VII. WATER USE EFFICIENCY OBJECTIVES

Improved efficiency of water use is a public policy goal. It can increase the overall benefits accruing from the state's waters while protecting existing beneficial uses. The following set of objectives could serve as a guide for the development of water use efficiency initiatives for the state

of Washington:

1. Maximize benefits accruing to the public resulting from use and protection of public waters;
2. Increase the productivity of water resources while equitably distributing the costs and benefits of water use;
3. Increase flexibility to allocate water to uses valued by the public;
4. Increase available water to meet current and future offstream needs;
5. Reduce diversion requirements to help preserve water for instream flows and other beneficial uses;
6. Reduce withdrawals from ground water to extend aquifer life, balance recharge and withdrawals, and reduce impacts on related surface waters;
7. Minimize negative water quality effects and other environmental consequences associated with inefficient water use;
8. Increase public awareness of the benefits to society from improved efficiency of use and the importance of each person's water use practices.

VIII. FUNDING AND STAFFING ESTIMATES

In compliance with Section 3(8) of SHB 1594, the Water Use Efficiency Study Committee has directed the Department of Ecology to prepare an estimate of funding and staffing required to implement the water use efficiency recommendations of the Committee. This estimate is contained in Appendix G. It does not include costs to local governments.

The Committee emphasizes that the recommendations contained in this report are recommendations to the Legislature and are not intended as directives to either state agencies or local governments. The Committee concludes that a detailed identification of both state and local funding and staffing is best undertaken in response to specific legislation which may be proposed in response to this report.

IX. SUMMARY OF RECOMMENDATIONS

Following is a summary of the recommendations for improving water use efficiency developed by three subcommittees of the full Committee. (Complete findings and recommendations are contained in appendices E-10A, E-10B, and E-12.) These recommendations were reviewed by the full Committee and approved for submission to the Legislature for its consideration.

The Committee was not able to examine all the dimensions of water use efficiency as thoroughly as desired within the limited time available. Although there was substantial agreement in the Committee, some members identified elements in the findings and recommendations, as well as additional issues not addressed by the subcommittees, which they believe merit further examination. These issues are listed and discussed briefly in this report. (See Appendix I.) The Committee recommends a process of continued examination so that decision-makers have a full appreciation of the problems, opportunities, alternatives, and consequences of improving the efficiency of water use.

In reviewing the findings and recommendations of the Municipal, Industrial, and Instream Flow Subcommittee and the Agriculture and Instream Flow Subcommittee, the Committee identified alternative approaches to common issues taken by the subcommittees. These alternative approaches reflect the different characteristics of water use by the use sectors addressed by each subcommittee. These alternative approaches are listed and discussed briefly in the report. (See Appendix H).

The relation of storage to water use efficiency was of concern to both the Municipal, Industrial, and Instream Flow Subcommittee and the Agriculture and Instream Flow Subcommittee. The Committee, therefore, recommends that the Legislature actively examine potential benefits of water impoundments which would conserve high runoff and, at the same time, improve water quality and protect fish and wildlife habitat.

While each subcommittee endorsed planning for water use efficiency, the Committee observed the possibility of variation in the provisions for specific plans. It therefore recommends that provisions for preparation of comprehensive plans apply to all major water use categories and that a common format be adopted for such plans.

1. Municipal, Industrial and Instream Use

A. Overview

Many efficiency alternatives need further research, study, and documentation. More emphasis on funding these alternatives is needed at the state level. Existing statutes which promote water use efficiency should be adequately funded and implemented. Several methods which could, at low cost, quickly increase water use efficiency have been identified.

B. Principles

Specific water use efficiency measures should be guided by the following basic principles and concerns.

Water use efficiency should be defined as the implementation of the least-cost means to meet water demand. Explicit consideration should be given to the value of water in all actual and potential uses in the identification of the least-cost means to meet water demand.

Determination of the value of water in all actual and potential uses should recognize that certain values associated with instream flows are not subject to definition in economic terms. These values should, however, receive full consideration.

Pricing structures should be promoted which encourage investment in cost effective efficiency measures. Where prices do not reflect actual costs of meeting demand, suppliers should be encouraged to provide incentives for increased water use efficiency.

Regulations to increase water use efficiency should be considered where other techniques are not effective and where such regulations can be efficiently implemented.

A water resource planning process should be established with involvement at the local, regional, and state level. It should identify within each river basin those values of instream flow which are not easily quantified. Based on such information, the planning process should determine the most cost-efficient means to meet competing demands for water. This planning process should recognize that islands and areas dependent on wells have a particular need for planning in order to use limited supplies most efficiently.

C. Measures

1) Planning

The value of water in different uses should be recognized as the basis for economically efficient use of water. The determination of the value of water in different uses should be achieved through a planning process.

A comprehensive water resource planning process should be required on a regional basis. Planning should be a three-tier process with involvement at the state, regional, and local level. The Legislature should consider appropriate funding for this process, such as dedication of a portion of the existing public water utility tax, a local option tax, or user fees.

The planning process should designate areas with significant reliance on domestic wells for possible regulation and monitoring of withdrawals.

The planning process should provide the basis for implementing water use efficiency measures.

The planning process should provide a needed public forum for integration of water resource management decisions with instream values.

2) Instream Flows

A planning process to establish instream flow levels for all river systems in the state should be funded.

Any effort to increase water use efficiency through the least costly alternative should fully consider instream flow values.

The planning process should emphasize the consideration of values associated with instream flow. Such planning should recognize that a significant portion of the value of instream flow is difficult to quantify because no market exists to define instream values in economic terms, because the role of water in natural systems is not easily quantified, and because the value of these natural systems dependent on water cannot be defined in economic terms.

A range of management measures in addition to protection and possible augmentation of instream flow should be considered to assure appropriate

recognition of the values of instream flow. Consideration should be given to improved water quality measures and to the alteration of flow regimes to increase biological productivity and the recreational and aesthetic benefits of any given flow.

Both modeling of river flows and related natural values and research on river management should be funded in order to identify opportunities for cost effective enhancement of instream values.

3) Source Development

Increased water use efficiency should receive consideration as a potential source of water in the coordinated water resource planning process.

Improved recognition of benefits and costs to instream uses and potential uses which result from source development is needed.

Fish, wildlife, and recreation costs and values, along with long term water quality and land use decisions, should be examined for consistency with future water supplies.

Future water supply sources and reservations authorized by the State should be included in state, regional, and local planning decisions.

State financial assistance to evaluate the benefits and costs associated with new sources should be provided in order to balance instream and out-of-stream considerations.

Metering, or measurement by other approved methods, and reports should be required by the state as a condition for new source development.

4) Water Rate Structures

The Legislature should consider facilitating the adoption of utility rate structures which encourage water efficient actions. Specifically, the Legislature should consider:

Provision for a state technical assistance program for rate structure design with provision for regional workshops and seminars;

Provision for a reference manual for utilities, which includes an interactive model billing computer program, and technical assistance from the State on rate structure design;

Requiring utilities applying for state financial assistance to implement revised rate structures, metering, and non-revenue water reduction programs which encourage conservation, unless the utilities can demonstrate that the measures are not appropriate for their system;

Researching the legality of rebates with respect to the prohibition in the State constitution against the lending of the State's credit.

5) Water Marketing

Water marketing is a tool that can provide necessary incentives for conservation. However, it needs further study and careful consideration and needs to be implemented cautiously.

The voluntary exchange of water within the municipal and industrial sector should be considered as a means to encourage water to move toward higher value uses and to increase, thereby, the economic efficiency of water use. Such a voluntary market should be recognized as a means to establish a lower bound for the economic value of water.

The economic value of water should be recognized as a measure by which to determine the cost effectiveness of at least some water use efficiency measures.

Any voluntary exchanges of water should be consistent with regional water resource plans where such plans exist.

Interest groups, state agencies, local governments, and tribes should be permitted to purchase and sell existing water rights.

6) Reuse

Current standards and restrictions regarding the use of greywater should be modified with the intent of authorizing and encouraging certain reuses of greywater.

The Legislature should review the fiscal implications resulting from both the removal of barriers to water reuse, e.g. tax disincentives and discharge liabilities, and from the institution of investment tax credits.

The Legislature should consider funding the identification of reuse opportunities through geographic inventories, discharge permit reviews, exploration of institutional options, and technical information exchange.

The Legislature should fund an educational and research program designed to promote reuse.

7) Construction Efficiency Codes

The Legislature should direct that the State Plumbing Code for new construction and rehabilitation be modified to reflect the latest cost efficient technology.

Research is needed on greywater use, particularly as it relates to plumbing codes. Pilot demonstration reuse projects for state and local governments should be funded.

To encourage the sale of water efficient fixtures and appliances, the Legislature should consider a requirement for water efficiency labeling which would increase consumer information. The Legislature should also consider a process to certify fixtures and appliances as water efficient. A tax should be imposed on the sale of uncertified fixtures and appliances to

discourage their sale.

An annual update and a phased implementation period of several years is recommended for both plumbing code and certification processes to allow manufacturers and distributors time to adjust inventories.

An extensive complementary education program is needed to introduce water efficient fixtures to architects, builders, plumbing contractors, facility managers, and home owners.

8) Education

A full time water efficiency education program at the state level should be funded.

D. Recommendations to the Legislature for Possible Review

The recommendations of the Municipal, Industrial, and Instream Flow Subcommittee either incorporate elements of broad water resource policy or identify a need for formulation of such policy. The following basic water policy issues are referred to the Legislature for possible review by the Joint Select Committee on Water Resource Policy for its consideration.

- 1) Establishment of standards for economic water use efficiency.
- 2) Definition of water rights in relation to consumptive and non-consumptive use, diversions, and losses.
- 3) Establishment of a "market" for water transfers.
- 4) Improvement in procedures for the transfer of water rights for both instream and out-of-stream uses.
- 5) Purchase and sale of rights for instream use.
- 6) Provision for regional planning assistance.
- 7) Dedication of a portion of the public water utility tax, a local option tax, or user fees to pay for water resource planning.
- 8) Development of a process for designating island and other locations of the State having special water management needs.

2. Agriculture and Instream Use

A. Process to Improve Efficiency

A statewide evaluation of irrigated areas should be conducted to determine efficiency related problems, opportunities and local interest in each area. This evaluation should establish basin and stream priorities for development of efficiency initiatives and should select a demonstration project area.

A conservation assessment should be conducted before a systematic effort to increase the efficiency of irrigated agriculture is undertaken for an irrigated area, a basin, subbasin or stream. For each area, the assessment should evaluate existing water use, needs and claims, hydrologic characteristics; guidelines and criteria for reasonable efficiency and best management practices, alternative efficiency measures, the net effect of efficiency improvements; costs and benefits, and the potential for integrating conservation efforts with water storage.

The assessment should be used as the basis for development of a conservation plan. The plan would prioritize conservation elements based on relative costs, benefits and impacts, estimated costs of plan implementation, and would propose a specific basis for distribution of costs.

The Department of Ecology should form plan formulation and plan implementation committees for each area to assist in the studies, the planning process, and implementation, and to solicit public input. Public workshops and hearings should be held. Once a final plan is approved by both the Department of Ecology and the plan formulation committee, funding should be sought.

A source of funding should be secured to support conduct of the conservation assessments and development and implementation of conservation plans. The willingness of agencies whose objectives would be benefited to contribute toward the implementation of conservation plans should be determined.

The Department of Ecology should utilize the process outlined above in a demonstration project area to evaluate the assessment and plan formulation process, determine administrative costs, and determine any needed changes in laws or regulations to implement the process on a statewide basis.

B. Implementation

An effective conservation plan will require a mix of economic incentives, cost share programs, regulatory programs, and technical and public information efforts. Programs which encourage voluntary participation should have the highest priority. Public funding should be commensurate with public objectives that are realized. Agriculture should be provided with incentives to conserve.

C. Conservation Measures

Generally, improvements to irrigation systems and to on-farm systems should be implemented together in order to achieve the greatest water savings. Converting older open conveyance gravity systems to pressure systems should be encouraged wherever possible and where consistent with conservation plans. Technical assistance and dissemination of information about technical conservation measures through existing agriculture extension entities should be increased.

D. Water Use Guidelines

The Department of Ecology should 1) adopt and publish relevant criteria to

be used for determining crop water requirements and conveyance efficiency, 2) adopt guidelines for on-farm water requirements for crops for various regions and soil types for use in water conservation funding and water right transfer, and 3) investigate the feasibility of developing guidelines for conveyance efficiency.

E. Grants and Loans

Centennial Clean Water Act and other water quality funds should be available for projects that would improve water quality and save water in irrigation. Maximum grant percentages should be the same as for other water quality projects.

Ecology should be authorized to establish grant and loan terms which vary based on relative water efficiency/water quality accomplishments as indicated by the water conservation assessments performed for irrigated areas. Preference should be given to projects which provide the greatest benefits in water savings and water quality improvement.

Ecology should be provided authority to establish grant and loan policies which vary based on the degree of public benefits from a water conservation program.

Private water entities should be authorized to form a public body capable of receiving public grant and loan funds for water conservation and quality improvements. The state should consider modifying the prohibition against lending state credit to individuals in order to permit funding of private conservation projects where public benefits are achieved.

F. Incentives

Districts that adopt graduated rate structures or other effective incentives to conserve water should be eligible for a higher cost share for system improvements.

The increase in value from replacing old private irrigation systems with new systems which conserve water should be exempt from state personal property taxes for a period of six years after purchase.

Irrigators who can save water without affecting other water users or dependent resources should be allowed to capture all or part of the benefits of the savings by being able to use or sell the savings.

G. Transfers

The State should adopt a cautious but encouraging policy toward transfers of water and water rights and water banking as efficiency tools. The state should allow permanent water right transfers only when there is sufficient legal certainty in the water right to be transferred. Only the amount of water that has been beneficially used should be subject to transfer.

The State should allow private parties to salvage water that is presently lost and apply it to a new use if the water to be saved does not serve another purpose as return flow. State approval of such salvage proposals

should be required to assure that third parties and the public interest are protected. An alternative is to do as described above, but require that a portion of the salvaged water revert to the state for a public benefit such as instream flows.

The State should provide authority to state and local government or to private individuals and groups to purchase or dedicate offstream water rights, conserved water, or dry year options to improve instream flows or for other public purposes, and should provide authority to Ecology to approve transfer of a portion of a water right from out-of-stream use to instream purposes to benefit specific stream segments.

The amount of water that should be transferable should be the average amount that has been consumptively used. Upon a showing by the transferring parties that there would be no effect on other water rights, the average amount that was beneficially used, i.e. consumptive use plus reasonable inherent conveyance loss, could be transferred.

The State should provide authority to an irrigation district board of directors to approve, on behalf of the district, the sale and transfer of water saved as a result of improvements to irrigation conveyance and distribution systems. In cases where water is proposed to be transferred between irrigation districts on a temporary or permanent basis, provide authority to either board of directors to approve the proposal or deny it if good cause exists.

The Department of Ecology should utilize a balanced advisory committee to assist in developing recommendations for water transfer procedures. These recommendations should be submitted to the Joint Select Committee on Water Resource Policy.

H. Water Right Adjudication

Water right adjudications should not be a preferred water efficiency tool from a systemwide perspective. Adjudications are useful in establishing the certainty of right necessary for water transfers.

I. Instream Flows

Efforts to improve instream flows in reaches at low levels should have the highest priority in water conservation efforts. Special recognition should be given to streams with low flows that affect tribal fisheries.

The conservation assessments and formulation of conservation plans should be closely coordinated with other basin planning efforts.

J. Water Quality

State and federal programs should consider both water quality benefits and water quantity benefits from improvements to irrigation systems. Quantity and quality benefits should be additive rather than considered separately.

The State agencies should meet with appropriate federal agencies to develop an evaluation process wherein water quality and quantity benefits are both

fully accounted for. The state should work to secure federal funds to assist in irrigation project improvements which improve water quality and conserve water.

Under the Centennial Clean Water Act, bonus points should be awarded for water quality projects which also increase the quantity of usable water. Guidelines should be adopted by the Department of Ecology allowing clean water funds and Referendum 38 funds to be used in conjunction for projects that would result in both water quality and water supply benefits.

K. Groundwater and Wetlands

The effect of conservation on recharge of shallow aquifers and wetlands should be considered as a component of the conservation assessment.

The issue of mitigation for artificially created wetlands affected by irrigation conservation measures should be carefully considered by the state Wetlands Committee and the recommendations of that Committee should be carefully considered in the development of water conservation plans.

L. Electrical Energy

Opportunities which conserve energy and water should be identified in conservation assessments so that these projects can be eligible for funding by future energy conservation programs. They also need to be implemented within a timeframe commensurate with the region's need for additional power.

Changes in power requirements should be factored into any analysis of conservation benefits and costs.

3. Public Education

The following recommendations were developed by the Public Education Work Group. The Recommended Program includes both short-term and long-term elements. The short-term recommendations includes those efforts which can be undertaken immediately and which can accomplish their intended purposes in a short time period. These elements would serve to build awareness of the need to use water efficiently and the benefits of conservation to water users. They are generally highly visible activities that would increase the awareness of easy-to-reach audiences. Long-term programs would be part of an ongoing water use efficiency effort. These programs would be used to reach target audiences that are difficult to educate in the short-term, such as commercial users and school aged children. The long-term programs also would provide technical and "how to" information.

The recommendations are as follows:

A. Short-Term

The State should:

Disseminate the results and recommendations of the Water Use Efficiency Study to all interested user groups;

Conduct a statewide media campaign about water use efficiency which includes the use of print, television, radio, billboards, displays, and other public information opportunities;

Conduct a survey of the level of knowledge regarding water conservation and water use efficiency. This survey would help design the education program in terms of target audience and geographic scope;

Develop videotaped water conservation messages for free use from video tape rental outlets. Such material should be developed in a variety of languages and for all age groups;

Develop Water Efficiency Certification standards for consumer goods such as appliances and outdoor plants. Develop a water efficient logo for certified appliances and plants;

Identify new means of disseminating information to specific target audiences.

B. Long-Term Elements

The State should:

Compile and disseminate information on actual water needs for various uses e.g., the actual irrigation requirements of various crops, gardens, lawns, shrubs, and the instream needs of fisheries, recreation, and water quality;

Develop specific "how to" information which various consumers can use to identify inefficient uses of water and to make improvements in their efficiency of use. This would be accompanied by information analyzing potential water and money savings;

Conduct biennial education programs using drama techniques for use in elementary schools throughout the state and provide support materials to teachers for use in the classroom;

Develop teacher training workshops for which teachers receive continuing education credits. These workshops would serve to give background information on Washington's resource and environmental issues;

Encourage and develop public/private partnerships to educate water users and to foster conservation and improved water use efficiency;

Encourage utilities to combine energy and water audit programs;

Develop and implement a formal recognition program to acknowledge significant contributions and efforts by public and private organizations and individuals to increase water use efficiency;

Seek the establishment of private foundations in Washington State dedicated to the encouragement of water conservation and efficient water resources use through the development and dissemination of education materials;

Target areas for concentration of the efforts to improve water conservation and water use efficiency;

Initiate an education program on the value of water reuse as a means of meeting future demands for water;

Develop demonstration projects in selected areas of the state to demonstrate to specific target audiences the feasibility and desirability of water conservation and improvements in water use efficiency;

Submit a bill to the Legislature requesting a staff of 4.75 FTEs and an appropriation of not less than \$489,900 to further the design and implementation of a comprehensive education program related to water conservation and water use efficiency.

X. LIST OF APPENDICES

Documents submitted to the Water Use Efficiency Study Committee and documents prepared by the Committee and submitted to the Legislature have been identified as appendices. Appendices B, E-10, E-12, F, H, and I, together with the Executive Summary, constitute the Committee's report to the Legislature. A complete list of appendices follows.

Appendix A - Substitute House Bill 1594

Appendix B - Membership of the State Water Use Efficiency Study Committee

Appendix C - Committee Workplan

Appendix D - Meeting Notes

Appendix E - Workplan Tasks

E-1	Task 1	Problem Definition and Objectives
E-2	Task 2	Existing Water Use Efficiency Activities
E-3	Task 3	Water Use In Washington
E-4	Task 4	Water Use Efficiency Initiatives in Other States
E-5	Task 5	Water Use Efficiency Recommendations of the Western Governor's Association
E-6	Task 6a	Legal Incentives and Disincentives to Water Use Efficiency in Washington Water Law
E-7	Task 7	Alternatives for Improving Efficiency
E-8	Tasks 6b and 8	Economic Evaluation of Efficiency Options
E-9	Task 9	Environmental Assessment
E-10	Tasks 10 and 13	Findings and Recommendations
E-11	Task 11	Definitions of Key Terms

E-12 Task 12 Public Education
E-13 Task 13 Changes in Laws, Rules, and Policies Required to
 Implement Recommendations

Appendix F - Summary of Public Comments
Appendix G - Estimation of Staffing and Funding Needs
Appendix H - Comparison Between Agriculture and Municipal/Industrial
 Subcommittee Reports
Appendix I - Additional Issues Recommended for Further Examination
Appendix J - Written Comment Received by Committee on Draft Report of
 Findings and Recommendations

APPENDIX B

LIST OF WATER USE EFFICIENCY STUDY COMMITTEE MEMBERS

Legislative Members

House of Representatives

Margaret Rayburn
Mary Margaret Haugen
Glyn Chandler
Darwin Nealey

Senate

Scott Barr
Frank "Tub" Hansen
Jack Metcalf
Phil Talmadge

Public Members

Barbara Bichsel
James Trull
Mike Williams
Maultin E. Mathias
Travis H. Keeler
Terry Williams
Allan J. Dietemann
Rick Nelson
Chan Bailey
Roger L. Purdom
Beth Bland Winn
Jim Perich-Anderson

Local Government
Irrigated Agricultural Products
Environmental Interests
Timber Industry
Industrial Water Users
Indian Tribes
Public Water Utilities
Owners and Operators of Cattle Farms
State-Wide Water Resource Assoc.
Hydro Power Utilities
Recreational and Commercial Fishing
Water Oriented Recreationists

Agency Representatives

R. Bruce Mackey
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Department of Natural Resources
Department of Fisheries
Department of Agriculture
Department of Wildlife
Department of Social and Health Services
Department of Ecology
Office of the Governor

APPENDIX E-10 A

FINDINGS AND RECOMMENDATIONS OF THE MUNICIPAL, INDUSTRIAL, AND INSTREAM FLOW SUBCOMMITTEE

Introduction

The Water Use Efficiency Study Committee was charged with an major task: the identification of conservation measures which could be implemented by state policy directives. The time for accomplishing this task was too short to allow adequate analysis of many of the efficiency alternatives. Because of the magnitude of the task and the significant impact that our recommendations may have on state water policy, the Committee is recommending to the Legislature that resources be dedicated to a more detailed study of efficiency alternatives.

Many of the proposed policies are provided for under existing statutes but these statutes have not been implemented. The Subcommittee strongly encourages the Legislature to review the funding for and implementation of these existing statutes.

In its identification of potential measures the Subcommittee considered over eighty suggestions for increased water use efficiency. (See Appendix E-7 to the Water Use Efficiency Report to the Legislature). Of these, most did not have detailed economic estimates available of cost or effectiveness. The lack of information, particularly in the areas of instream flow and industrial efficiency, tends to create an inadequate and incomplete decision process. As a result, no priorities have been attached to these findings and recommendations.

A few suggestions appeared to have such a high potential to increase efficiencies, quickly, at a low cost, that they have been individually identified. The elevation of these suggestions to recommendations should not in any way be interpreted as a diminishment of any of the remaining suggestions, but should serve to emphasize the need for further research, study, and documentation.

Principles

Findings and recommendations reached by the Municipal, Industrial, and Instream Flow Subcommittee are organized into two categories: the identification of basic principles to achieve water use efficiency; a selective listing and discussion of the more significant measures and activities which result from the application of these principles.

The Subcommittee concludes that implementation of six basic principles will result in major increases in water use efficiency. First, water use efficiency should be defined as the least cost approach to the supply of water to meet competing demands. The calculation of the least cost source must recognize both direct costs and those indirect costs and impacts which result from a reduction in health and environmental values as a result of the diversion of water from instream flow. This economic definition of

efficiency is important to any resolution of the appropriate level of investment in measures to increase the physical efficiency of water use.

Second, the determination of the least cost means to meet water demand requires that the value of water in all actual and potential uses be explicitly considered. Specifically, the cost of water in any one use must include any resulting loss of value of water in other uses. Certain values of water associated with instream flow are not subject to definition in economic terms. These values and any possible reduction in such values must receive full and explicit consideration. Historically, the value of water instream has not been fully considered in decisions to divert water to out of stream uses.

Third, efficiency is encouraged when prices paid for water inform the user of the full social costs of current water use. Such pricing both encourages efficient allocation among uses and helps assure the development of the least cost sources of water. Because the loss of alternative uses of water has not been fully incorporated in prices and because the cost of water for municipal and industrial uses rises in response to relative scarcity, the cost of water to meet expanded demand is significantly greater than the current price of water. Reflecting even a portion of this difference in the price of the last increment of water used will encourage water users to invest in those water use efficiency measures which can provide water at less than the cost of supplying this water from conventional sources.

Fourth, where users are paying less than the cost of new water supplies from conventional sources, that is, the avoided cost, the least cost approach to meeting water demand dictates that the supplier provide conservation incentive payments to users when the cost of conserving this water is less than the avoided cost to the supplier. For example, when the cost of conserving water through a revised industrial process is less than the cost of a new water supply, the supplier may be justified in returning all or a portion of the savings to the conserving user.

Fifth, where prices and incentives fail to encourage investment in cost-efficient water use due to institutional or information constraints, regulations may be appropriate. Such regulations are justified when prices to the user do not reflect the avoided cost or when the individual making the decision on investment does not pay the cost of inefficient use.

Finally, the value of water in different uses depends on the unique resources of each watershed or aquifer and on the demands for water. Consequently, the identification of avoided cost and of the least cost alternative requires an inclusive consideration of both physical and social aspects of water supply and demand. An opportunity to consider both the economic values and the non-quantifiable environmental values of water resources could be provided by a planning process.

Planning on a regional basis will allow unique water conditions to be recognized. This is of particular importance in areas with limited water resources such as islands and areas dependent on wells where the use of such wells can have direct and significant effects on instream flow.

The implementation of these principles has been described by the Subcommittee in relation to several measures and broad areas of concern. A discussion of these measures and concerns follows.

Planning and Implementation

Findings

Implementing coordinated water resource plans has the potential to increase water use efficiency in both instream and out-of-stream uses. Such planning, combined with specific implementation techniques, such as conjunctive use of surface and groundwater, reservoir release scheduling, and exchange capacity (inerties), can allow independent municipal, industrial, and resource management agencies to maximize system efficiencies. For example, systems which experience peak demand at different times can share capacity, rather than each developing separate peaking facilities.

Water use efficiency requires recognition of the values of water in alternative uses. In some cases, these values can be defined by conventional market analysis. In other cases, these values reflect social and environmental considerations. In all cases, values will be specific to the flow characteristics, the biological characteristics, and the human activities of each watershed. This is particularly true of islands which experience significant water supply problems and of areas heavily dependent on wells.

Planning provides a process to consider the value of water in alternative uses in a manner which allows acknowledgment of regional differences.

The State has not provided the incentives needed to encourage regional water resource planning. State leadership, guidelines, and coordinated planning assistance are limited. The state programs which require water resource planning are not adequately funded. Moreover, limited planning efforts are segmented. Water resource development, wastewater treatment, non-point source control, land use, and protection of instream resources are treated separately. Schedules of these efforts frequently conflict.

A lack of detailed water resource plans and programs is particularly evident in some parts of the State. Islands, coastal areas, sole source aquifers, and selected areas with high competition for water are areas of special concern and need study and assistance in the development of protection standards and enhanced efficiency techniques.

In areas of limited water supply which are heavily dependent on domestic wells, the absence of regulations on groundwater withdrawal by such wells can have significant effects on both adjacent wells, on salt water intrusion, and on both instream and out-of-stream uses of surface water.

Recommendations

1. The Legislature should consider requiring and funding comprehensive water resource plans on a regional basis. Such plans should address water efficiency standards, including least cost planning, with explicit recognition given to the value of water in alternative uses.

2. A three-tiered planning process is recommended.

The State should integrate plans among regions, agencies, tribes, industry, and other users and interested groups, provide general guidelines, encourage participation, and provide funding and technical assistance.

Regional plans should form the basis of water management decisions and address the needs of all future water users, instream needs, and protection policies within a basin.

Local or system plans would examine specifications, benefits, and costs for instream and out-of-stream needs.

Model programs should be developed to serve as planning guides.

3. The Legislature should consider appropriate funding for this process, such as dedication of a portion of the existing public water utility tax, a local option tax, or user fees.

4. The Legislature should consider amendment of existing statutes to permit the planning process to designate areas within which groundwater withdrawal from domestic wells would be regulated and monitored. Provision should be made to permit local funding and enforcement of such regulations.

(Planning is proposed as a means to incorporate in an explicit and structured manner the values of instream flows in decisions regarding water use efficiency in the municipal and industrial sector. Consequently, the Subcommittee considered both non-structural and structural aspects of instream flow.)

Instream Flows as an Element in Water Use Efficiency

Consideration of the value of water instream is both a key principle in the determination of water use efficiency and a major element in comprehensive water resource planning on a regional basis. Instream values can be protected and enhanced by both non-structural and structural approaches. Non-structural alternatives include policy and planning decisions which provide protections for instream values while assuring stable water resources for out-of-stream uses. Structural alternatives describe measures associated with the built environment which result in increased water use efficiency. (A more complete discussion of instream flows is contained in Appendix E-7 to the Water Use Efficiency Report to the Legislature.)

Instream Flows - Non-Structural Alternatives

Findings

In order to adequately assess policy decisions relating to implementation of various out-of-stream water uses, instream values must be considered. While these instream values are sometimes difficult to define in economic terms, some elements are quantifiable. Quantification of these values must consider the cumulative impacts associated with prior out-of-stream usage which has impaired the ability of a given water resource to provide natural values. Indirect measures permit calculation of a portion of instream values which lack market prices, including water quality benefits, fish and wildlife benefits, aesthetics, and ground water recharge.

A significant portion of instream values cannot, however, be calculated by conventional, indirect measures. Those elements of instream values not directly or easily quantifiable should be considered in the planning process. These elements include future enjoyment of riparian values or "option values", preservation for future generations or "bequest values", and the preservation for continued existence of a water feature or "existence values." Studies suggest that these criteria frequently describe a significant portion of the total value of a water resource.

Finally, instream values associated with the health and protection of natural systems defy easy quantification but provide significant benefits. Such benefits include but are not limited to groundwater recharge and wetlands maintenance and protection. These benefits should, however, be considered in decisions on the use of water resources.

A variety of water quality and stream enhancement measures can increase instream values for any given instream flow. These measures are designated as instream efficiency measures.

Regional Planning and Instream Values

A coordinated approach to decision making is required to reflect protection of instream values and out-of-stream uses. Determining needs and meeting them can be accomplished through regional planning and through research to enhance technological tools.

Regional planning should address issues ranging from setting instream flow levels to developing processes for assessing the future growth potential of instream values. Such a planning process would assess possible impacts to public instream resources resulting from out-of-stream allocations.

Planning actions to adopt instream efficiency measures must be coordinated with land use, road construction, and other regional and local planning activities.

Research, Technology, and Instream Values

When considering management strategies to protect and enhance instream values, a comprehensive understanding of instream qualities is necessary. Advances in technology have greatly improved the ability of resource managers to model physical and biological aspects of stream systems. The

use and improvement of modeling capabilities and idea exchange and consultation between out-of-stream users and instream interests can greatly enhance the range of instream efficiency options available for implementation. These modeling capabilities represent the best available data collection tools for use and interpretation by federal, state, and tribal experts and decisionmakers.

Recommendations

1. The Legislature should consider the initiation and adequate funding of a planning process which contains the following components:

- Setting of instream flow levels for all state river systems;
- Development of a process to identify instream values which are not easily quantifiable in order to include them in all water use decisions;
- An explicit reflection of instream flow values in all out-of-stream diversions based upon cost analysis of alternative supply and water use efficiency options and the quantifiable cost to be borne by instream uses;
- Inclusion of both existing and potential instream values and their future growth opportunities;
- Specific criteria for identification of potential damages to the public resource resulting from additional claims on the resource by the responsible party;
- A process for allocating water resulting from efficiency measures; and
- Coordination with all planning activities having direct and indirect impacts on instream flows and water quality such as land use planning and road construction planning.

2. The Legislature should consider funding for:

- Refining and implementing existing technological management tools to model physical and biological aspects of stream systems in order to protect instream values. In addition, the Legislature should support research aimed at assessing the benefits provided by such tools.
- Development and adoption of monitoring programs aimed at assessing the success of non-structural measures to protect and enhance instream values.

3. The Legislature should consider review of existing legal and institutional constraints to adoption of measures to enhance instream efficiency. Ongoing work by the Joint Water Resources Committee Independent Factfinder can assist in this examination.

Structural Alternatives and Instream Flows

Findings

In order to accommodate instream values while providing benefits to out of stream users, water management strategies and regimes need to be developed to minimize instream impacts of water diversion and of impoundments. Some of these strategies can include implementation of revised flow regimes from existing impoundments and repair or replacement of instream structures or construction of instream structures, where appropriate.

Flow Regimes

Managed instream flow regimes can be beneficial if carefully planned and monitored. Instream flow needs can often be defined on the basis of seasonal needs. This allows implementation of a water release regime. A release regime can result in out-of-stream efficiency, avoid waste, and protect instream values.

A regime geared toward providing constant flows at all times is not necessarily the desired goal. A reliable but variable flow rate is crucial to contribution and maintenance of instream and out of stream habitat. Tailoring instream flow regimes can also help to maximize the recreation economy while assuring water for out-of-stream uses.

Instream Structures

In some instances where instream impacts already exist, rehabilitation may be an appropriate course of action. Placement of instream structures can improve instream values in some situations. Because these structures represent a significant investment in both human and financial resources, further research and monitoring is necessary to evaluate their effectiveness.

Recommendations

The Legislature should consider:

- The encouragement of the development of water management regimes which protect instream values while assuring stable water supplies for out-of-stream uses;
- Funding research concerning instream structures; and
- Development and funding of priority demonstration projects.

Source Development

Findings

Historically, development of new sources of water has been the dominant means to keep pace with increasing municipal and industrial water demand.

Increased water use efficiency constitutes a potentially significant cost-effective source of water. This is particularly relevant for islands and other areas with limited water resources.

Under certain circumstances, the capture of high streamflows and rainwater, use and recharge of groundwater, and conjunctive use of surface and groundwater, can make more efficient use of local water resources.

New sources of supply and better management and operation of existing sources are important options for meeting increased demand. Capture of high flows for use during periods of less abundance is a traditional and sometimes a very cost-effective water supply technique.

The costs associated with developing new sources vary depending on the type of source developed. In addition, detailed administrative review of major supply development projects can be a major expense for state agencies and the utilities.

Constraints and competition for new sources of supply are increasing, while the most desirable sites for ground and surface water development are being precluded by other land uses.

Increasing water efficiency and demand reduction can postpone, but not eliminate the need for additional water supply source development. Current source supply decisions should recognize long term needs for out-of-stream uses as well as instream flow values and should protect areas suitable for impoundment or for aquifer recharge.

Efficient source development requires that existing demand be determined by metering or by other recognized techniques.

Recommendations

1. Increased water use efficiency should receive consideration as a potential source of water in the coordinated water resource planning process.
2. Improved recognition of benefits and costs to instream uses and potential uses which result from source development is needed.
3. Future water source development should be examined for consistency with fish, wildlife, and recreation costs and values and long term water quality and land use decisions.
4. Future water supply sources and reservations authorized by the State should be included in state, regional, and local planning decisions.

5. State financial assistance to evaluate the benefits and costs associated with new sources should be provided in order to balance instream and out-of-stream considerations.
6. Metering, or measurement by other approved methods, and reports should be required by the State as a condition for new source development.

Water Rate Structures

Findings

Pricing water to reflect the avoided cost to the utility of meeting new demand rewards water efficiency and discourages wasteful practices. Designing price structures in this way also better reflects the availability of and competition for water, as well as utility production and delivery costs. Rate techniques used to reflect the avoided cost include billing based on frequent metering, drought surcharges, seasonal rates, increasing or inverted rates, multistep block rates, and demand metering based on peak consumption. Alternative incentives could include rebates or direct purchase of conserved water from existing customers by utilities.

Some sophisticated rate structures can be expensive to design and often make it difficult to project revenue receipts. Furthermore, information on the design of water efficient and revenue enhancing rate structures is not readily available to most water utilities.

A restructuring of rates will not raise the overall cost of water to users. It only redistributes cost to inefficient or high cost uses. Nonetheless, public acceptance of the rate restructuring technique may not be high. The cost-of-water rate studies and rate structure analysis depends on the size and complexity of the utility.

Statewide, municipal water demands could be reduced significantly by adoption of progressive water rate structures, rate structures which reflect the avoided cost. These rate structures can be more effective in encouraging water use efficiency than simple rate increases.

Because utilities vary in their revenue requirements and customer base, mandatory establishment of specific rate structures is not appropriate.

Currently there is a distinct lack of information, technical assistance, and funding for rate structures designed to increase water efficient practices. This lack of knowledge and resources is hampering the adoption of more creative rate structures by utilities.

Where a major industrial user is dependent on a utility for its water supply, progressive water rate structures may place such a user at a disadvantage with respect to competitive enterprises which have secured surface water or groundwater rights. This potential competitive disadvantage will be diminished by the application of least cost principles to the administration of all water rights, including those granted to major industrial users.

Recommendations

The Legislature should consider facilitating the adoption of utility rate structures which encourage water efficient actions. Specifically, the Legislature should consider:

1. Provision for a state technical assistance program for rate structure design with provision for regional workshops and seminars;
2. Provision for a reference manual for utilities, including an interactive model billing computer program, and technical assistance from the State on rate structure design;
3. Requiring utilities applying for state financial assistance to implement revised rate structures, metering, and non-revenue water reduction programs which encourage conservation, unless the utilities can demonstrate that the measures are not appropriate for their system;
4. Researching the legality of rebates with respect to the prohibition in the State constitution against the lending of the State's credit.

Water Marketing

Findings

Some holders of water rights presently risk the loss of a portion of those rights if they do not put all their water to a beneficial use. No simplified procedure exists for them to sell or transfer a portion of their existing water right. As a result, a strong disincentive to using water more efficiently exists. Not only is any "conserved" water not marketable, but, under current legislation, the owner risks the loss of the right to the conserved water in the future.

A policy of allowing the voluntary transfer of a portion of existing water rights has the potential to provide a much needed economic incentive to increase water efficiency among all users. A water market can provide the impetus to reduce waste because the value of the water is quantified. Use of voluntary transfers rather than regulation will minimize the disruption of historical water use.

The creation of a water "market" to reflect the supply, demand, and price of water could result in the more efficient use of water. Removal of barriers to voluntary exchange of water could allow water to move from lower to higher value uses. This would mean that water to meet current demand could be acquired from those uses in which its value is least.

The entire process of a market would be voluntary, operating under rules and regulations adopted by the State. Transfers of water and water rights would have to be consistent with regional water plans, wherever such plans have been completed.

Temporary or yearly contracts for water transfers could greatly enhance water use efficiency.

Recommendations

1. The Joint Select Committee should examine modifying the existing water transfer statutes and should consider establishing an administrative institution for handling water marketing transactions. Experimentation with short term transfers and pilot projects should be a high priority. Guidelines for transfers should be established as part of the three-tiered planning process with involvement of the state and tribes, regional governments, and local governments.
2. A legal process to standardize establishment of new water rights statewide, to permit voluntary transfers of water rights, and to protect existing water rights and instream standards while encouraging efficiency actions such as conjunctive use, aquifer recharge, and movement of water between adjacent systems should receive consideration by the Legislature.
3. Wherever completed regional water plans exist, water transfers should be consistent with them.
4. Interest groups, state agencies, local governments, and tribes should be permitted to purchase and sell existing water rights.

Reuse

Findings

Non-potable reuse of greywater could significantly reduce demands on existing and future supplies of water. Reuse of industrial wastewater and treated municipal effluent offer opportunities to reduce water demands. Large water using industries are among the most attractive potential non-potable reusers, particularly for water to use for cooling water, washing rinse water, and certain manufacturing processes.

Major obstacles to reuse currently exist. These include difficulties associated with proximity and transmission of water, treatment costs, discharge liability, tax disincentive, and possible prohibition against financial assistance from state or municipal governments.

Concerns over public health have delayed greywater reuse.

The cost of retrofitting facilities for reuse are not well quantified. Because of current rate policies, the total cost of a reuse project is frequently higher to a water customer than continued purchase or production of primary supplies, even when reuse represents the least costly means to meet increased demand.

The State's discharge permit system does not provide incentives for wastewater reuse.

Current tax policies in Washington apply sales and property taxes to plant and equipment required to increase the efficiency of industrial water use. In addition, a Business and Occupation manufacturing and use tax might be applied to any in-plant operation which would "manufacture" clean water from

either in-plant wastewater or wastewater from other industrial or municipal sources.

Investment in industrial water use efficiency could be encouraged by revised rate structures and by a tax credit program for such investment. For example, under a now expired program to encourage investment in pollution control equipment, industrial firms received a tax credit (i.e. an offset against a tax liability) for up to 50% of the pollution control investment. This credit could be claimed at a maximum of 2% for 25 years.

New institutions, such as publicly owned industrial water supply systems, could treat, distribute, and market reuse water using long term contract agreements.

Recommendations

1. Current standards and restrictions on the use of greywater should be modified with the Legislative intent of authorizing and encouraging certain reuses of greywater.
2. The Legislature should review the fiscal implications resulting from both the removal of barriers to water reuse, e.g. tax disincentives and discharge liabilities, and from the institution of investment tax credits.
3. The Legislature should consider funding the identification of reuse opportunities through geographic inventories, discharge permit reviews, exploration of institutional options, and technical information exchange.
4. The Legislature should fund an educational and research program designed to promote reuse.

Construction Efficiency Codes

Findings

Major water conservation can result from installation of water efficient plumbing fixtures in new construction and remodeling. Over the next twenty years, future municipal demands for water can be reduced by 20 billion gallons a year, or 10% of total demand, by the adoption and enforcement of more water efficient construction codes at the state and local level.

Such investments can usually pay for themselves in less than a year without any noticeable inconvenience to the user.

This savings will also reduce the need for a similar amount of wastewater treatment capacity, and save a significant amount of energy.

Costs to the State to achieve these savings would be modest and would be confined to administrative costs of certification, research, hearings, and education efforts.

Much greater savings could be achieved by retrofitting existing fixtures. However, the added labor required makes the retrofit option much more

expensive.

A number of states have tightened plumbing and applicable codes, allowed reuse of "greywater" (water from a home, except from the toilet), and encouraged the use of water efficient fixtures. There are more examples in other states of recent code modifications resulting in economic savings greatly exceeding costs for the State, individual customers, and utilities

Standards for greywater reuse and appliances still need to be developed.

(A more complete discussion of the economic costs and benefits of water use efficiency codes is contained in the report by Gibson on municipal and industrial water use efficiency contained in Appendix E-8 to the Water Use Efficiency Report to the Legislature. Water use efficiency codes in other states are summarized in a separate document in Appendix E-4 to this Report)

Recommendations

1. The Legislature should direct that the State Plumbing Code for new construction and rehabilitation be modified to reflect the latest cost efficient technology.
2. Research is needed on greywater use, particularly as it relates to plumbing codes. Pilot demonstration reuse projects for state and local governments should be funded.
3. To encourage the sale of water efficient fixtures and appliances, the Legislature should consider a requirement for water efficiency labeling which would increase consumer information. The Legislature should also consider a process to certify fixtures and appliances as water efficient and a tax on the sale of uncertified fixtures and appliances to discourage their sale.
4. An annual update and a phased implementation period of several years is recommended for both plumbing code and certification processes to allow manufacturers and distributors time to adjust inventories.
5. An extensive complementary education program is needed to introduce water efficient fixtures to architects, builders, plumbing contractors, facility managers, and home owners.

Education Programs

Findings

Communication of water efficient techniques, standards, and incentives is essential if these methods are to receive wide acceptance. Public information can result in long term behavior changes.

The State has no programs designated to educate the public and large water users on water efficient techniques. Most western states have had such programs for many years.

Better information is needed on water efficient practices for municipal customers, reuse, industrial process changes, complimentary water use activities, advantages of sub-metering, leak detection techniques, and on water use efficiency for self supplied rural wells.

Recommendation

1. A full time water efficiency education program at the state level should be funded.

Recommendations to the Legislature for Possible Review by the Joint Select Committee on Water Resource Policy

The recommendations of the Municipal, Industrial, and Instream Flow Subcommittee either incorporate elements of broad water resource policy or identify a need for formulation of such policy. The following basic water policy issues are referred to the Legislature for possible review by the Joint Select Committee on Water Resource Policy.

1. Establishment of standards for economic water use efficiency.
2. Definition of water rights in relation to consumptive and non-consumptive use, diversions, and losses.
3. Establishment of a "market" for water transfers.
4. Improvement in procedures for the transfer of water rights for both instream and out-of-stream uses.
5. Purchase and sale of rights for instream use.
6. Provision for regional planning assistance.
7. Dedication of a portion of the public utility tax, a local option tax, or user fees to pay for water resource planning.
8. Development of a process for designating island and other locations of the State having special water management needs.

APPENDIX E-10 B

FINDINGS AND RECOMMENDATIONS OF THE AGRICULTURE AND INSTREAM FLOW
SUBCOMMITTEE OF THE STATE WATER USE EFFICIENCY COMMITTEE

A. FINDINGS (PROCESS TO IMPROVE EFFICIENCY)

1. Statewide, overall project efficiency averages less than 50 percent in terms of the amount of water diverted to the amount consumed by crops. Major losses can occur during conveyance of water to the farm as well as in application to the field. However, overall basin efficiency in major irrigated areas is usually much higher due to the multiple reuse of return flows.

Individual farm efficiency could theoretically be increased to over 90 percent by adoption of available techniques. However, improvement to this level of technical efficiency would involve such high marginal costs that it would not be economically justifiable in many cases.

Given the current determinants of efficiency in irrigated agriculture -- existing water supply, cost of inputs, prices received for production, existing incentives and disincentives, and legal constraints -- most irrigation in the state is probably as efficient as could be expected.

2. The extent of claims by Indian Tribes to reserved water rights (pursuant to Federal treaties) for instream protection for anadromous fish remains uncertain. The confirmation of such claims could preempt the rights to water which non-Indians exercise under state law. With the support and cooperation of the affected parties, improved efficiency and conservation by all water users could provide an effective and equitable means to satisfy all or a part of tribal claims, as well as other instream flow needs, without a substantial impact on existing rights granted under state law.

3. The amount of reduction in headgate diversion resulting from implementation of conservation measures can be estimated. However, because return flows are often reused elsewhere in the hydrologic system, reduced diversion at a particular headgate is not necessarily equivalent to new water supply for a given basin. In basins which rely on reservoir storage, only headgate reductions after reservoir releases begin can be reliably counted upon as contributing to new water.

4. Runoff and percolation from inefficient conveyance and field application often serves many desirable purposes that could be harmed by improving irrigation efficiency. These purposes include serving as a source of supply for other irrigators, increased late season flows in some stream reaches, ground water recharge, and wetland and riparian habitat.

In many areas, water diverted for irrigation but not consumed through evapotranspiration by crops is not available for new consumptive uses because it returns to the river system as return flows to be reused or support other values in the manner described above.

In other areas, reductions in headgate diversions contribute to available water supplies because return flows are in excess of those necessary to meet

downstream needs. In these areas, additional water supplies can be made available through conservation for new uses.

In still other areas, reduction in headgate diversions will not result in an increase in usable water supplies because the full amount of the existing return flow is needed to meet existing downstream uses, but may increase instream flows in a bypassed stream segment between the point of diversion and the point of reentry of the return flow.

5. Runoff and percolation from inefficient field application may also result in water quality degradation. Poor water quality relates to low streamflows, soil erosion, sedimentation and the migration of nutrients and pesticides.

6. There are two general approaches to improving the efficiency of water use by irrigated agriculture. The first is to develop uniform policies, standards, cost share programs, and incentives which apply equally to all water users. This approach would attempt to improve the engineering efficiency of systems regardless of whether or not there is a net increase in the new supply of water on a sub-basin or basin. Also, this approach would not give consideration to the unique existing conditions found on any given stream, sub-basin or basin system.

The second approach is to target specific areas where improvements to irrigation systems would result in the greatest and most cost effective increase in the new supply of water. Under this approach, costs associated with attaining new water supplies from efficiency improvements would be reduced and limited state and federal cost share funds would be more effectively spent. Secondary impacts on groundwater recharge and wetlands could be diminished by avoiding measures that would affect these secondary benefits of irrigation.

RECOMMENDATIONS

1. The Department of Ecology (Ecology) should establish a task force to assist in a statewide evaluation of irrigated areas, not to exceed six months in duration, to determine efficiency related problems, opportunities and local interest in each area. Ecology and the task force should establish basin and stream priorities for development of efficiency initiatives and select an irrigation area for a demonstration project.

2. A conservation assessment should be conducted before a systematic effort to increase the efficiency of irrigated agriculture is undertaken for an irrigated area, a basin, subbasin or stream. For each area, the conservation assessment should address the following:

- a) Evaluate existing patterns of water use.
- b) Assess conflicting needs for future water allocations and claims to reserved rights.
- c) Evaluate hydrologic characteristics of surface and ground water including return flow characteristics.
- d) Identify guidelines and criteria for reasonable efficiency and best management practices.
- e) Assess alternative efficiency measures.
- f) Determine the likely net effect of efficiency improvements including the amount and timing of water that would be saved and potential

- benefits and impacts to other water uses and resources.
- g) Evaluate the full range of costs and benefits that would accrue from various measures.
 - h) Evaluate the potential for integrating conservation efforts with operation of existing or potential storage facilities.

A conservation assessment should be used as the basis for development of a conservation plan. The plan would prioritize conservation elements based on relative costs, benefits and impacts. It would also estimate the costs of implementing the plan and propose a specific basis for cost share distributions.

Conservation plans when completed, could be incorporated as part of a broader water management planning process for the basin or region.

3. A process should be adopted and a source of funding should be secured to support conduct of the conservation assessments and development and implementation of conservation plans.

Ecology should be directed to form a Conservation Plan Formulation Committee for each area being addressed to assist in the conservation assessment and in developing a conservation plan. Each committee should consist of representatives of a cross section of affected local water users, members of the public, and tribal governments. Public agencies having particular expertise in various resource areas, and other members as deemed appropriate may also participate as nonvoting members. The committees would also be charged with soliciting input from the public throughout the plan formulation process.

After completion of studies, a conservation plan would be developed jointly by Ecology and the committee. Public workshops and hearings should be held to obtain public comments on the proposed plan. Once a final plan is approved by both Ecology and the Committee, funding should be secured.

Next, Ecology should form an Implementation Oversight Committee composed of local water interests and public members. The plan would serve as the basis for subsequent use of economic incentives, cost sharing, regulatory efforts, technical assistance, and public information in each stream, subbasin or basin to which it applies.

Efforts should be made throughout the process to solicit involvement from agencies having objectives that would be benefited by the implementation of the plan and to determine those agencies' willingness to cost share toward implementing the plan. Ecology would provide the necessary staff, or through contractual arrangements with public and private organizations would conduct the necessary studies and assist with preparing the conservation plan. Adequate new funding for this work will be required.

4. Ecology should utilize the process outlined in the above recommendations in the demonstration project area identified in the statewide evaluation in recommendation 1. The purposes of this will be to test and evaluate the conservation assessment and plan formulation process, determine administrative costs, and determine any needed changes in laws or regulations to implement the process on a statewide basis.

B. FINDINGS (IMPLEMENTATION)

Four conceptual approaches exist for effecting conservation improvements. They are regulatory efforts, economic incentives, cost sharing programs, and public education. Important examples of each approach includes:

Regulatory: quantify and monitor existing uses, planning, enforce waste and relinquishment provisions, standards for water duties and conveyance efficiency, adjudication of water rights, and clarification of administrative definitions and procedures.

Economic incentives: tax incentives, water pricing structures, allow the sale or use of all or part of salvaged water, temporary and permanent water right transfers.

Cost sharing programs: Provide state and federal matching money from new and existing programs. Link program objectives from water quality, soil conservation, fisheries, wildlife, recreation and energy conservation programs to leverage water efficiency efforts.

Public education: use of print media, radio and television, technical assistance, and research extension.

2. The potential exists to more efficiently use some of the water presently diverted for agricultural use. Best results can be expected from a coordinated water conservation program based on appropriate incentives and adequate funding similar to successful energy conservation programs in the Northwest. Acceptability will depend upon providing benefits to both the affected consumer and the general public.

Central to energy conservation programs is the principle that to society as a whole, it is preferable to seek opportunities for efficiency in the use of existing sources of supply which will cost society less than developing a new source of supply. This "avoided cost" principle can also apply to water resource development and utilization.

RECOMMENDATIONS

1. An effective conservation plan will require an appropriate mix of economic incentives, cost share programs, regulatory programs, and technical and public information efforts. Programs which encourage voluntary participation should have the highest priority.

2. Public funding of improvements should be commensurate with public objectives that are realized. Agriculture should be provided with incentives by allowing the capture of all or part of the benefits derived from private investments in conservation improvements

C. FINDINGS (CONSERVATION MEASURES)

1. Numerous technical measures exist for conserving water in irrigated agriculture (listed in Appendix E-7). The major categories of water conservation measures which could be undertaken include: irrigation conveyance and distribution system improvements, on-farm application

improvements and, water management practices.

2. Improvements to irrigation conveyance and distribution facilities can decrease seepage and operation spill, reduce the number of diversion structures in the stream.

3. Improvement of on-farm applications systems and irrigation water management practices could reduce the diversions at the system's headgate. The purpose of improved on-farm systems and irrigation water management is to avoid application rates which exceed intake capabilities of the soil. Benefits include: reduced surface runoff, avoiding overwatering, reducing percolation of water below the root zone, reduced nutrient and pesticide migration, more uniform application rates and moisture levels, and avoiding extended periods between irrigations which result in wilting and a loss in crop production.

4. Conversion of older gravity flow to pressurized on-demand distribution systems would allow the farmer to take a precise quantity at the time it is needed so that the efficiency of the improved on-farm system could be realized. (Otherwise the conserved water will be spilled from the canal.)

5. Actual new water that can be realized depends in part upon the level of cost share available to prospective conservers. The level of cost sharing will determine participation rates in a voluntary program.

The actual results from a basin wide conservation plan may not be fully realized for many years. If a major program to retrofit existing systems is recommended it could take many years to fully implement and will entail significant costs.

Extending the length of the implementation period would permit taking advantage of irrigator's need to replace obsolete and worn out irrigation systems with more efficient systems as well as technological improvements that will inevitably occur over time.

6. Highly effective technical assistance to irrigators is now available from various sources including the Soil Conservation Service, the Washington State University Agricultural Extension Service, the Washington State Energy Extension Service, the state Conservation Commission, and local conservation districts. The extension activities of all of these entities is limited by budget and personnel. Expansion of their resources for extension activities could improve irrigator's access to important information and technical assistance concerning water conservation.

RECOMMENDATIONS

1. Generally, improvements to irrigation systems and to on-farm systems should be implemented together in order to achieve the greatest water savings. Converting older open conveyance gravity systems to pressure systems should be encouraged wherever possible and where consistent with conservation plans.

2. Technical assistance and dissemination of information about technical conservation measures through existing agriculture extension entities should be increased.

D. FINDING (WATER USE GUIDELINES)

Ecology currently uses published research reports on water requirements for crops in various soil types and microclimates. No published guidelines exist for conveyance loss.

RECOMMENDATIONS

1. Ecology should adopt and publish relevant criteria to be used for determining crop water requirements and conveyance efficiency.
2. Ecology should review existing published information regarding on-farm water requirements for crops for various regions and soil types and should adopt guidelines for a schedule of such requirements which will be used for the purposes of water conservation funding and water right transfer procedures.
3. Ecology should investigate the feasibility of developing guidelines for conveyance efficiency. The findings and conclusions of the investigation should be distributed in a report to obtain public input to determine whether such guidelines are workable.

E. FINDING (GRANTS AND LOANS)

1. Ecology presently administers bond funds authorized by Referendum 27 and Referendum 38 for improving agricultural water supply facilities. These funds are disbursed through loans and grants primarily to irrigation districts to finance rehabilitation and betterment projects. Ecology has not adopted any rules to implement these programs, but has published a set of guidelines. Referendum 27 specifies a maximum grant percentage of 15 percent. Referendum 38 does not specify a maximum grant percentage, but Ecology's current guidelines limit grants to 15 percent.
2. The Centennial Clean Water Act and other state and federal sources provide funds for a variety of types of water quality improvement projects. Irrigation efficiency projects that have significant water quality benefits may be eligible for funding.
3. Loans and grants from state and local government can only be provided to public bodies due to state constitutional prohibitions against lending the state's credit to individuals. Consequently, private water supply systems and on-farm systems are not eligible for state financial assistance.

RECOMMENDATIONS

1. Centennial Clean Water Act and other water quality funds should be available for projects that would provide water quality improvements and improve the efficiency of irrigation systems. Maximum grant percentages should be the same as those available to other water quality projects.
2. Ecology should be authorized to establish grant and loan terms which vary based on relative water efficiency/water quality accomplishments as indicated by the water conservation assessments performed for irrigated

areas. Preference should be given to projects which provide the greatest benefits in water savings and water quality improvement.

3. Ecology should be provided authority to establish grant and loan policies which vary based on the degree of public benefits from a water conservation program.

4. Private water entities should be authorized to form a public body capable of receiving public grant and loan funds for water conservation and quality improvements. The state should consider modifying the prohibition against lending state credit to individuals in regard to funding conservation projects where public benefits are achieved.

F. FINDING (INCENTIVES)

1. Owners of land within an irrigation district make payments for delivery of water based on one of several systems. In some districts, land owners pay an annual assessment for a base quantity of water. Any additional water above the base quantity can be purchased from the district if it is available (normally this is at the same rate per unit as the base quantity.) In other districts, irrigators own shares that represent a proportion of the total volume of water available to the district. In either case, payment is made to cover operation and maintenance of project facilities and to pay obligations for major project facilities.

Since 1979, irrigation districts have had authority to adopt graduated water rate structures which provide incentives to water users to reduce the amount used. In some districts the utility of this provision is limited because water rates are set by long term contracts between the district and land owners and can only be changed by mutual consent.

2. Facilities and materials purchased by a farmer for the purpose of conserving water is presently taxed as personal property. This discourages the purchase of materials necessary to effect conservation such as pipe, pumps and sprinklers. Certain energy conservation systems received sales tax exemptions for six years.

3. Presently, irrigators who invest in new facilities or adopt new practices that conserve water are prohibited from capturing the benefits of the water savings. Under current law the saved water goes to the next junior appropriator, and cannot be used on new land or sold by the saver.

RECOMMENDATIONS

1. Districts that adopt graduated rate structures or other effective incentives to conserve water should be eligible for a higher cost share for system improvements.

2. The increase in value from replacing old private irrigation systems with new systems which conserve water should be exempt from state personal property taxes for a period of six years after purchase.

3. Irrigators who can save water without affecting other water users or dependent resources should be allowed to capture all or part of the benefits of the savings by being able to use or sell the savings. (For more

specifics see recommendations under the section on transfers.)

G. FINDINGS (TRANSFERS)

1. Current laws allow a water right to be transferred by changing the place of use, purpose of use, and point of diversion or withdrawal. When such changes occur outside an irrigation district (including transfers by districts) approval by Ecology is required. In considering a transfer, Ecology is required to determine that a transfer will not impair any existing rights and that it would not be detrimental to the public interest. No guidelines or administrative rules currently exist for water right transfers.
2. Transfers within districts are generally regarded as the district's business and may not require state approval. Districts often approve such intradistrict transfers unless the district's ability to deliver water would be impaired or the district would incur unrecoverable costs.
3. Transfers from a district to a use outside the district are often complicated by legal and physical constraints. One problem is that some courts have regarded the districts as only conveyance agents for water rights held by district members rather than trustees of the rights. Districts are thus inhibited from effecting conveyance improvements and selling the savings.
4. Transfers serve as a mechanism to allow water uses to be updated and for water to be acquired by higher value uses. Existing case law prohibits a transfer from enlarging the acreage served by a water right. This inhibits the incentive to save and sell or utilize the saved water. Oregon and California have amended state law to allow salvaged water to be used or sold, but have retained the prohibition against impairment of third parties. Oregon requires that some portion, equal to 25 percent or less, of the salvaged water be returned to the state to benefit instream flow objectives.

RECOMMENDATIONS

1. The state should adopt a cautious, but encouraging policy toward transfers of water and water rights and water banking as efficiency tools. The state should allow permanent water right transfers only when there is sufficient legal certainty in the water right to be transferred. Only the amount of water that has been beneficially used should be subject to transfer.
2. Allow private parties to salvage water that is presently lost and apply it to a new use if the water to be saved does not serve another purpose as return flows. State approval of such salvage proposals should be required to assure that third parties and the public interest are protected.
 - 2.a. (Alternative) Same as recommendation 2. above, but require that a portion of the salvaged water revert to the state for public benefit such as instream flows.
3. Provide authority to state and local government or private individuals and groups to purchase and dedicate a portion or all of an offstream water right, conserved water, or dry year options to improve instream flows or for

other public purposes.

4. Establish a "rebuttable presumption" that the amount of water that could be transferred would be the average amount that has been consumptively used. Upon a showing by the transferring parties that there would be no effect on other water rights, the average amount that was beneficially used, i.e. consumptive use plus reasonable inherent conveyance loss, could be transferred.

5. Provide authority to Ecology to approve transfer of a portion of a water right from out-of-stream use to instream purposes to benefit specific stream segments. (Instead of water diverted at a headgate returning to the river as return flows downstream, reducing conveyance losses would reduce headgate diversion and benefit streamflows in the reach bypassed.)

6. Provide authority to an irrigation district board of directors to approve, on behalf of the district, the sale and transfer of water saved as a result of improvements to irrigation conveyance and distribution systems. The action by the board should only be made following the submission of an engineering analysis which conclusively shows that the amount of water which would be transferred is the result of reduction in conveyance and distribution losses and would not reduce the amount of water otherwise provided to water users. (Any transfers outside a district would still require the approval of Ecology.)

7. In cases where water is proposed to be transferred between irrigation districts on a temporary or permanent basis, provide authority to either board of directors to approve or deny the proposal if good cause exists to do so. Denial should be based on one or all of the following:

- a) It would cause an interruption in water deliveries to other users in the district.
- b) It would cause a reduction of water that would otherwise have been available to other water users in the district.
- c) It would cause an increase in direct administrative costs to the district which have not been reimbursed by the transferring party.
- d) The transferring party has not fully provided for the payment of assessments to the district from which the water is being transferred for the period of the transfer agreement.
- e) The inability of the district receiving the water to deliver the water to the transferee due to physical constraints.

9. Ecology should utilize a balanced advisory committee to assist in developing recommendations for water transfer procedures. These recommendations should be submitted to the Joint Select Committee on Water Resource Policy by January 1990. This should include the conditions and methodology to determine the amount of water that can be transferred from one irrigation district to another district or user. The regulations should address both consumptive use and water needed for system conveyance and operation.

H. FINDINGS (WATER RIGHT ADJUDICATION)

1. Ecology has authority under current law to bring general adjudications of water rights before state courts to determine the existence, extent and

priority of rights and claims to water. Adjudications establish a certainty of right that is desirable for existing and prospective right holders. Such certainty is important in promoting transfers of water rights.

2. Adjudications are a means of increasing the efficiency of water use by utilizing standards for water duty and conveyance efficiency. Through this process, claims to diversions of water in excess of the standards may not be considered beneficial use. The excess claim is not affirmed as part of the water right. Reasonable allowances for conveyance and application inefficiency are recognized as a necessary part of putting water to beneficial use.

3. In many cases a reduction in headgate diversion would not increase the supply of usable water because much of the unused water returns to the source or to ground water to be reused by an existing right or to support wetlands. Thus water users could be required to incur additional expenses to meet lower headgate diversion levels even though no benefits result to them or to anyone else.

4. Adjudications generally do not focus only on those areas where a net savings of water can be obtained. All uses are treated alike whether they really are or not. Adjudications do not take into account that water that is excess to crop requirements is reused by others or supports riparian habitat and wetlands. Effects on these areas and on existing rights could be an unintended consequence of adjudicating rights to save water.

RECOMMENDATION

By themselves, water right adjudications should not be a preferred water efficiency tool from a systemwide perspective. Because they do not rely upon the findings of an in-depth assessment of an area's hydrology and water use patterns, they have the potential to upset the hydrologic system that supports existing rights, recharges ground water and supports wetlands and riparian habitat. However, adjudications do serve a useful purpose in establishing a certainty of right necessary for water transfers.

I. FINDINGS (INSTREAM FLOWS)

It is extremely difficult prior to performing a conservation assessment for a given area to quantify the amount of water which could supplement instream flows as a result of water use efficiency in agriculture. Water supply generated from irrigation conservation improvements will contribute to instream flows in some cases. The amount will depend on a number of variables including the extent, timing, and location of savings; and whether the saved water is allocated to instream flows or to satisfy other existing water rights or new uses.

Several approaches outlined in this report can, within the framework of western water law, be utilized to improve instream flows. These include 1) reversion of a portion of saved water to the state commensurate with public cost sharing in efficiency improvement, 2) allowing state and local government or private individuals to purchase out-of-stream water rights for dedication to instream flows, 3) requiring that some portion of water savings revert to the state where needed for instream flows, and 4) incidental to efforts for which the primary purpose is rehabilitation and

updating of irrigation systems.

The value of saving water for the benefit of improving instream flows is greatest when flows are at low levels. Additional increments of flow are generally less valuable as flows increase. As flows approach the "optimum level" for instream values, the marginal utility of additional increments of water usually becomes lower so that proportionally more water is required to reach the optimum level. This diminishing returns function varies considerably, but it is not unusual for Instream Flow Incremental Method studies to indicate that satisfying the upper increments of habitat may require that minimum flows be increased by large percentages. Despite this "cost", the additional increment of habitat may have no effect on actual fish production because other factors often constrain production.

On the other hand, the cost of conserving water by irrigated agriculture is also subject to diminishing returns at the margin. The first block of water savings would be relatively inexpensive per unit. The cost per unit of water savings increases at an increasing rate as the amount required to be conserved increases. As a result of these diminishing returns and increasing costs per unit of water, the ratio of benefits to costs for public and private investments in water conservation becomes a major consideration.

Offstream uses can achieve higher rates of efficiency that could benefit instream flows by adopting technological advances. However, achieving high levels of instream flows in some streams solely through conservation may be cost-prohibitive beyond a certain level of achievement. Once the level of conservation by offstream uses that is reasonable and feasible is attained, a further increase in fish production may require either water supply augmentation through storage or artificial supplementation of fish production.

RECOMMENDATIONS

1. Efforts to improve instream flows in reaches which are at low levels should be regarded as having the highest priority in water conservation efforts. Special recognition should be given to stream reaches with low flows that affect tribal fisheries.
2. The conservation assessments and formulation of conservation plans should be closely coordinated with other basin planning efforts, including fish and wildlife plans that establish objectives for management of fisheries and wildlife.

J. FINDINGS (WATER QUALITY)

1. Improvements to irrigation systems generally result in improvements to water quality whether or not there is an increase in the usable supply of water. Improvements in water quality correlate with reductions in soil erosion, sedimentation and nutrient migration.
2. The close relationship between conservation of water by irrigated agriculture and improved water quality is not fully recognized under current state and federal water quality or water supply programs.

Federal Principles and Guidelines are used to evaluate water resource projects and establish a rigid methodology for computing a benefit-cost ratio. Historically, this methodology was designed to evaluate new reservoir projects and thus do not allow inclusion of water quality benefits which result from water conservation projects. The benefit-cost ratio for water conservation improvements which include only the benefits from an increase in the quantity of usable water often fall below one to one. With the shift in the Bureau of Reclamation's mission toward water conservation, a change in analytical procedures which would allow inclusion of water quality benefits and reduction in soil erosion and sedimentation is needed to fully account for conservation benefits.

3. Water quality projects funded through various clean water programs are not required to pass a benefit-cost analysis. The use of a point system to rate water quality projects based only on water quality criteria (and excluding points for increase in quantity of usable water) results in the incomplete evaluation of proposals to improve irrigation systems.

RECOMMENDATIONS

1. State and federal programs should be adjusted to allow consideration of both water quality benefits and water quantity benefits which result from improvements to irrigation systems. Institutional changes need to be made whereby the benefits are additive rather than considered separately.

2. To attain action at the federal level, the Department of Ecology with other appropriate state agencies should seek meetings with appropriate federal agencies including the Bureau of Reclamation, the Environmental Protection Agency, and Soil Conservation Service to develop a mechanism wherein water quality and water quantity benefits are both fully accounted for.

3. Under the Centennial Clean Water Act, bonus points should be awarded for water quality projects which also increase the quantity of usable water. Guidelines should be adopted by the Department of Ecology allowing clean water funds and Referendum 38 funds to be used in conjunction for projects that would result in both water quality and water supply benefits.

4. The state should work to secure federal funds to assist in irrigation project improvements which improve water quality and conserve water.

K. FINDINGS (GROUNDWATER AND WETLANDS)

1. Surface irrigation artificially recharges groundwater supplies which may be depended upon by a variety of users. Conservation may adversely affect groundwater availability by reducing such recharge. Water right laws do not require the continuation of a water use which artificially recharges groundwater aquifers

2. In some irrigated areas, artificial wetlands have been created as a result of either an increase in elevation in the water table from water that percolates into the soil or from surface runoff from irrigation. In some cases, conservation improvements in irrigation could reduce current wetland areas. In other cases, improvements in irrigation which would improve the quality of surface water runoff could improve the quality of the wetlands

while not reducing the wetland area.

3. A state Wetlands Committee has been formed under an executive order to study the extent of the state's wetlands and the potential for loss these areas due to development. One issue under consideration is mitigation for development effects on wetlands. The question of what level of mitigation, if any, should be required for effects on wetlands artificially created due to irrigation development is under consideration by the Wetlands Committee.

RECOMMENDATIONS

1. The effect of conservation on recharge of shallow aquifers and wetlands should be considered as a component of the conservation assessment.
2. The issue of mitigation for artificially created wetlands affected by irrigation conservation measures should be carefully considered by the state Wetlands Committee and the recommendations of that committee should be carefully considered in the development of water conservation plans.

L. FINDINGS (ELECTRICAL ENERGY)

1. Use of electricity in agriculture could increase in some cases and decrease in others as a result of a water conservation program. Decreased use could result from reduced pumping to obtain an adequate supply. Conversion to gravity pressurized enclosed laterals could reduce on-farm power costs. Conversion from high pressure to low pressure sprinkler systems would also reduce power consumption.
2. On the other hand, electrical consumption could increase from new water recovery pumpback systems and converting from surface to sprinkler application. Reduction of aquifer recharge as a result of conservation may result in higher pump lifts and therefore higher costs in ground water systems.
3. Power production potential could be enhanced if conservation measures reduce diversions and increase streamflows. As the surplus of electrical power diminishes, efforts to conserve electrical energy in agriculture may be renewed.

RECOMMENDATIONS

1. Opportunities which conserve energy and water should be identified in conservation assessments so that these projects can be eligible for funding by future energy conservation programs. They also need to be implemented within a timeframe commensurate with the region's need for additional power.
2. The changes in power requirements should be factored into any analysis of conservation benefits and costs.

DEFINITIONS

These definitions were developed as part of Workplan Task 11. The definitions were not made part of the full Committee's recommendations, however, they were used in the development of the findings and recommendations of the agriculture subcommittee. These definitions are set forth to help the reader understand the context with which they are used in this report and are intended for discussion purposes only.

- 1) "Beneficial Use" is the use of water using reasonably efficient practices to accomplish without waste the purposes recognized as beneficial in RCW 90.54.020(1).
- 2) "Reasonably Efficient Practices" are those practices, including, but not limited to, methods of conveyance, use, and disposal of water which are reasonable and appropriate under the circumstances as determined by an area-specific application of criteria identified by the Department of Ecology, which shall include, among others:
 - (a) Consistency with any basin or other water resource plan developed for such area;
 - (b) Needs of other beneficial uses for water from the same source;
 - (c) Reasonableness of any works at the time of installation;
 - (d) Reasonableness of any works at the present time;
 - (e) Technological changes
 - (i) all known
 - (ii) all known and reasonable;
 - (f) Cost of improvements and impact of the costs of upgrading facilities on the continued use of water by an appropriator;
 - (g) Impact of upgraded facilities on the stream, and;
 - (h) Impact of upgraded facilities on surrounding habitat.
- 3) "Waste" is the diversion of water in excess of what is required by reasonably efficient practices to accomplish a purpose recognized as beneficial in RCW 90.54.020(1). Such use is not within the scope of any water right.
- 4) "Wasteful Practices" are those practices, including, but not limited to, methods of conveyance, use, and disposal of water, which result in "waste", as defined in (2).
- 5) "Consumption" means the amount by which there is a diminishment of the water source through the beneficial use of water.
- 6) "Impairment of Water Right". A water right shall be deemed impaired when the use of another or other water rights interferes with the ability of a person to exercise his right to make "beneficial use" of the water, as defined in (1.), from that source.
- 7) "Conservation" includes the implementation of those practices or techniques which will reduce the amount of water diverted by an appropriator, who is using reasonably efficient practices, to accomplish a purpose recognized as beneficial in RCW 90.54.020(1), without reducing the amount of "consumption" associated with the use.

- 8) "Conserved Water" is that portion of a water right which is no longer diverted as a result of the implementation of "conservation" measures. "Conserved water" does not include water that was previously wasted.
- 9) "Salvage" includes the implementation of any practices or techniques which reduce the historic "consumption" of water associated with a specific beneficial use of water, thereby making a certain quantity of water available for beneficial use which was not previously available.
- 10) "Salvaged Water" is that portion of water in a water right which under normal usage or conditions is consumed, but which is recovered and made available for beneficial use through the implementation of salvage measures.
- 11) "Significant Hydraulic Continuity" describes that degree of relationship between ground water and surface water which is so direct that those sources may be considered one source.

APPENDIX E-12

REPORT ON THE PUBLIC EDUCATION COMPONENT OF THE WATER USE EFFICIENCY STUDY

MISSION STATEMENT

The overall mission of the public education component of the Conservation and Efficiency Program is to create existing and future generations of water users which are more aware of water use and the importance of water conservation and efficient water use. By promoting the message that there can be enough water for all uses if each user uses water wisely and conserves, individuals may realize that every effort to conserve water is important. This awareness of the resource and the roles that conservation and efficient use of water play will be instrumental to the reduction of future water demands.

OBJECTIVE

To identify, evaluate and recommend programs to educate the public about the need for and methods of using water resources efficiently.

DISCUSSION OF PROBLEMS AND OPPORTUNITIES

Washington State is blessed with abundant water resources. These waters are absolutely essential to virtually all citizens of the state. Waters of the state contribute significantly to the quality of life for all of its citizens. Waters of the state are used for consumptive uses such as agriculture, domestic supply, industrial supply and for non-consumptive uses such as hydropower, fish and wildlife habitat, recreation and aesthetics. The waters also serve a vital purpose for Indian tribes because of the economic, cultural, and religious significance of water in their society.

The need for improvements in conservation and the efficiency of water use will become even more critical in the future. Even at existing levels of population and development, the conflicts between water uses have increased dramatically in recent years. With projected increases in population and with little projected increase in total water supplies available, these conflicts will undoubtedly increase. Conservation and water use efficiency improvements are one way to minimize the conflicts that will occur.

The purpose of education programs is to provide information to people which results in a change in their attitudes or behavior (in this case in their water use). In order to be effective in achieving water efficiency improvements, the program needs to emphasize a voluntary approach. The program needs to clearly spell out why individual water users should want to become more efficient in their water use. This information should be presented in laymen's terms and should discuss economic, environmental, and social benefits to the individual as well as the public at large whenever such savings can be quantified. This emphasis on a voluntary approach can result in a decrease in the need for regulatory enforcement to achieve the desired changes in attitudes or behavior.

The education program needs to present a positive theme or central message emphasizing that, although some conflicts are inevitable, conservation and efficient use of our water resources can be instrumental in ensuring adequate supplies of water for as many uses and users as possible and in minimizing the conflicts between water uses and users.

TARGET AUDIENCES FOR EDUCATION PROGRAMS

The water use efficiency public education program should identify specific target audiences and provide them with the information they need to increase water use efficiency practices. These audiences include the following:

- * Water utility managers/Irrigation district managers
- * Industrial users
- * Residential users
- * Commercial users (including public bldg. and park managers)
- * Growers/Irrigators
- * County extension agents
- * School children/teachers
- * Appliance purchasers and manufacturers
- * Plumbers and builders
- * Recreational users
- * Decisions-makers

These audiences are important to reach for several reasons. Some, such as industrial, commercial and residential users, are major users of water resources. Others, such as utility managers, extension agents, schoolchildren and teachers, can strongly influence water use practices in the future. Yet others, such as plumbers, builders, appliances purchasers/manufacturers and recreational users, have very limited awareness of the water supply situation in our state, but can have a strong impact on the practices of other users.

A comprehensive water use efficiency education program must include all of these audiences and address their special informational needs. The role of the state should be to support existing programs that are being offered and to encourage development of programs for audiences that are not being reached. The state should work closely with local governments and the private sector to offer support and coordination of new education programs.

The education and information needs of these audiences vary widely from general awareness of water conservation and how-to information on water use practices to new technology in water use efficiency and case-by-case consultation. For example, the needs of an audience of schoolchildren might best be served by providing information about water supply and the benefits of conservation, whereas a major industrial water user would best be served by a water use consultation identifying Operation and Management practices and new technology that could increase water use efficiency and identify economic benefits. The needs of each of the target audiences listed above are outlined in Table 1.

Currently, some of these audiences are being reached with water use efficiency education programs. For example, the large water utilities in western Washington offer programs for schoolchildren, training for teachers, and conservation publications and kits for residential users. The Tacoma

Water Department also works with large industries and the parks department to conserve water in their operations.

In addition to these audiences, managers of small water utilities and irrigators are being reached with education services offered by Department of Social and Health Services and Washington State University Cooperative Extension, respectively. In the private sector, some commercial and industrial users have undertaken in-house programs to educate employees as to water conservation practices. Many water equipment vendors offer education and training programs demonstrating the benefits of their products. Water use efficiency education programs conducted by the public and private sectors are discussed in more detail below.

PUBLIC EDUCATION ON WATER USE EFFICIENCY IN WASHINGTON STATE

Although there is not currently a statewide water use efficiency education program in Washington, many agencies promote water use efficiency on a state, regional, and local level. These agencies reach a wide range of audiences, but many of the programs reach only a small segment of each audience. For example, the larger water utilities in western Washington have very extensive conservation education programs but these programs only reach persons in their service area.

For the most part, the educational programs in use in Washington are in themselves comprehensive, up to date and effective. The organizations that have developed these programs represent a valuable resource in the development and implementation of a statewide water use efficiency program. Several opportunities exist to combine the efforts of several agencies to create a more effective and far reaching conservation education programs.

The state's role should be to encourage and assist more agencies to implement education programs, to develop programs in areas that are lacking, and to coordinate, train, and provide guidance to agencies and groups that could reach those target audiences that needs are not being met through the existing programs.

In general, the education efforts in the western part of the state and those in eastern Washington are targeted to different audiences and have different missions. In western Washington, efforts are targeted at residential and commercial users and schoolchildren; the public utilities are very active in conservation education. For the most part, the message imparted by these programs emphasizes the value of water and the benefits of using water efficiently. In eastern Washington, these audiences are not targeted. The extension services, which work most closely with irrigators, are most active in these communities. The emphasis is supply shortages and drought measures. These agencies and their public education programs for water use efficiency are summarized below. Also included in this summary is a discussion of some education programs from other states that complement and augment the programs in existence in Washington.

Seattle and Tacoma water utilities have the most extensive water conservation education programs of all the utilities in the state, while Everett also has a very successful program. Most of the other utilities consider conservation only in terms of drought or emergency water shortage

response. The lack of education programs through utilities may be due to a lack of funds but is also from a lack of knowledge and understanding of the importance and benefits of a water conservation education program. There is great potential for state support in this area in both the form of funds and programs. Many of the programs developed by Tacoma and Seattle could be adapted for use by other utilities around the state. And, although Seattle and Tacoma programs are very extensive, these programs would be much more effective if there was an opportunity to integrate and coordinate them. What seems to be most needed on a state level is guidance, coordination, and training.

FINDINGS AND RECOMMENDATIONS

PUBLIC AWARENESS

FINDINGS

The first step in any public education campaign is public awareness. Before the public can be educated on specific water use issues they must be made aware that there is a need for concern and what are the areas of concern. Without an awareness of the need to conserve, few people will take the initiative to evaluate and change their water use practices. Once the level of awareness of the public has been raised, other education programs are much better received and are more effective.

The media can be a great resource for public awareness as it can be instrumental in reaching a large segment of the population. Television and radio stations have often publicized conservation messages through public service announcements. Newspapers and magazines have also been instrumental in educating the public on water conservation through public service announcements. The media has often done special features on water issues and the benefits of conservation. One notable example is Sunset magazine, which often has articles on the value of water and includes specific conservation methods. Television has been used very successfully in other states to both raise awareness of water conservation and to give specific information on ways to conserve. Denver, Colorado, for example, uses the evening newscasts to announce evapotranspiration values and translates this information into decisions on whether area lawns need watering. These broadcasts have not only given "how to" information but serve as a daily reminder that water is a valuable resource that is not to be wasted.

In Kentucky, Massachusetts, and Virginia, movie shorts on water conservation are shown before the feature at movie theaters. Often one major theater company can distribute one copy to many individual theaters. The American Water Works Association also has short video messages available.

Another way to focus attention on water efficiency issues is to present awards to persons and institutions which have implemented many water conservation practices. Such programs focus attention on water use efficiency as well as encouraging and rewarding initiative.

The Governor's office has instituted energy conservation awards which the Governor presents each year in an annual energy conference. The Governor's office also has a program that contacts companies that are planning to build

new facilities and offers free professional consultation on adding energy saving designs into the plans. Los Angeles has taken the award concept one step further and has started competitions among school districts for the best conservation efforts. The winning school is reimbursed part of the money the district saved through energy and water conservation programs to use for school improvement projects.

The energy award programs in Washington offer the opportunity to either include water saving criteria to the existing programs or to use them as a guide in designing similar programs for water conservation.

Besides informing the public on water efficiency issues and methods, public awareness measures serve to create acceptance of the different methods of conserving water. Demonstration and education projects can be used to develop an acceptance of water use efficiency measures which are not well understood and which may carry negative connotations, such as the reuse of water.

For example, many cities in Arizona and Colorado have used demonstration gardens to help create public acceptance of xeriscaping. These gardens, developed in cooperation with the city and garden clubs, show the public what low water use landscaping looks like. The gardens help the public to accept the idea of xeriscape by familiarizing them with low water-use plants, and by displaying the beauty of these gardens.

RECOMMENDATIONS

- The state should demonstrate to the public that it has given wise use of water resources a priority by disseminating the results and recommendations of the Water Use Efficiency Study to all interested user groups.
- The state should conduct a statewide media campaign about water use efficiency which includes using print, television, radio, billboards, displays, etc.
- The state should develop and implement a formal recognition program to acknowledge significant contributions and efforts in water conservation and improvements in efficiency of water use by public and private organizations and individuals.
- The state should develop demonstration projects in selected areas of the state to demonstrate the feasibility and desirability of water conservation to specific target audiences.
- The state should initiate an education program on the value of water reuse as a means of meeting future water needs.

PUBLIC INFORMATION

FINDINGS

Several agencies on both a local and state level have programs to disseminate information about water conservation to the public on how to

conserve water. This information takes many forms, from pamphlets, speakers, and workshops to video and telephone messages. All these modes of dissemination have proven very successful.

DSHS, and Seattle and Tacoma Water Departments have developed several flyers on how to conserve water outdoors and in indoor residential use. These flyers are aimed at the general public and are available through bill inserts, and by request. DSHS' Drinking Water Section has recently published drought response guidelines which are aimed at helping small utilities set up drought conservation programs. The Washington Energy Extension Service publishes "how to" information on water and energy conservation through a newspaper column newsletters to irrigators. WEES also holds workshops for irrigators on how to save energy costs through water conservation. The Everett Water Department distributes in-home conservation kits as well as information on water conservation.

These agencies also have programs in which their representatives can interact more closely with groups. The Tacoma Water Department works with the Tacoma parks department to educate employees on irrigation scheduling and the importance of updating old equipment. The Water Department's Speakers Bureau provides speakers for clubs, public interest groups, and attend fairs to lecture on water conservation. Also, every summer Seattle leads field trips to the Seattle watershed for children, adults, and educators. This program has been very effective in helping people gain an appreciation for the importance of protecting our water resources, especially in water short years when the reservoirs are low.

Electric utilities in Washington are mandated to offer energy audits for customers in their service areas. These audits allow personal contact between the utility and its customers during which education on conservation takes place. Some utilities have included water conservation information in their audits. Utilities in California have extensive audit programs which include energy and water conservation and recycling information. There is great potential to expand Washington's energy audits to educate individuals on water issues more thoroughly and provide specific "how to" information.

Two newer modes of disseminating information are computers and videos. Cooperative Extension recently began an experimental irrigation scheduling program using computer software to predict irrigation needs. This program should educate irrigators on wise use of water and will help them realize the monetary benefits of saving water on-farm. The extension also has a "Dial Extension" recorded telephone message program that includes information on water conservation.

Several cities in California have taken advantage of the popularity of home video movies and have developed videotaped conservation information, which includes both the benefits of conserving water and specific "how-to" information. These videos are available to borrow free at video rental centers. They have proven to be very popular.

RECOMMENDATIONS

- The state should compile and disseminate information on water needs for various uses. For example, the actual irrigation

requirements of various crops, gardens, lawns, shrubs; instream needs of fisheries, recreation, and water quality, etc.

- The state should develop specific "how to" information on how various users can identify inefficient uses of water and how they can make improvements in their efficiency of use. This information would be welcomed by the public in it also included information on potential water and money savings their efforts can bring.
- The state should encourage utilities to combine energy and water audit programs which would give customers of these utilities specific means of saving not only energy but water as well.
- The state should develop videotaped water conservation messages for free use from video tape rental outlets. Such material should be developed in a variety of languages and for all age groups.
- The state should identify new means of disseminating information to specific target audiences.

SCHOOL PROGRAMS

FINDINGS

The Water Conservation Offices of Everett, Seattle, and Tacoma coordinate and staff several elementary school programs. These programs include dramatic education programs for elementary school children, series of comic and coloring books which teach children about water conservation, a teacher handbook, educator's newsletters, and teacher training seminars. All of these programs have been very successful and are models which the state can use to develop statewide school programs.

Dramatic Education

Tacoma implemented one of the first dramatic education programs; the utility contracted with the Small Change Theater from Minneapolis, Minnesota to present skits on watersheds, groundwater, and water conservation to elementary school children. Last year the theater group reached 30,000 children from 40 schools in Tacoma and 40 schools in Pierce County. Along with these presentations, teachers are supplied with a 16 page workbook and two supplemental workbooks on water conservation. Both Seattle and Everett water utilities have implemented similar dramatic education programs and continue to sponsor this program each year. This year the utilities are coordinating their efforts to reach more schools. Everett hopes to be able to videotape the shows for future use and for public service television spots.

Teacher Training

The Education Office of the Tacoma Water Department has an extensive teacher training program. Each year the department sponsors an In-service workshop on water issues taught by staff of the Oregon Museum of Science and Industry. The workshops focus on general environmental and water resources background with hands-on training in experiments the teachers can conduct

with their students. Only 25 teachers can participate per year, but these teachers often have shared the information and educational materials with their colleagues, thereby extending the benefits of this very popular program.

The Seattle Water Department has also offered teacher training programs which have not been as successful as Tacoma's program. But Seattle has developed many popular materials for students and guidebooks for teachers. The Conservation Office distributes a newsletter, "Pipelines", which keeps teachers informed on curricula resources available from the department. It also describes experiments the class can do and keeps the teachers informed on the issues.

Some school districts in the state have implemented their own water conservation educational programs. One such school district is the Highline School District, which has mandated one day per school year to be spent on water resources awareness, including includes water use efficiency.

The majority of the in-school programs are aimed at small children, usually grades one through four. Children at this age level seems to be the most receptive and often bring the message home to other family members. High School programs in the past have not been very well received by the students. But recently, the Seattle Water Department has developed computer software lessons on water conservation, which they hope will capture the attention and imagination of this age group. The software will be tested in schools this year.

Several states, such as Florida, California, and Utah, have state approved and mandated conservation curricula which includes both materials and teacher training. In Washington curricula would have to compete for teaching time as the amount of information that teachers must present increases each year. Therefore, it is very important to have general environmental and conservation curricula available which incorporates information from all environmental areas that holistic view of the ecosystem. If the state provided the materials, teachers could individualize the materials for their specific area, often with the help of the water utilities. Training is especially important in Washington; many teachers expressed that they do not have enough science background and, therefore, do not feel comfortable teaching water resource issues.

RECOMMENDATIONS

- Educating school children on the importance of Washington's water resources and the need for conservation and wise use of water is the best way to insure long-term concern and awareness of water resource issues. The in-school programs have been very successful on the local level and these programs could be extended statewide.

- The state should provide for Biannual dramatic education programs to schools around the state. The programs could be rotated by region, thereby reaching most schools in the state. With the dramatic presentation of water conservation, the state should provide follow-up and support worksheets and other materials so teachers may follow-up in the classroom.

- The state should develop teacher training which provides an overview on the interrelationships of Washington's land, air, and water resources. The workshops would serve to give background information to teachers so they feel comfortable to teach environmental issues as well as providing teachers with programs they can take back to the classroom. These workshops would be best received by teachers if offered on regularly scheduled in-service days and if credit was offered for the workshops.

PRIVATE ORGANIZATIONS

FINDINGS

Many private organizations in Washington have been active in educating the public on water use efficiency. These private organizations are instrumental in reaching certain audiences that may not be able to be adequately targeted by the state. A few examples of the different types of organizations are discussed below.

Many private industries are now educating employees to be efficient users of water at work. Water use efficiency is often a part of standard procedures in work task descriptions; and some companies have recognition programs to award employees for safety and efficiency. Boeing and Union Carbide are two private industries which conduct water conservation education for employees.

The League of Women Voters is involved in many issues on both a regional and local level. The Yakima league has a state water resources chair which stays abreast of water issues in the state. The League does not have any educational programs in water use efficiency but can act as a liaison between the state and regions for state programs. The League often provides informational public meetings and publicizes issues and programs.

Environmental groups are active in educating the public on environmental issues through advertisements, newspaper editorials, newsletters, community task forces, and public information meetings. These organizations are active on the national, state, and local levels and could be an integral part of a state water use efficiency education program. For example, the Massachusetts Audubon Society has been very active in the area of groundwater. This group has published several information bulletins on groundwater and have held many workshops for both public and local officials on the wise use of water resources.

Another example of a private group educating the public is the Water Education Foundation in California; a private group funded through grants from private contributors, such as individuals and businesses. The Foundation develops educational materials and literature on water resources for a general audience. This foundation or one similar to it could be encouraged in Washington.

Youth groups such as the Boy and Girl Scouts of America and 4-H teach conservation through merit badges and group and individual projects. Counselors who are knowledgeable in this field guide participants in both information gathering and hands-on experience in conservation techniques. The children not only gain an education on the value of natural resources, but often help their families to implement conservation measures at home.

All these private organizations offer a great resource to the state in disseminating information to specific audiences and creating an overall awareness of the need for efficient use of water. Through cooperative effort with the private organizations in Washington, the state will be able to reach many small local audiences.

Many other states have found that teaming up with private organizations can result in very successful programs. For example, California has developed information on low water-use plants and xeriscaping, which it provides to cities, garden clubs, and nurseries for disbursement to the public. The state encourages nurseries to use this information to display and market low water-use plants. A low water-use logo has been developed for use in garden stores to tag plants that do not require much water. Iowa has promoted the use of lawn watering gauges by encouraging stores to give them away with their logo for advertising purposes.

RECOMMENDATIONS

- The state should encourage and develop public and private partnerships to educate water users and foster water conservation and more efficient use of the state water resources.
- The state should seek the establishment of private foundations in Washington State dedicated to the encouragement of water conservation and efficient use of water resources through the development and dissemination of educational material.

TARGETING EDUCATION PROGRAMS

At present, little data exists about the public's level of awareness and knowledge of water use efficiency issues. Educators agree that the level of awareness of water use efficiency is very low in many regions of the state. Although a statewide media campaign would reach a large segment of the population, different audiences would require different types of information. Also, educational needs may vary on a regional basis, thus requiring educational programs to vary by region throughout the state.

Two separate data bases are required to determine the best educational programs for each audience in the state. First, actual water use data is needed for different areas of the state to find those areas that are least efficient. These areas should be targeted first in implementation of educational programs. Secondly, a survey of the knowledge of water use efficiency and conservation is needed to design the scope of some short-term programs and all long-term programs. The state's efforts would be most effective if specific problem areas can be addressed. Also, this data base would be instrumental in evaluating the progress and success of the state's educational programs.

RECOMMENDATIONS

- The state should conduct a survey of the level of knowledge regarding water conservation and water use efficiency to help design the education program in terms of target audience and

geographic scope.

- The state should evaluate water use efficiency in selected areas of the state in order to target areas for concentration of the efforts to improve water conservation and water use efficiency.

SUMMARY OF THE RECOMMENDED ELEMENTS OF THE WATER USE EFFICIENCY PUBLIC EDUCATION PROGRAM

The following recommendations were developed by the Public Education Work Group. The Recommended Program includes recommendations for both short-term and long-term elements. The short-term recommendations includes those efforts which can be undertaken and which can accomplish their intended purposes in a short time period. These elements would serve to build awareness of the need to use water efficiently and the benefits of conservation to users. They are generally highly visible activities that would increase the awareness of easy-to-reach audiences. Long-term programs, although implemented immediately, would be part of an ongoing water use efficiency effort. These programs would be used to reach target audiences that are difficult to educate in the short-term, such as commercial users and school aged children. The long-term programs also would provide technical and "how to" information.

The recommendations are as follows:

Short-Term

- Disseminate the results and recommendations of the Water Use Efficiency Study to all interested user groups.
- Conduct a statewide media campaign about water use efficiency which includes using print, television, radio, billboards, displays, etc.
- Conduct a survey of the level of knowledge regarding water conservation and water use efficiency to help design the education program in terms of target audience and geographic scope.
- Develop videotaped water conservation messages for free use from video tape rental outlets. Such material should be developed in a variety of languages and for all age groups.
- Develop Water Efficiency Certification standards for consumer goods such as appliances and indoor and outdoor plants. Develop a water efficient logo for certified appliances and plants.
- Identify new means of disseminating information to specific target audiences.

Long-Term

- Compile and disseminate information on actual water needs for various uses (for example, the actual irrigation requirements of various crops, gardens, lawns, shrubs; instream needs of fisheries, recreation, and water quality, etc.).

- Develop specific "how to" information on how various users can identify inefficient uses of water and how they can make improvements in their efficiency of use. This would be accompanied by information analyzing potential water and money savings.
- Provide speakers to various local meetings and water use organizations (such as irrigation districts, water associations, utilities, etc.) to discuss the state's role in this area.
- Conduct biannual dramatic education programs to schools around the state. Support materials for the classroom should be provided to teachers.
- Develop teacher training workshops for which teachers receive continuing education credits. These workshops would serve to give background information on Washington's resources and environmental issues.
- Encourage and develop public/private partnerships to educate water users and foster conservation and improved water use efficiency.
- Encourage utilities to combine energy and water audit programs.
- Develop and implement a formal recognition program to acknowledge significant contributions and efforts to water conservation and improvements in efficiency of use by public and private organizations and individuals.
- Seek the establishment of private foundations in Washington State dedicated to the encouragement of water conservation and efficient water resources use through the development and dissemination of education materials.
- Evaluate water use efficiency in selected areas of the state in order to target areas for concentration of the efforts to improve water conservation and water use efficiency.
- Initiate an education program on the value of water reuse as a means of meeting future demands for water.
- Develop demonstration projects in selected areas of the state to demonstrate the feasibility and desirability of water conservation and improvements in water use efficiency to specific target audiences.
- Submit a bill to the Legislature requesting funds to establish public education programs in smaller utilities.
- Submit a bill to the Legislature requesting staffing and funding to further design and implement a comprehensive education program related to water conservation and efficiency of use. The Water Use Efficiency Public Education Workgroup has developed three alternative funding and staffing scenarios for the development and implementation of the public education effort. These are shown in Table 2.

TABLE 1

WATER USE EFFICIENCY EDUCATION AUDIENCES

Target Audiences	Education/information Needs	Timeframe
Water Utility Mngrs. Irrigation District Mngrs.	Benefits of conservation Alternate rate structures (i.e. water banks, impact on revenues)	Short/Long
Industrial Users	Water reuse/recycling technologies Water efficient equipment Case-by-case evaluation	Long-term
Commercial Users -Parks mngrs. -Architect/designers -Building operators -Public bldg. mngrs.	Benefits of Conservation Water efficient equip./appliances Water efficient plumbing design Equipment maintenance & operation for efficiency	Short/Long
Plumbers/Builders	Benefits of conservation Water efficient equip./appliances Water efficient plumbing design	Long-term
Appliance Manufact.& Purchasers	Awareness of water supply awareness Benefits of conservation Use water efficiency for marketing Water efficient equipment/appliances Appliance labeling/certification	Long-term
Recreational Users	Water supply awareness Instream flow needs Benefits of conservation	Short-term
Residential Users -Architect/designers -Minority population -Community groups/clubs	Awareness of water supply situation Benefits of conservation (media campaign) "how-to" conservation practices Alternate vegetation/landscape design	Short-term
Growers/Irrigators	Water scheduling methodology Pump efficiency testing Dryland crops Benefits of conservation	Short/Long

TABLE 1
(continued)

WATER USE EFFICIENCY EDUCATION AUDIENCES

Target Audiences	Education/Information Needs	Timeframe
County Extension Agents	Upgrade knowledge of conservation Technology and benefits Alternate role in community	Short-term
Schoolchildren/teachers	Water supply awareness Benefits of conservation "How-to" conservation practices Training for teachers	Long-term
Decisionmakers	Water supply awareness Benefits of conservation Water system planning Alternate rate structures	Short-term
Media	Water supply awareness Benefits of conservation Awards program for model water	Short-term

APPENDIX F

SUMMARY OF ORAL AND WRITTEN COMMENTS RECEIVED BY THE WATER USE EFFICIENCY STUDY COMMITTEE ON THE DRAFT WATER USE EFFICIENCY FINDINGS AND RECOMMENDATIONS

Oral comment was received at three public meetings held on the Draft Report of the Washington State Water Use Efficiency Study Committee in Spokane, Ellensburg, and Seattle on November 28, 29, and 30, respectively. Written comment was received by the Committee through December 7.

Oral and written comments are summarized herein according to five major categories: water utilities, agriculture, environment, Tribes, and unaffiliated. Within these categories, comment is summarized under common topics.

WATER UTILITIES

Written Responses Summarized:

Vera Water and Power
Puget Sound Council of Governments
Seattle Water Department
American Water Works Association - Pacific Northwest Section
Public Utility District No. 1 of Asotin County
The Lakeland Agency, Inc.
City of Yakima
City of Everett
Washington State Association of Water/Wastewater Districts

General

Improving efficiency is a responsibility of all interests, instream and out-of-stream. General support was expressed for conservation programs to stretch existing supplies. Conservation is not a panacea; additional new sources will be needed.

Coordination with the Joint Select Committee is encouraged. Report should identify an immediate action program for the Legislature.

Report should discuss how regulations to achieve improved water use efficiency would be enforced.

Organization of the report into three sections divides the state geographically and politically. A preferable format would organize findings and recommendations into demand management and use reduction.

New Sources

Desalinization and industrial reuse are potential sources which should be considered as efficient means to meet demand.

The report pays insufficient attention to water impoundment as a major efficiency measure. Impoundments could save significantly more water than can on-farm and conveyance improvements. Benefits, including electrical generation, should be identified. Report places undue emphasis on negative consequences of impoundments.

The report should give more attention to development of storage as an efficiency measure that can be beneficial to all uses, including instream uses.

Support for the use of lesser quality water for uses that do not require potable water was given.

Allocation

It is inappropriate for the Committee to recommend where water savings should go.

Rights should not be required for use of surface water from lakes for residential use (less than 5000 gpd). Such potential users should, therefore, be exempt from the current moratorium on the granting of new water rights.

Residential use should be recognized as the priority use.

The report places excessive emphasis on instream flow standards.

The recommendation that meeting instream flow standards be the priority use of conserved water may reduce incentives for conservation.

The benefit of conserved water should go to the water right holder in proportion to costs of increased water use efficiency borne by the holder.

Report should forbid new private water systems where public water systems exist.

Incentives/Funding

Support was expressed for the use of state water utility taxes to fund conservation planning as well as for implementing the Safe Drinking Water Act. Local option tax and user fees were questioned.

A tax on public and industrial outfalls would help protect water sources and might create an incentive for more efficient water use.

User fees on major instream users might pay some of the costs of meeting instream standards.

For improved watershed management, the report should consider a tax on timber.

Price structures can be a useful efficiency tool, but may be limited by political acceptability.

Approval is expressed for metering municipal use and for rates to reflect costs to the utility of meeting demand.

Pricing must remain under local control and incentives to investment in efficiency other than price should be emphasized.

General preference is expressed for incentives and cost sharing over regulation.

The cost of efficiency improvements should be borne by all beneficiaries and not only the water users themselves.

The report recommends state funding for efficiency improvements in the agricultural sector but relies on user charges in the municipal and industrial sector. The source of funding of improvements should be consistent between agriculture and municipal uses.

Purchase of conservation as a resource by utilities should be encouraged and legal obstacles to lending state credit should be overcome. Utilities, however, should not be exclusively responsible for costs of conservation measures which are justified only by broader public benefits. The state should assume the responsibility to supply funding for purchase of conservation in the same fashion as BPA now does for energy conservation.

A process should be specified to assure that expenditure of public funds will result in public benefits.

Water Marketing

Regulation of a voluntary market for water rights should be minimal.

Policy and Planning

Support for improved data collection on water use was expressed.

The report should identify early action measures that are not controversial and can be easily implemented. Planning should be used to resolve the more difficult issues.

Funding will be limited; recommendations, including those for education, must be prioritized.

Support is expressed for the concept of three tier (local, regional, state) planning.

New planning cannot do what thirty years of planning has not done in the Yakima basin.

Consideration should be given to a new state water board to propose and implement water policy.

Zoning provisions to increase lot size could reduce demand for utility services.

Support is expressed for education.

A conservation program is an appropriate element in a utility comprehensive plan. A common format for such programs should be established. Comparable provisions should be recommended for other major categories of users.

Planning should recognize uncertainty in supply as a major consideration.

Instream

The report fails to adequately discuss instream use efficiency measures as required by SHB 1594.

Excessive emphasis is placed on meeting instream flow standards.

The report should recommend legislative review of instream flow challenges.

Opportunities for increased instream efficiency receive less attention than other areas of potential efficiency. The Legislature needs to be informed of work required in this area.

AGRICULTURE

Written Responses Summarized:

Agrimanagement
CH2M Hill
Gene Jenkins
Kittitas County Cattlemen's Association
Kittitas Reclamation District
South Columbia Basin Irrigation District
Washington Cattlemen's Association
Washington Women for the Survival of Agriculture

General

Source for definitions used in the Agriculture Subcommittee report should be

indicated.

Large irrigation districts have structural inflexibilities that make on-farm conservation difficult to implement. Upgrading to closed systems and higher quality flow measurements devices in canals should be encouraged.

Most farmers tend to under-irrigate their crops now. The recommendations are too theoretical and general and therefore impractical.

New Sources

Inadequate attention is given to storage of excess runoff as an efficiency measure, particularly to the retention of spring runoff and to the use of aquifers for this purpose.

Due to the effects of clear cutting, there is more than usual spring runoff in many river basins; this water should be stored and utilized.

Upstream storage may enhance anadromous fish habitat downstream.

Allocation

"Water duties" (on-farm efficiency standards) should not be used to determine the quantity of water defining a legal right.

The concept of allowing conservers to use their savings is welcome.

Incentives/Funding

A general preference for incentive approaches over regulatory measures is indicated.

Allowing farmers to sell a prorated share of saved water commensurate with their investment in conservation measures would encourage farmer-funded conservation.

State law should allow operators who have saved water to sell that water either for out-of-stream use or to the state for instream flows.

The financial incentive of a personal property tax exemption for six years may not be long enough to make upgrading of delivery systems cost effective.

Policy and Planning

The Legislature should look at establishing "conservancy districts" that would supervise planning for an entire watershed.

Existing water rights are a constitutionally protected property right and

should not be subject to forced efficiency improvements. A concern is expressed that the recommendations indicate an intent to dictate governmental management of private lands.

The report needs to define how Washington state defines existing water rights, as transfer requires certainty of title.

The Legislature should provide for the marketing of water rights between irrigation districts.

Some are wary of water markets unless many legal restrictions exist.

Some question the effectiveness of basin or regional planning given the variability of farms. Others support the recommendation to study regional hydrologic effects before implementing conservation.

Agriculture should be strongly represented on any policy, procedural, fact finding, or other water use committee.

Support for the implementation of the public education component of report is given. Voluntary action will provide more lasting results.

The request for 4.75 FTE's for an education program may be excessive.

Some recommend the implementation of a conservation demonstration project in a river basin with little or no storage to demonstrate the effectiveness of both offstream and instream efficiency measures.

The Department of Ecology does not have the expertise to publish crop water requirements and should not be given enforcement power.

Instream

The wisdom of focusing efforts on streams with low instream flows was questioned, as instream flow restoration is not practical on every stream. Concern is expressed about any implication that tribal claims may be valid.

Under some circumstances water conservation may reduce fish and wildlife habitat and may require mitigation. The report should more explicitly address this in the conservation section of Appendix E-10B.

The intangible instream values are very difficult to evaluate and objectivity must be maintained during such an analysis.

Appendix E-10A recommends that there be an "explicit reflection of instream flow values in all out of stream uses"; it is unclear how that would affect agriculture.

ENVIRONMENT

Written Responses Summarized:

Icicle Chapter of Trout Unlimited
Washington Council of the Federation of Flyfishers
Wenatchee Valley Fly Fishers
Washington Environmental Council
Northwest Rivers Council
The Mountaineers

General

Committee should recognize the connection between forest management, as a major source of runoff, and water quality and availability.

Report should be clearer as to how this draft report fits in with the report of the Joint Select Committee.

The two subcommittee reports are inconsistent and need to be integrated.

The structure of the Committee protects consumptive interests and understates the importance of protecting the benefits accruing to the public from instream waters.

Objective criteria for water use efficiency should be included.

Findings and recommendations in the report should encourage the Department of Ecology to develop more comprehensive data on existing water uses throughout the state.

New Sources

Storage as a new source should be the method of last resort, and then should allow for established instream flows.

Allocation

Water saved through efficiency should be considered to be in the public domain. The priority use of saved water should be instream flows in order to meet established standards. Water in excess of instream flow standards can be available for reallocation to other uses.

The public should not have to "buy back" water to replenish depleted instream flows.

Protection of existing levels of fish habitat and riparian ecosystems and enhancement of over-appropriated streams should not be sacrificed to competing interests.

Report must look at population growth patterns in Washington state and the limits that must be realized to that growth. Unless population growth is reduced, instream resources and values will be incrementally destroyed.

Incentives/Funding

The use of public funds to secure a reasonable level of efficiency was opposed; efficiency standards should be a condition of the existing water rights and should, therefore, be the appropriator's responsibility.

Support is expressed for a mix of regulatory measures, adjudications, penalties, and public education, in addition to the possible use of incentives. The use of existing regulations should be an immediate action to achieve increased efficiency. The use of marketing incentives and transfers require further study.

Water Marketing

General concern is expressed that marketing approaches will not protect the public trust in water.

Marketing of water should be approached with more caution than report reflects and should address how the public interest will be preserved.

Water pricing should reflect the true environmental costs of using water.

Policy and Planning

The report needs a clearer statement of fundamental principles of water use in the state that recognizes that water used both instream and out-of-stream is a public resource. Instream flows are essential for the protection of a variety of other valuable public resources, and water taken out of streams must be used efficiently to be of beneficial use.

General distrust of the recommendation to use a "least cost" approach to economic efficiency was expressed. The concern is that this economic analysis would not fully reflect environmental values. Economic tests, as discussed in report, are appropriate only for competing consumptive uses. Opposition was expressed to a balancing test that compares instream to out-of-stream values because of the difficulty in quantifying environmental values.

Instream

Disappointment is expressed that the public interest in maintaining and enhancing adequate instream flows has been subordinated to out-of-stream uses, and instream values will be accommodated only "if possible."

There is a general opposition to viewing spring runoff as excess water that would be available through storage. Spring freshets are essential for maintenance of fish and wildlife habitat and other instream values.

Incremental impacts of diversions have not been fully considered in the report.

Fish hatcheries are not a suitable solution to low fish production; hatchery fish do not compare favorably with wild fish. Hatcheries are generally not cost-effective when compared to propagation of wild fish.

Skepticism expressed to the approaches to instream flows, especially structural, which attempt to "manage" the resource to the degree found in the findings and recommendations.

"Instream efficiency" should be defined. Concern is expressed that "instream efficiency" means controlling water through dams, and/or addressing the need for fisheries habitat not by improving instream flows or protecting habitat, but by building fish hatcheries.

TRIBES

Written Responses Summarized:

Northwest Indian Fisheries Commission
The Suquamish Tribe
The Tulalip Tribe

General

The two subcommittee reports deal with related problems by completely different means. It would have been preferable to achieve an integrated report.

Findings that gaining 90% efficiency in agriculture is cost prohibitive and that most irrigation is reasonably efficient are based on conjecture and should not be included in the findings until documentation is available.

The report does not adequately address detrimental effects of agriculture such as nonpoint source pollution and problems associated with return flows.

New Sources

Source developments should be undertaken with caution. Augmentation of water with other sources must preserve instream flows in all waters affected.

Allocation

The tribes support removal of legal impediments to securing "salvaged" water for instream flows and other public purposes.

Metering is a reasonable means by which out-of-stream consumptive use can be monitored. This requirement should apply not only to municipal and industrial users but should apply evenly to all out-of-stream users.

The extent of claims by Indian tribes to reserved water rights for instream protection for anadromous fish is not uncertain, as the report indicates.

Incentives/Funding

Caution should be applied to any recommendation to use Centennial Funds for water conservation implementation measures by irrigators. This fund is already too small to carry out its stated purpose.

Water Marketing

Water marketing must be undertaken with caution. The sale of conserved water for other out-of-stream uses is not advocated unless and until instream flow values have been met first.

Planning and Policy

The tribes support and advocate a comprehensive water resources planning process with representation of various interests.

Some agree with including consideration of effects of conservation on wetlands and shallow aquifers as a component of the conservation assessment.

Water resource planning should be required on a regional basis. Tribal governments should take a lead role within their affected watersheds because of overriding federal and tribal interests.

Data collection and a planning process to establish instream flow levels for all river systems in the state should be funded and be listed as the primary activity.

Support is expressed for data collection and implementation of processes which will be used to set instream flow levels on all waters in the State's jurisdiction.

Instream

Protection of instream values is the driving force to this legislation and Senate Bill 6724.

Defining water efficiency as "the implementation of least cost means to meet water demands" does not adequately address instream flow values.

Some contend that instream values can be quantified. There is a real economic value in maintaining instream flow levels required to support fishery resources.

The agriculture report prioritizes instream flows for tribal fisheries. However, there are numerous other reasons for assigning adequate instream flows a high priority, such as protection and enhancement of non-tribal fisheries, water quality, recreation, and wildlife.

All waters that support tribal fisheries in their usual and accustomed areas should be given priority in the establishment of instream flows.

Fisheries resources have been guaranteed by the government. These resources are dependent on instream flows. Hatcheries are a costly alternative to instream flows.

There is support for aiming conservation at stream reaches with low level flows.

The marginal utility and diminishing returns analysis described in the report is inaccurate and misleading. The analysis is based on conjecture with little knowledge of the ecological system upon which instream resources are dependent.

UNAFFILIATED

Written Responses Summarized

Andrew Lewis
Patrick H. Kofmehl
Milly Radonovich

General

Landscaping for aesthetics and for surface water management requires irrigation. Requirements for such landscaping require reconsideration.

Extensive clearcutting of forests could have major impacts on runoff and aquifer recharge, and could significantly reduce local precipitation.

Allocation

A portion of conserved water should be returned to streams to assure adequate instream flow.

Incentives/Funding

Public funding, including tax incentives for investments in water efficiency, should be linked to public benefits.

Instream

Identification of instream values is important but difficult and merits special attention.

APPENDIX H

COMPARISON BETWEEN AGRICULTURE AND MUNICIPAL/INDUSTRIAL SUBCOMMITTEE REPORTS

Upon reviewing the reports of findings and recommendations of the Agriculture and Instream Flow and the Municipal, Industrial and Instream Flow Subcommittees, the full Committee recognized that alternative approaches to improving efficiency are reflected in those reports. The following comparative analysis is provided to facilitate the public's review.

1. Process - The Agriculture Subcommittee report outlines a planning process which provides a framework within which to improve efficiency. Agriculture Report (AR) at 1-4. The remaining findings and recommendations are discussed within the framework of that process. The "conservation plans" discussed in that report are in turn prepared and implemented as a component of an overall water resource plan for certain geographic areas. AR at 3, paragraph 2.

The Municipal/Industrial (M/I) report discusses a comprehensive water resource planning process. M/I at 3-5. The purpose of that planning process would be to effectuate the most efficient allocation of a particular region's water resources. Unlike the Agriculture report, however, the specific efficiency measures and policies, other than those relating to instream flows, are not discussed within the framework of the planning process or as a conservation component of that process.

2. Focus - The focus of the Agriculture report is a process for identifying economically efficient policies and measures which will improve the efficiency of water users. The recommendations of the Agriculture Subcommittee would result in water which is currently allocated for one use being made available for new uses, including instream flows and new agriculture. AR at 1-2, paragraph 4.

The focus of the Municipal/Industrial report is the establishment of a process and policy which will encourage the retention or movement of water to its most economically efficient use. M/I at 4, lines 8-9, 21-22. The recommendations of the Municipal/Industrial Subcommittee would result in water which is currently being used for various M/I purpose being stretched to preclude or delay development of new sources. M/I at 9 (Findings and Recommendations of Source Development). Those recommendations are also intended to minimize the "cost" of new source development, including social/environmental costs. While the M/I report does not contain a specific recommendation to reallocate water among the various instream and out-of-stream uses, it does make provision for exchange of water rights. M/I at 12.

3. Implementation - The Agriculture report recommends implementation of a pilot or "demonstration" project to test the conservation assessment and plan formulation process before implementing that process throughout the state. AR at 4, paragraph 4. That demonstration project would be implemented in an irrigation area with efficiency related problems identified in a statewide evaluation of irrigated areas. AR at 2, paragraph

2.

The M/I report recommends "model programs" as planning guides. M/I at 5, paragraph 2. The M/I report recommends that the preparation of plans be required. M/I at 4, lines 21-22. While the substantive content of such plans would not be mandated, the procedures for preparing the Regional and Local plans would be guided by the "model programs".

4. Planning Authority - The Agriculture report proposes formation of a "Conservation Plan Formulation" and "Implementation Oversight" Committees, made up of water users, members of the general public, and agency representatives to prepare basin or regional plans. AR at 3, paragraph 3.

The M/I report does not identify any particular entity to prepare regional plans, but appears to recommend preparation of local water supply plans consistent with regional plans. M/I at 4-5, paragraph 2. The M/I report does not have any recommendation for an implementation committee.

5. Financial Assistance - The M/I report does not discuss specific grant and loan programs currently available as does the Agriculture report. AR at 6-7.

The Agriculture report does not recommend any new, alternative sources of funding for efficiency programs as does the M/I report. M/I at 5, paragraph 3. The Agriculture report does recognize that projects funded under state and federal clean water programs can also improve water use efficiency. AR at 6-7, 12-13. The M/I report does not explicitly discuss this relationship.

6. Transfers/Marketing - The Agriculture report sets forth principles and procedures for implementing a water transfer process. AR at 8-10. While the M/I report does recommend that various entities be permitted to purchase and sell existing water rights (M/I at 12), it defers more specific action on such proposals to Joint Select Committee. M/I at 15-16.

7. Adjudications - The Agriculture report recommends that adjudications not be regarded as a preferred water efficiency tool. The M/I report does not discuss adjudications as a tool to promote water use efficiency and water transfers.

8. Instream Use Efficiency - The two reports appear to discuss instream use efficiency in different contexts. The Agriculture report discusses instream flow levels in terms of marginal productivity for fish. Conservation efforts to improve instream flows are discussed in terms of marginal return (increased fish productivity) per unit investment (level of investment in irrigation efficiency improvements).

The M/I report recommends that instream efficiency be evaluated in terms of the value of water in alternative uses and costs associated with reductions in such values. The M/I report recommends that value to society determine efficient levels of instream flows. Two distinct approaches to achieve instream efficiency were considered: watershed management and enhancement to improve streamflow regimes, water quality and riparian habitat; and structural measures to benefit instream uses, primarily hatcheries, spawning channels and impoundments. A detailed list of potential instream mitigation

techniques is included in Appendix E-7.

9. Instream Resource Values - The M/I report recommends the use of habitat enhancement techniques, in addition to increased flow levels, to improve or maintain natural fish production and other instream resource values. M/I at 5-8. Such techniques would be compared to the costs of maintaining or achieving specific instream flows in determining the most cost effective means to protect instream values. The benefits of such techniques in relation to their costs should determine the efficient level of investment in such techniques.

The Agriculture report discusses the utilization of hatcheries as an alternative to natural production. AR at 12. The Agriculture report does not explicitly discuss instream values other than fish or instream efficiency measures, but does recommend that low flow reaches be given priority for efficiency efforts and recommends close coordination with fish and wildlife plans. AR at 12.

10. Re-use - The M/I report makes comprehensive recommendations concerning water re-use. M/I at 12-13. The Agriculture discusses water re-use in the context of the use of irrigation return flows by downstream irrigators. AR at 1-2.

11. Efficiency Standards - The M/I report recommends that efficiency standards be adopted for certain user groups. M/I at 13-15. The Agriculture report does not contain a recommendation for specific efficiency standards. AR at 6. The Agriculture report does recommend that "criteria" for evaluating "reasonably efficient" practices be identified where practicable. AR at 6. The Agriculture report also recommends adoption of "guidelines" for crop requirements and conveyance efficiency. AR at 6.

12. Water Quality/Quantity Coordination - The Agriculture report more explicitly recommends coordination of water quality and water quantity planning. AR at 12-13. More discussion of this issue is found at 5. above.

APPENDIX I

ADDITIONAL ISSUES RECOMMENDED FOR FURTHER EXAMINATION

In the course of reviewing the recommendations of the Agriculture and Instream Flow and Municipal, Industrial and Instream Flow Subcommittee reports, some members identified certain issues which they believe require additional examination and discussion as those reports are put before the public. These issues are listed and briefly explained below.

1. Planning Process - How will the different assessment and planning processes described in the two Subcommittee reports be coordinated? Where the two processes conflict, how will those conflicts be reconciled?

Concern was also expressed that the proposed planning processes appear to be open-ended with no commitment for closure within a foreseeable time-frame. Some members were particularly concerned that the reports gave no clear indication of what efficiency efforts would/could be undertaken in the interim before the plans are prepared.

2. Definitions - The Committee was asked to review the need to define key terms relating to water use efficiency needing definition or clarification. A number of terms were identified in the Revised Code of Washington and Administrative Code. Other terms which may need definition were identified by certain Committee members. Appendix E-11 contains a lengthy list of efficiency related terms identified. The full Committee did not have time to agree on definitions for those terms, although the Agriculture Subcommittee did agree to definitions of some key terms which were used in that Subcommittee's recommendations. The full Committee did agree, however, that reviewing key terminology and development of definitions, where appropriate, should be a priority with the Joint Select Committee on Water Resource Policy. Four terms or concepts appearing in both reports which were identified as needing special attention are:

- a) Least Cost Planning
- b) Mitigation
- c) Re-use
- d) Beneficial Use/Waste

3. Water Quality/Quantity Coordination - There was discussion among members of the full Committee concerning the rationale for seeking clean water funds for efficiency related projects. Concern was expressed that competition for those funds, particularly the Centennial Clean Water Funds, was already too high. Some members felt that the relationship between water quality and water quantity (efficiency) projects needs better definition. The discussion in the two reports with respect to the water quality/efficiency relationship, particularly as it relates to financial assistance, needs further examination.

4. Allocation of "Saved" Water - There was some concern expressed regarding the procedures and criteria for allocating the right to use water saved through the implementation of conservation practices. Of particular concern was the allocation of water saved where public financial assistance is involved.

5. Public Funding - Some members question the use of public money for cost-sharing in water conservation projects. They are concerned about the possibility of public money being used to create private benefits.

6. Instream Flows and Values - There was discussion by the full Committee concerning the need to reconcile the two reports with respect to their treatment of instream resource values and instream efficiency. The values considered and the process for incorporating those values into decisionmaking were recognized as needing further examination.

Some members question the Agriculture Subcommittee's analysis of diminishing returns to higher instream flows. They also question the suggestion that hatcheries may be a solution for "efficient" fish production.

The recommendation to allow purchase of existing water rights to achieve instream flows raised some concerns regarding the source of funds for this purpose. An alternative would be to achieve improved flows through a regulatory approach for existing water rights.

7. Least Cost - Concerns were expressed that the least cost source of water may not be the most practical or desirable.

8. Mitigation - What constitutes acceptable mitigation for the loss of wetlands or stream habitat or other instream values? Who should be responsible to mitigate losses that could result from some forms of water use efficiency improvements?

9. Non-irrigated Agriculture - Concern was expressed that agricultural practices other than irrigation have received no attention, particularly stock grazing on riparian land. Some members assert that riparian grazing affects flow regimes, water quality, and instream values and thereby affects considerations of water use efficiency.

10. Storage - The environmental cost of additional water storage needs further examination.

11. Public Trust Doctrine - Should the public trust doctrine be considered in the context of achieving efficient water allocation?